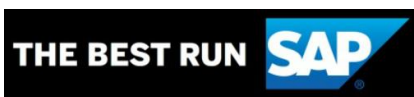# State of Arkansas

Request for Proposal SP-18-0087 for SAP HANA Upgrade Installation Services

April 20, 2018

THE BEST RUN **SAP**

DOCUMENT IDENTIFICATION

Document Authors   SAP Public Services, Inc.

Prepared by   Mr. Satish Mani

Effective Date   April 20, 2018

Proposal Validity

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SAP warrants that to the best of its knowledge those who prepared this material have taken all reasonable care in preparing it and believe its contents to be true as at the date of this document. SAP cannot however warrant the truth of matters outside of its control and accordingly does not warrant the truth of all statements set out in this document to extent that such statements derive from facts and matters supplied by other persons to SAP. The statements in this document are qualified accordingly.
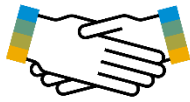
SECTION T-1: COVER LETTER / EXECUTIVE SUMMARY

1.0 PROPOSAL SIGNATURE PAGE

Type or Print the following information.

PROSPECTIVE CONTRACTOR'S INFORMATION						
Company:	SAP Public Services, Inc.					
Address:	1300 Pennsylvania Avenue NW The Ronald Reagan Building / International Trade Center North Tower / Grey / Suite 600					
City:	Washington		State:	DC	Zip Code:	20004
Business Designation:	☐ Individual ☐ Sole Proprietorship ☐ Public Service Corp ☐ Partnership ☒ Corporation ☐ Nonprofit					
Minority and Women-Owned Designation*:	☒ Not Applicable ☐ American Indian ☐ Asian American ☐ Service Disabled Veteran ☐ African American ☐ Hispanic American ☐ Pacific Islander American ☐ Women-Owned AR Certification #: _____ * See *Minority and Women-Owned Business Policy*					

PROSPECTIVE CONTRACTOR CONTACT INFORMATION			
Provide contact information to be used for bid solicitation related matters.			
Contact Person:	Mr. Satishkumar Mani	Title:	
Phone:	(713) 953-3643	Alternate Phone:	(832) 434-7719
Email:	Satish.Mani@sap.com		

CONFIRMATION OF REDACTED COPY
☐ YES, a redacted copy of submission documents is enclosed.
☒ NO, a redacted copy of submission documents is <u>not</u> enclosed. I understand a full copy of non-redacted submission documents will be released if requested.
Note: If a redacted copy of the submission documents is not provided with Prospective Contractor's response packet, and neither box is checked, a copy of the non-redacted documents, with the exception of financial data (other than pricing), will be released in response to any request made under the Arkansas Freedom of Information Act (FOIA). See Bid Solicitation for additional information.

ILLEGAL IMMIGRANT CONFIRMATION
By signing and submitting a response to this *Bid Solicitation*, a Prospective Contractor agrees and certifies that they do not employ or contract with illegal immigrants. If selected, the Prospective Contractor certifies that they will not employ or contract with illegal immigrants during the aggregate term of a contract.

ISRAEL BOYCOTT RESTRICTION CONFIRMATION

ISRAEL BOYCOTT RESTRICTION CONFIRMATION

By checking the box below, a Prospective Contractor agrees and certifies that they do not boycott Israel, and if selected, will not boycott Israel during the aggregate term of the contract.

☒ Prospective Contractor does not and will not boycott Israel.

An official authorized to bind the Prospective Contractor to a resultant contract shall sign below.

The signature below signifies agreement that any exception that conflicts with a Requirement of this *Bid Solicitation* **will cause the Prospective Contractor's proposal to be disqualified.**

Authorized Signature: _____   **Title:** Corporate Counsel

Use Ink Only.

Printed/Typed Name: Jonathan Miller   **Date:** 4/10/18

2.0 Executive Summary

Instructions: Provide a brief (three [3] to five [5] page) summary of the key aspects of the Prospective Contractor's Technical Proposal. The Executive Summary should include an overview of the Prospective Contractor's qualifications, approach to deliver the services described in the RFP, time frame to deliver the services, proposed team and advantage of this Proposal to DFA.

In today's highly competitive economy, the ability to make quick and informed decisions. based on reliable and accurate data, is what distinguishes leading state government agencies. The State of Arkansas executives, employees, and end customers (constituents) require this capability; and therefore, must have access to current technologies and systems that support the State of Arkansas's business processes. SAP Digital Business Services (SAP DBS) understands the strategic importance of this project, "SAP HANA Upgrade", which includes the migration of; SAP ECC systems to SAP's Business Suite on HANA platform (SoH), Unicode migration, and migrating the SAP BW system to SAP Business Warehouse for HANA.

SAP DBS is the services arm of SAP. In the entire SAP ecosystem, we are the only entity with unparalleled access to SAP executives, product experts, and development support network. Our solutions have enabled customers to address their unique business needs for 45+ years, in over 100,000 SAP implementations across 120 countries. We build solutions for organizations across 25 industry verticals, including Public Sector and state and local government agencies. A few metrics related to our SoH Migration experience are:

- 600+ SoH Migrations: We have delivered over 600 SoH Migrations
- 5+ years of SoH Migration Experience: SAP DBS has been delivering successful SoH Migrations since the launch of SoH.
- 700+ experts: We have over 700 plus Migration Experts on our staff.
- Experience: Across our consulting staff, 90% of our staff have an average of 15 years of experience.

Although the above statistics are impressive, we understand that what really matters is the team that will be directly involved with your migration, we have included representative resumes in this proposal, and we are committed to staffing the project with an experienced and proven team.

The State of Arkansas and SAP DBS have been working together for over 17 years. This experience gives us confidence in our understanding of the project scope, our proposed project plans, timeframes, and budgets that make up this proposal. But more importantly, our shared experience with the State of Arkansas gives us confidence that SAP DBS' services and solutions will provide unique and discerning value for the State of Arkansas.

Proposed Solution

The State of Arkansas is seeking a partner to manage migration from the current version of SAP software to SAP Suite on HANA (SoH).

SAP Digital Business Services offers a combination of SAP experts, methodologies, and tools. We have streamlined our approach to migrations to decrease time to value based on experience, knowledge, and an understanding of best practices for the State of Arkansas. Our hybrid, agile project methodology, ACTIVATE, significantly differentiates us in the market. This proven delivery model based on Best Practices, along with fine tuning it to meet the State of Arkansas' specific business needs, will facilitate 'Quick Time to Value', reduced risk, and successful adoption by the State of Arkansas's end user community.

SAP Services Value Differentiators:

- Taking full accountability and driving program execution for your success
- Aligning program objectives and the State of Arkansas' goals
- Focusing on AGILE Activate execution to speed time to value
- Providing rigor in implementation methodology, governance, and quality standards
- Facilitating technical risk mitigation through standard analysis and practices
- Enabling co-innovation

The chart below is a high-level summary of our proposed project timeline. We are estimating 20 weeks from project start to Production/Go-Live, followed by 4 weeks of Post Go-Live Support to ensure a successful and smooth transition into production.

ACTIVITIES	RESP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Project Setup & Concept		2 weeks																					
Quality Gate	SAP			◆																			
Cycle 1 - Sandbox Migration																							
Quality Gate	SAP										◆												
Cycle 2 - Development Migration																							
Quality Gate	SAP													◆									
Cycle 3 - QA Migration																							
Quality Gate	SAP																			◆			
Cycle 4 - Dry Run and Cutover planning																							
Quality Gate	SAP																		▮	◆			
Cycle 5 - Production Cutover and Go-Live																							
SAP ERP - Unicode Conversion and HANA Migration (DMO)	SAP																				★		
Post Go-Live (PRD System powered by HANA)																						4 weeks	
Quality Gate	SAP																						◆

Helping Our Customers Do What They Do Best, Even Better

No one understands the State of Arkansas better than the State of Arkansas team themselves. Similarly, no one understands SAP better than SAP themselves. Together we win and enable success. SAP prides itself on our customer's successes. We strongly believe that the continued success of our customers is the best illustration of how SAP can help the State of Arkansas run even better and be a 'Best Run State Agency'

While customer successes are highlighted in the relevant sections of this RFP, we have inserted a brief extract as an example. Mike Mattos; Chief of Facilities & Business Support Services Division at **Sacramento Regional Transit District (SRT) –**

"Our SAP project was delivered on time, under budget and no significant issues throughout the project. The cost of this project was a 3rd of what I had expected. SRT is thrilled with the value that SAP Consulting brought to this project and we are delighted with the end results.

SRT believes that a key success factor in new functionality deployment is to have SAP as the prime services provider. Benefits of having SAP as the prime include access to SAP's global development network, the ability to leverage key skilled consultants when needed, and having access to an extensive knowledge capital found in no other consulting Organization"

Our Vision for Your Success: Run Better with SAP

SAP's Quality Assurance, Project Management, and Governance teams follow a time proven methodology to identify potential risks early, address, and resolve the risks in a manner that minimizes any negative impact on the project. The Project Management and Governance teams provide critical feedback with dashboard reports to State of Arkansas management to address the "state of the project" and suggest proactive actions to bring projects back on track if needed. It adheres to SAP's best practices, and one good example is guidance on issues like customization when workaround options exist within standard SAP. The dashboard reports allow the State of Arkansas team to make joint informed decisions based on available data.

By partnering with SAP DBS, the State of Arkansas does not contract a few individual consultants, but rather with representatives of a global enterprise software development and support organization with adherence to best practices. We leverage the power of this global team of professionals to support and enable one goal:

SAP wants to enable the State of Arkansas to be a "best-run state government agency amongst your peers".

3.0 Prospective Contractor Contact Information

Instructions: Complete the following information regarding the Prospective Contractor's organization. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

Table 1.   Prospective Contractor Profile

PROSPECTIVE CONTRACTOR ORGANIZATION PROFILE	
Name of Parent Company	SAP SE is our German-based parent company. SAP America, Inc. is based in the US and is a wholly owned subsidiary of SAP SE. SAP Public Services, Inc. is a wholly owned subsidiary of SAP America, Inc.
% of Revenue from State and Local Government Clients in the United States	SAP doesn't report by revenues by market segment. Refer to our enclosed financial reports for available revenue information.
Number of Years in Business	SAP was established in 1972.
Number of Years Prospective Contractor has been Providing the Type of Services Specified in the RFP	SAP Suite on HANA (SoH) was launched in 2013, and SAP DBS has been performing SoH Migrations since the launch of SoH. SAP DBS have performed over 600 successful SoH Migrations.
Number of Employees Providing the Type of Services Specified in the RFP	As of December 31, 2017, SAP has 17,379 employees globally in the Professional Services organization of our company.

3.1 Subcontractor Contact Information (If applicable)

Instructions: Complete the following information regarding the subcontractor's contact information. If more than one subcontractor is proposed, add more Tables as necessary. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

SAP is not proposing the use of any subcontractor with our proposal response.

Table 2.   Subcontractor Contact Information

COMPANY INFORMATION:	
Company Name:	Not applicable.
Address:	Not applicable.
City, State & Zip Code:	Not applicable.
Company Type (Check One):	☐Private ☐Public
Company Size:	Not applicable. (Total Number of Employees)

Annual Revenue:	Not applicable.		
PRIMARY CONTACT INFORMATION:			
Name:	Not applicable.	Title:	Not applicable.
Address:	Not applicable.		
City, State & Zip Code:	Not applicable.		
Phone:	Not applicable.	Fax:	Not applicable.
E-mail:	Not applicable.		

Table 3.   Subcontractor Profile

SUBCONTRACTOR ORGANIZATION PROFILE	
Subcontractor Name	Not applicable.
Headquarters Location	Not applicable.
Date Founded	Not applicable.
Services to be Provided	Not applicable.
Experience of Subcontractor in Performing the Services to be Provided	Not applicable.
Brief Description and Number of Projects that Prospective Contractor has Partnered with this Subcontractor on	Not applicable.
Locations Where Work is to be Performed	Not applicable.

4.0 Minimum Mandatory Qualifications

The Prospective Contractor must provide clear, compelling justification that it meets all of the Minimum Mandatory Qualifications. The Prospective Contractor is encouraged to provide ample references to information contained in the Proposal that supports its attestation. Prospective Contractor's that fail to provide clear, sufficient evidence that they meet the Minimum Mandatory Qualifications may be subject to disqualification. OSP and DFA may ask for additional clarifications relating to the Minimum Mandatory Qualifications prior to determination of compliance.

Instructions: Complete the following information regarding the Prospective Contractor's ability to meet the Minimum Mandatory Qualifications. Provide specific references to Proposal locations that support the Prospective Contractor's assertions that it meets the Minimum Mandatory Qualifications. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

Table 4.   Minimum Mandatory Qualifications

#	QUALIFICATION ITEM	DOES THE PROSPECTIVE CONTRACTOR MEET QUALIFICATION ITEM?		REFERENCE TO PROPOSAL RESPONSE SECTION
1	Contractor **must** have a SAP Partner Center of Expertise Certification (SAP PCOE certification). (Provide information in Template T-2)	YES ☒	NO ☐	Section 2.2, SAP Certification
2	Contractor's technical staff **must** be SAP HANA certified. (Provide information in Template T-3)	YES ☒	NO ☐	Section 2.2, SAP Certification
3	Contractor staff **must** be SAP HANA certified. (Provide information in Template T-3)	YES ☒	NO ☐	Section 2.2, SAP Certification
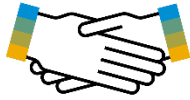
SECTION T-2: PROSPECTIVE CONTRACTOR EXPERIENCE

1.0 Prospective Contractor Corporate Background and Experience

1.1 Prospective Contractor's Corporate Background

> The Prospective Contractor should describe its corporate background to provide context of the organization that will be providing the services in this RFP.
>
> **Instructions:** Describe the Prospective Contractor's corporate background as it relates to projects similar in scope and complexity to the project described in this RFP.

The SAP DBS organization provides consulting, education, custom development, and support services. We offer a simplified engagement model for continuous solution optimization, innovation delivery, and value realization across analytics, applications, and technology areas. We deliver quality, short time to value, and reduced implementation cost with our strong industry expertise, our outcome-based portfolio, and our pre-assembly delivery model.

Digital Business Services Organization

Our 25,000+ Service & Support professionals focus on business outcomes for a faster time to value and reduced total cost of implementation and ownership. We bring together all the expertise required to help be successful with your SAP solutions. Whatever level of service you need, our services organizations will come together as one team to support your requirements. We can support you directly, or through your partner of choice.

25,000+ professionals worldwide

Located in **70 countries,** serving customers in **130+ countries**

Quick Facts on Digital Business Services

- **7** global support centers and **16** development centers worldwide; training facilities in over **50** countries
- **15,000** engagements each year
- **25,000+** certified consultants and support professionals
- **250,000** customers
- **500,000** individuals trained each year
- **1,200,000** development days delivered to this day

Why Choose Digital Business Services?

Our approach to support digital transformation is focused on business outcomes. We offer a simple portfolio and a single contract to meet the needs of a digital business. We also remain committed to providing embedded support with all our deployment options from day one.

Five reasons to choose Digital Business Services

Leveraging our 25,000 experts and a single, comprehensive platform, we deliver outcome-based results with greater collaboration, flexibility, and vision in a direct, simplified engagement.

1	**SIMPLICITY**	We offer a simple, end-to-end portfolio; we advise, deploy, and support by implementing only what is necessary.
2	**OUTCOMES**	We focus on business outcomes for faster time to value.
3	**EXPERTISE**	We use our industry expertise to help our customers translate creative ideas into new digital business models.
4	**COST**	We apply our strong global presence to reduce deployment costs by providing the right skills at the right time.
5	**STANDARDS**	We co-engineer with our customers and partners to deliver standard cloud computing, remotely, in one contract.

We offer a simple, end-to-end portfolio; we advise, deploy, and support by implementing only what is necessary. Our engagement model provides the right services throughout every phase of your

life cycle—from planning to building to running your solution. Whether implementing SAP applications out of the box or developing business process extensions, we can support the State of Arkansas every step of the way.

We focus on business outcomes for faster time to value. Our consultants focus on optimizing service delivery with model-company and model-solution approaches. They deliver business outcomes successfully as quickly as possible with smaller teams, while driving costs down for the State of Arkansas. Our SAP Activate implementation methodology and project management models are based on best practices to leverage the value of your SAP investments effectively through all phases of your project.

We use our industry expertise to help our customers translate creative ideas into new digital business models. With over 40 years of experience, we offer unmatched expertise and capabilities to help the State of Arkansas create and realize business value. Our experts combine solution know-how and industry-specific process expertise with data analytics to define and deliver the right digital reference architecture.

We apply our strong global presence to reduce deployment costs by providing the right skills at the right time. We support more than 335,000 customers and 25 industries in over 190 countries. This gives us the global presence, experience, and expertise to help meet the unique business needs of the State of Arkansas. You have direct access to our development organization and our complete network. With qualified experts and partners around the world, our ecosystem can address your unique challenges.

We co-engineer with our customers and partners to deliver standard cloud computing, remotely, in one contract. Our consultants work with more customers in newer solution areas and technologies than most competitors with less experience. We deliver comprehensive services for cloud solutions (more than 2,500 services for HR, supply chain, procurement, finance, sales, enterprise cloud, assessment, onboarding, learning services, and hybrid cloud scenarios) and in-memory computing (more than 2,000 global services). We can also help the State of Arkansas influence future innovation developments and road maps.

Overview of the SAP Digital Business Services Portfolio

We offer comprehensive services and support to help our customers maximize the value of their SAP investments. Our portfolio builds on tested business processes with clearly defined cost and scope. This allows us to deliver fast and cost-effective value and greater predictability to our customers, while lowering the services-to-software ratio.

We take a holistic approach to the entire application lifecycle. This approach incorporates a broad array of methodologies, tools, and certified partner offerings to help our customers gain value from their SAP investment while meeting their business needs. Services are tightly integrated with our development organization and contribute to a closed customer-feedback loop to the development organization, building end-to-end risk and quality management into the entire customer lifecycle.
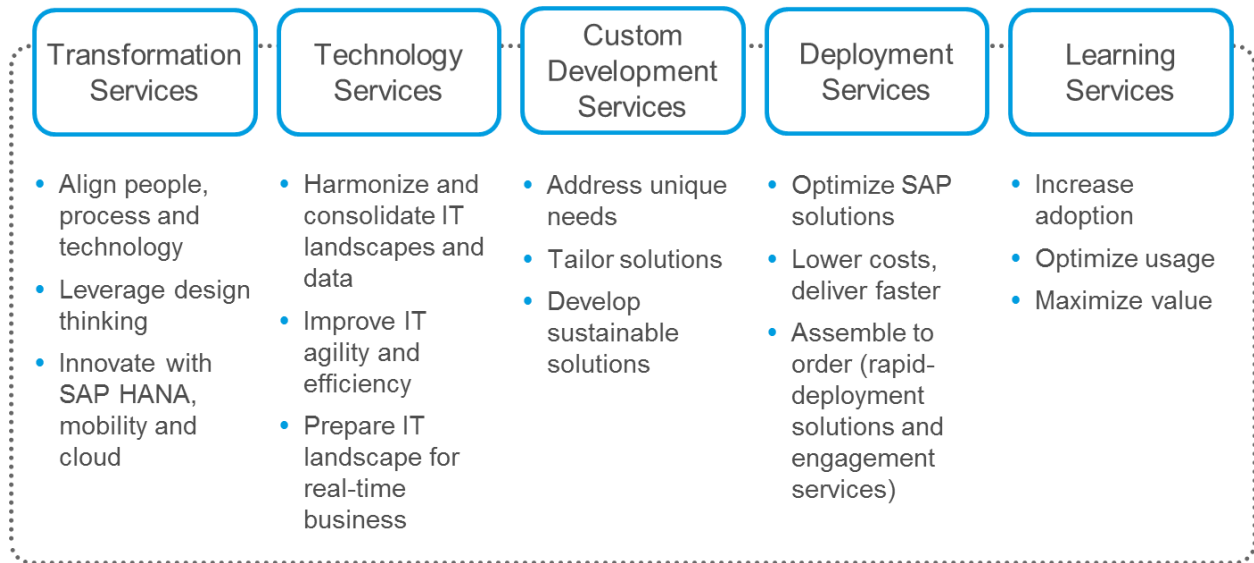
- Our **Big Data consulting services** help transform your IT infrastructure and implement Big Data technologies that let you capture, store, and leverage data-driven insights in real time.
- Our **business transformation services** help close the gap between strategy and execution by aligning your people, processes, and technology to your corporate goals using industry-specific best practices and expertise.
- Our **cloud professional services** help develop a cloud road map, execute your migration, securely manage your hybrid or cloud infrastructure, and move to cloud managed services like Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS).
- Our **custom application development services** help modify and tailor your solutions to meet your unique business needs.
- Our **Internet of Things consulting services** help create and execute a successful Internet of Things or machine-to-machine (M2M) strategy.
- Our **learning services** help drive adoption of your solution throughout your organization and ensure your workforce has the tools they need to meet your objectives.
- Our **managed services** help deploy, manage, monitor, and optimize your SAP solutions and business processes in on premise and cloud environments.
- Our **rapid-deployment solutions** are preconfigured software and service packages that simplify the delivery approach and use best practices to deploy quickly, predictably, and affordably.
- Our **SAP HANA Enterprise Cloud consulting services** help maximize the value of SAP HANA in-memory technology.
- Our **support and maintenance services** provide around-the-clock technical support in every region, as well as preventive support to protect and enhance our customers' investments in SAP technology and software, regardless of how they are deployed.
- Our **user experience design services** help build role-based, customized solutions to improve user efficiency, effectiveness, and satisfaction.

We also offer specialized services:

- For **specific industries**: automotive, manufacturing and high tech, product lifecycle management/R&D and engineering, telecommunications
- For **specific lines of business**: finance, human resources

SAP Digital Business Services Portfolio

SAP offers a broad range of services to cover our customers' end-to-end digital transformation journey, ranging from advising on and planning a digital innovation road map, to implementing with proven best practices, supporting all deployment models, and optimizing for continuous innovation. SAP provides both choice and value in our services, allowing you to tailor the best approach based on your needs and approach.

Transformation Services	Technology Services	Custom Development Services	Deployment Services	Learning Services
• Align people, process and technology • Leverage design thinking • Innovate with SAP HANA, mobility and cloud	• Harmonize and consolidate IT landscapes and data • Improve IT agility and efficiency • Prepare IT landscape for real-time business	• Address unique needs • Tailor solutions • Develop sustainable solutions	• Optimize SAP solutions • Lower costs, deliver faster • Assemble to order (rapid-deployment solutions and engagement services)	• Increase adoption • Optimize usage • Maximize value

1.2 SAP HANA Upgrades completed in the Public Sector in the Last Five Years

> The Prospective Contractor should list all SAP HANA upgrades that were completed/finished or were active in the last 5 years in the Public Sector.
>
> **Instructions:** Provide a listing and contact information for all SAP HANA upgrade contracts in the last five (5) years. Denote any that are pending litigation or have been terminated for cause or convenience. Provide the same information for each subcontractor, associated company, consultant and entity that will be involved in any phase of this engagement. Duplicate the table for each entity in the Proposal. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

Table 1.   SAP HANA Upgrades Completed in the Last Five (5) Years

SAP DBS has been delivering successful SoH migrations since the launch of SoH in 2013. SoH migrations have become part of our mainstream business. As a result of the widespread adoption of SoH by our customers, we no longer track the individual project statistics as there is a such high-volume of SoH migrations. Overall, we've been engaged on over 600 SoH projects since the SoH launch in 2013, of those 53 were in the public sector, utilities, or higher education space.

Due the large number of SoH migrations, and the fact that we no longer track individual SoH migration projects, we cannot populate Table 1. However, we can provide as many specific references, in addition to the three listed in this proposal, as the State may require.

REF #	ENGAGEMENT NAME	CUSTOMER NAME	CUSTOMER CONTACT	PROJECT DURATION	BUSINESS DISPUTE?
1					YES ☐ NO ☐
2					YES ☐ NO ☐

3					**YES** ☐	**NO** ☐
4					**YES** ☐	**NO** ☐
5					**YES** ☐	**NO** ☐

2.0 Prospective Contractor References

To realize the objectives stated as part of the RFP, the State of Arkansas is issuing this RFP to contract with a Contractor who has experience upgrading SAP environments to HANA. As such, the State has established mandatory qualifications that **must** be met in order to submit a proposal to this RFP, see Section 2.3 of the RFP.

To satisfy this requirement, include at least three (3) references (for the Prime Contractor) of projects which are of similar size, complexity and scope to this engagement, that have either completed within the last five (5) years or are active projects. At least two (2) of the references **must** be from HANA 2.0 upgrade projects. Each reference chosen should clearly demonstrate the Prospective Contractor's ability to perform the Scope of Work described in the RFP.

Instructions: Provide the information requested in the Tables below. The Tables may be replicated if the Prospective Contractor would like to include more than three (3) references. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

Table 2.   Reference 1

PROSPECTIVE CONTRACTOR INFORMATION	
Name: SAP Public Services	Contact/Name: Randall Townsend
Project Dates: Oct. 2014 – March 2015	Contact Phone:678-428-7495
CUSTOMER INFORMATION	
Customer Organization: **Weill Cornell Medicine**	It is SAP's policy to coordinate reference discussions with Weill Cornell Medicine at an appropriate time. We therefore do not include contact details in RFP responses. This facilitates a better use of time and resources by providing Weill Cornell Medicine visibility to the areas that the State of Arkansas would like to cover prior to the discussion. We look forward to working with the State of Arkansas team to schedule.
	Customer Phone:
Customer Address:	Customer Email:

Information Technologies & Services 575 Lexington Ave, 9th floor, Room 962 New York, NY 10022	Customer Fax:

PROJECT INFORMATION	
Total Prospective Contractor Staff:	Delivery Executive, Project Manager, Database architect, Cloud Migration Lead, Functional Leads FI,MM,HCM

Project Objectives: Accelerate adoption of latest In Memory technology.

Project Description:
Migration of WCM landscape to SAP's HANA Enterprise Cloud (HEC)

Prospective Contractor's Involvement (Role and Scope):
Lead the migration of all the customer landscapes from ECC Oracle to HANA. Provided PMO, and technical leads.

PROSPECTIVE CONTRACTOR KEY PERSONNEL ASSIGNED TO PROJECT	
Name: (Add more rows as needed)	Role: (Add more rows as needed)
Name: (Add more rows as needed)	Role: (Add more rows as needed)

PROJECT MEASUREMENTS				
Estimated Start & Completion Dates	From:	Oct. 2014	To:	Mar. 2015
Actual Start & Completion Dates	From:	Oct. 2014	To:	Apr. 2015

Reason(s) for Difference Between Estimated and Actual Dates:

Added an extra mock conversion cycle to verify the team was prepared for cutover.

If the Prospective Contractor performed the work as a subcontractor, the Prospective Contractor should describe the scope of subcontracted activities:

Table 3.   Reference 2

PROSPECTIVE CONTRACTOR INFORMATION	
Name: SAP Public Services	Contact/Name: Randall Townsend
Project Dates: 01/19/2018 – 09/30/2018	Contact Phone: 678-428-7495
CUSTOMER INFORMATION	
Customer Organization: State of Michigan	Customer Contact Name: It is SAP's policy to coordinate reference discussions with State of Michigan at an appropriate time. We therefore do not include contact details in RFP responses. This facilitates a better use of time and resources by providing the State of Michigan visibility to the areas that the State of Arkansas would like to cover prior to the discussion. We look forward to working with the State of Arkansas team to schedule
	Customer Phone:
Customer Address: 525 W Allegan St. Lansing, MI 48913-0001	Customer Email:
	Customer Fax:
PROJECT INFORMATION	
Total Prospective Contractor Staff:	Delivery Executive, Project Manager, Quality Director, HANA Platform Architect, TRM (Application) Consultant, Technical Leads for- CRM, BW, ERP, Solution Manager, PI, and Security.
Project Objectives: To migrate from legacy database technology to in-memory technology to drive performance and scale. To modernize the State's technology portfolio, and position the State for future technology enhancements and innovation. To deliver substantial productivity improvements to the State's tax processing operations.	
Project Description: Upgrade from SAP EHP 5 to EHP8. Migrate to in-memory technology. Move from on-premise to SAP Secure Cloud environment	
Prospective Contractor's Involvement (Role and Scope): SAP Services are the prime contractor, there are no subcontractors.	
PROSPECTIVE CONTRACTOR KEY PERSONNEL ASSIGNED TO PROJECT	
Name: Can be shared as part of Reference Check process	Role: Can be shared as part of Reference Check process

Name: Can be shared as part of Reference Check process	Role: Can be shared as part of Reference Check process		

PROJECT MEASUREMENTS			
Estimated Start & Completion Dates From:	01/19/2018	To:	09/30/2018
Actual Start & Completion Dates From:	01/19/2018	To:	In-Process
Reason(s) for Difference Between Estimated and Actual Dates:			
If the Prospective Contractor performed the work as a subcontractor, the Prospective Contractor should describe the scope of subcontracted activities:			

Table 4.   Reference 3

PROSPECTIVE CONTRACTOR INFORMATION	
Name: SAP Public Services	Contact/Name: Randall Townsend
Project Dates: July 2015 – December 2015	Contact Phone:678-428-7495
CUSTOMER INFORMATION	
Customer Organization: **Massachusetts Institute of Technology (MIT)**	Customer Contact Name: It is SAP's policy to coordinate reference discussions with MIT at an appropriate time. We therefore do not include contact details in RFP responses. This facilitates a better use of time and resources by providing MIT visibility to the areas that the State of Arkansas would like to cover prior to the discussion. We look forward to working with the State of Arkansas team to schedule
	Customer Phone:
Customer Address: Information Technologies & Services Cambridge MA	Customer Email:
	Customer Fax:
PROJECT INFORMATION	

Total Prospective Contractor Staff:	Delivery Executive, Project Manager, OS/Database architect, Cloud Migration Lead, ABAP Developer
Project Objectives: Accelerate adoption of latest in-memory and move administrative systems to the cloud.	
Project Description: Migration of MIT landscape to SAP's HANA Enterprise Cloud (HEC)	
Prospective Contractor's Involvement (Role and Scope): Lead the migration of all the customer landscapes from ECC Oracle to HANA. Provided PMO, and technical leads.	

PROSPECTIVE CONTRACTOR KEY PERSONNEL ASSIGNED TO PROJECT	
Name: (Add more rows as needed)	Role: (Add more rows as needed)
Name: (Add more rows as needed)	Role: (Add more rows as needed)

PROJECT MEASUREMENTS				
Estimated Start & Completion Dates	From:	Jul. 2015	To:	Feb. 2016
Actual Start & Completion Dates	From:	Jul. 2015	To:	Dec. 2015

Reason(s) for Difference Between Estimated and Actual Dates: Chose to remove a mock conversion cycle as previous cycles provided the needed clarity and detail needed to accomplish migration ahead of schedule.
If the Prospective Contractor performed the work as a subcontractor, the Prospective Contractor should describe the scope of subcontracted activities:

2.1 Subcontractor References (If applicable)

If the Proposal includes the use of subcontractor(s), include at least three (3) references (for each subcontractor proposed) from scopes of work equivalent to the scope of work proposed of the subcontractor in the Proposal. At least two (2) of the references **must** be from HANA 2.0 upgrade projects. Each reference chosen should clearly demonstrate the subcontractor's

ability to perform the relevant portion of work requested in the RFP (the State has established mandatory qualifications that must be met to submit a proposal as stated in Section 2.3 of the RFP), and proposed by the Prospective Contractor.

Instructions: Provide the information requested in the Tables below. Replicate the Table if more than three (3) references are desired. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

SAP is not proposing the use of any subcontractor in our proposal.

Table 5.   Subcontractor Reference 1

SUBCONTRACTOR INFORMATION	
Subcontractor Name: Not applicable.	Subcontractor Contact/Name: Not applicable.
Project Dates: Not applicable.	Subcontractor Contact Phone: Not applicable.
CUSTOMER INFORMATION	
Customer Organization: Not applicable.	Customer Contact Name: Not applicable.
	Customer Phone: Not applicable.
Customer Address: Not applicable.	Customer Email: Not applicable.
	Customer Fax: Not applicable.
PROJECT INFORMATION	
Project Objectives: Not applicable.	
Project Description: Not applicable.	
Subcontractor's Involvement (Role and Scope): Not applicable.	
SUBCONTRACTOR KEY PERSONNEL ASSIGNED TO PROJECT	
Name: (Add more rows as needed) Not applicable.	Role: (Add more rows as needed) Not applicable.
Name: (Add more rows as needed) Not applicable.	Role: (Add more rows as needed) Not applicable.
PROJECT MEASUREMENTS	

Estimated Start & Completion Dates:	From:	Not applicable.	To:	Not applicable.
Actual Start & Completion Dates:	From:	Not applicable.	To:	Not applicable.

Reason(s) for Difference Between Estimated and Actual Dates:
Not applicable.

Table 6.   Subcontractor Reference 2

SUBCONTRACTOR INFORMATION	
Subcontractor Name: Not applicable.	Subcontractor Contact/Name: Not applicable.
Project Dates: Not applicable.	Subcontractor Contact Phone: Not applicable.
CUSTOMER INFORMATION	
Customer Organization: Not applicable.	Customer Contact Name: Not applicable.
	Customer Phone: Not applicable.
Customer Address: Not applicable.	Customer Email: Not applicable.
	Customer Fax: Not applicable.
PROJECT INFORMATION	
Project Objectives: Not applicable.	
Project Description: Not applicable.	
Subcontractor's Involvement (Role and Scope): Not applicable.	
SUBCONTRACTOR KEY PERSONNEL ASSIGNED TO PROJECT	
Name: (Add more rows as needed) Not applicable.	Role: (Add more rows as needed) Not applicable.
Name: (Add more rows as needed) Not applicable.	Role: (Add more rows as needed) Not applicable.
PROJECT MEASUREMENTS	
Estimated Start & Completion Dates: From: Not applicable. To: Not applicable.	

Actual Start & Completion Dates:	From:	Not applicable.	To:	Not applicable.

Reason(s) for Difference Between Estimated and Actual Dates:
Not applicable.

Table 7.   Subcontractor Reference 3

SUBCONTRACTOR INFORMATION	
Subcontractor Name: Not applicable.	Subcontractor Contact/Name: Not applicable.
Project Dates: Not applicable.	Subcontractor Contact Phone: Not applicable.
CUSTOMER INFORMATION	
Customer Organization: Not applicable.	Customer Contact Name: Not applicable.
	Customer Phone: Not applicable.
Customer Address: Not applicable.	Customer Email: Not applicable.
	Customer Fax: Not applicable.
PROJECT INFORMATION	
Project Objectives: Not applicable.	
Project Description: Not applicable.	
Subcontractor's Involvement (Role and Scope): Not applicable.	
SUBCONTRACTOR KEY PERSONNEL ASSIGNED TO PROJECT	
Name: (Add more rows as needed) Not applicable.	Role: (Add more rows as needed) Not applicable.
Name: (Add more rows as needed) Not applicable.	Role: (Add more rows as needed) Not applicable.
PROJECT MEASUREMENTS	

Estimated Start & Completion Dates:	From:	Not applicable.	To:	Not applicable.
Actual Start & Completion Dates:	From:	Not applicable.	To:	Not applicable.

Reason(s) for Difference Between Estimated and Actual Dates:
Not applicable.

2.2 SAP Certification

Please provide information regarding your organizations status as an SAP Partner Center of Expertise Certification (SAP PCOE certification). Please include links or other documentation that show this status.

Not applicable as SAP Services is part of SAP. As the Customer Services and Delivery arm of SAP, *SAP Services brings end to end SAP accountability.*

SAP Services has 77 training centers, 7 global support centers, and 14 custom development centers worldwide.

Of particular relevance to this project we offer:

- 16,000 delivery consultants
- 3,000 HANA certified experts
- 600+ HANA Migrations
- 100,000+ Man days of Upgrade & Database Migration Experience
- More than 700 database Migration Experts

2.3 Prospective Contractor's Work Locations

The Contractor Key Project Personnel associated with this engagement must be available to participate in project-related meetings as scheduled by DFA during normal business hours, Monday through Friday 8:00 a.m. to 5:00 p.m. CST, except Federal, State and local holidays.

Per Section 2.10.C.3. of the RFP, Contractor prefers to have at least one (1) dedicated BASIS administrator onsite for the duration of the project dedicated to performing the activities required to complete the entire upgrade.

Per Section 2.10.C.4 of the RFP, the State prefers the Contractor have other key technical staff onsite and dedicated during critical stages of the upgrade.

At no time shall the Contractor maintain, use, transmit, or cause to be transmitted information governed by privacy laws and regulations outside of the United States and its territories.

Instructions: Describe the locations where the Prospective Contractor proposes performing work associated with this RFP. Indicate the site(s) from which the Prospective Contractor will perform the relevant tasks identified in this Proposal. If the site(s) for a specific task changes during the Contract term, provide a timeline reflecting where the task will be performed during each time period.

Specifically identify where the Key Project Personnel identified in the RFP will be physically located for the duration of the Contract.

For each of the deliverables identified in the RFP, provide the percentage of work to be done in the State.

The table below lists each of the proposed SAP resources and whether they are scheduled to be onsite or to work remotely. If a resource is listed as on onsite then we expect that the majority of their time during the project will be onsite at the State.

Role	Location	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
																	Week									
HANA DB SME - BW	Offsite	24	24	40	40	40	8	40	40	8	8	40	40	8	40	40	8	16	40	40	40	40	40	24	24	712
HANA DB SME -ERP and Migration Lead	Onsite	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	16	16			832
ABAP Development Lead	Onsite		40	40	40			40	40	40	40			40		40	24	24	16	40	40	8	8			520
ABAP Development Conultant	Offsite		40	40	40			40	40	40	40															280
ABAP Development Conultant	Offsite			40	40			40	40	40	40															240
SAP BW Consultant - Support Role	Offsite									40	40						24	24	24	24						176
Testing Lead	Onsite		40	40	40	40										40	40	40	40	40						360
Testing Conultant	On/Offsite			40	40	40										40	40	40	40	40						320
SAP Delivery Executive	Onsite	40	40	40	40	8	8	8	8	8	8	8	8	8	8	8	8	8	8	40	40	4				356
SAP Program Manager	Onsite	40	40	40	40	24	24	24	24	24	24	24	24	24	24	24	24	32	40	40	40	24	16			640
Associate Project Manager	On/OffSite												96													96
		Prepare		Explore									Realize							Deploy		Run				

As depicted in the chart above, we expect the following roles to be onsite for the weeks and days as listed:

- SAP Delivery Executive
- SAP Program Manager
- HANA SB SME – ERP and Migration Lead (BASIS Administrator)
- ABAP Development Lead
- Testing Lead
- Testing Consultant (partially onsite and partially remote)

Our team, both onsite and remote, will be available to the State Monday through Friday, 8:00 a.m. to 5:00 p.m. CST, except Federal, State and local holidays.

The requirement for "at least one (1) dedicated BASIS administrator onsite for the duration of the project dedicated to performing the activities required to complete the entire upgrade" will be fulfilled by the HANA SB SME – ERP and Migration Lead, as depicted in the above table. This resource is scheduled to be onsite throughout the project, excluding the post go-live period.

All SAP resources assigned to this project will be based in the United States. Resources will perform their work while onsite at the State, or from a SAP facility, or their home offices. We will provide the State with a list of assigned resources and their work location, once the project is awarded.

A detailed project schedule will be developed, with the State's participation, in the Prepare Phase of the project. The detail plan will specify the deliverables schedule along with the resources responsible for each deliverable.

3.0 Legal Considerations

3.1 Existing Business Relationships with the State of Arkansas

> **Instructions:** Describe any existing or recent (within the last five (5) years) business relationships the Prospective Contractor or any of its affiliates and proposed subcontractors has with the State.

SAP has been serving the State of Arkansas since 2000, when the State originally purchased SAP software and services.   The initial implementation went live in 2001.

Over the last 5 years, SAP has been involved in the following activities with the State of Arkansas:

- In 2013, the State purchased the SAP Learning Management System (LMS) and P-Card capability.
- SAP has been working with the State, over the past few months, reviewing e-procurement solution capabilities. The State wants to move to an e-procurement system. It is expected that the State will issue a formal RFP for software and services to support the procurement processes.
- In March 2018, SAP performed a Transactional Data Assessment focused on the current Material Master. The Assessment put forth the recommendation of migration of the material group from NIGP to UNSPSC code. SAP DBS is working with the State of Arkansas on the recommendations and how to incorporate them as the first step in their transition towards an e-procurement system.
- During Q4' 2017 the SAP DBS team worked closely with the SAP license and State of Arkansas teams in identifying business challenges and proposing the best fit solution in line with best public-sector industry practices, when the State of Arkansas acquired the SoH licenses. The current RFP (and this proposal) is for implementation of that same software.

As stated above, SAP and the State of Arkansas have enjoyed a business relationship since 2000. Therefore, we already have a valid Professional Services Agreement (PSA) in place, which will allow us to engage quickly in delivering this project.

3.2 Business Disputes

> **Instructions:** Provide details of any disciplinary actions and denote any that are pending litigation or Terminated for Cause or Convenience and associated reasons. Also denote any other administrative actions taken by any jurisdiction or person against the Prospective Contractor. List and summarize all judicial or administrative proceedings involving sourcing activities, claims of unlawful employment discrimination and anti-trust suits in which the Prospective Contractor has been a party within the last five (5) years. If the Prospective Contractor is a subsidiary, submit information for all parent companies. If the Prospective Contractor uses subcontractors, associated companies and consultants that will be involved in any phase of this engagement, provide the same information for each of these entities.

SAP is subject to legal proceedings and claims, either asserted or unasserted, which arise in the ordinary course of business. Details of such litigation can be found in filings made by SAP with the SEC which are publicly accessible through the SEC's EDGAR database on the Internet

http://www.sec.gov/edaux/searches.htm. We also publicly disclose this annually in our Annual Report. The link is: http://www.sap.com/company/investor/reports/

4.0 Financial Stability

4.1 Dun & Bradstreet Ratings

The Prospective Contractor should provide the industry standard Dun & Bradstreet (D&B) Ratings that indicates the firm's financial strength and creditworthiness, assigned to most US and Canadian firms (and some firms of other nationalities) by the US firm D&B. These ratings are based on a firm's worth and composite credit appraisal. Additional information is given in credit reports (published by D&B) that contain the firm's financial statements and credit payment history. Additional information may be requested regarding financial stability for the Prospective Contractor and any subcontractors proposed.

Instructions: Provide a D&B Ratings report.

SAP SE is our German-based parent company. SAP America, Inc. is based in the US and is a wholly owned subsidiary of SAP SE. SAP Public Services, Inc. is a wholly owned subsidiary of SAP America, Inc. We have included a Dun and Bradstreet report from January 2018 with our response to the State of Arkansas. Please see **Appendix 1** of our response.
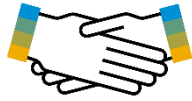
SECTION T-3: PROSPECTIVE CONTRACTOR ENGAGEMENT ORGANIZATION AND STAFFING

1.0 Engagement Organization and Staffing Plan

The Prospective Contractor should describe an integrated Project Organization and Staffing Plan required to execute the proposed approach for the Engagement. This section should include details of the Prospective Contractor's team, proposed use of subcontractors, and the Prospective Contractor's expectations of DFA resources. This section should include a visual representation of the Prospective Contractor engagement including the reporting structure. The Prospective Contractor should also describe the required staffing of business and technical resources DFA will need to provide to support the delivery. The Plan should include the number of resources (both business and technical), anticipated role and responsibilities, level of participation and necessary capabilities/skills for both DFA and Prospective Contractor resources.

Key Project Personnel identified in the Proposal for the engagement are considered to be the core Prospective Contractor resources and are therefore expected to be the major participants in all procurement activities and services delivery activities. If the Prospective Contractor is selected, its Key Project Personnel cannot be replaced without prior DFA approval during the life cycle of the Project.

Instructions: Provide a Staffing Plan and associated organization chart detailing the number of personnel, level, roles and responsibilities, team reporting relationships, and then identify the approach to providing "shoulder-to-shoulder" links for key staff roles between Prospective Contractor staff and DFA staff. Show proposed Prospective Contractor personnel hours by phase, by personnel level, and by role for the entire engagement. Identify all Key Project Personnel for the Prospective Contractor, personnel for DFA and their proposed roles. If the Prospective Contractor's proposed engagement organization and staffing plan does not align with the guidance provided in the body of the RFP the Prospective Contractor should discuss the justification for recommending an alternative staffing organization.

Proposed SAP Team Staffing and Hours by Phase

Role	Location	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
HANA DB SME - BW	Offsite	24	24	40	40	40	8	40	40	8	8	40	40	8	40	40	8	16	40	40	40	40	40	24	24	712
HANA DB SME -ERP and Migration Lead	Onsite	24	40	40	40	40	24	40	40	24	24	40	40	24	40	40	24	24	40	40	40	16	16			720
SAP Basis Administrator	Onsite	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	16	16			832
ABAP Development Lead	Onsite		40	40	40			40	40	40	40			40		40	24	24	16		40	8	8			480
ABAP Development Consultant	Offsite		40	40	40			40	40	40	40															280
ABAP Development Conultant	Offsite			40	40			40	40	40	40															240
SAP BW Consultant - Support Role	Offsite									40	40									24	24	24	24			176
Testing Lead	Onsite		40	40	40	40										40	40	40	40	40						360
Testing Conultant	On/Offsite			40	40	40										40	40	40	40	40						320
SAP Delivery Executive	Onsite	40	40	40	40	8	8	8	8	8	8	8	8	8	8	8	8	8	8	40	40	4				356
SAP Program Manager	Onsite	40	40	40	40	24	24	24	24	24	24	24	24	24	24	24	24	32	40	40	40	24	16			640
Associate Project Manager	On/OffSite											96														96
		Prepare		Explore								Realize								Deploy		Run				

Proposed State of Arkansas Team Staffing and Hours by Phase

Role	Location	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
DFA Project Manager	Onsite	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	960
DFA Basis Administrator	Onsite	40	40	40	40	40	40	40	40	40	40	24	24	24	24	24	24	24	24	40	40	16	16	16	16	736
DFA Basis Security Administrator	Onsite	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	40	40	16	16			400
ABAP Development Lead	Onsite		40	40	40			40	40	40	40		40			40	24	24	16		40	8	8			480
Operating System Administrator	Onsite	40	40	40	40	40	40	40	40	40	40	24	24	24	24	24	24	24	24	40	40	16	16	16	16	736
DFA IT DBA Support	Onsite	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	40	40	16	16			400
DFA BW - Support Role	Onsite	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	40	40	16	16			400
Integration Testing Lead	Onsite		40	40	40	40										40	40	40	40	40						360
Functional Tester	Onsite															40	40	40	40	40						200
Functional Tester	Onsite															40	40	40	40	40						200
Functional Tester	Onsite															40	40	40	40	40						200
Functional Tester	Onsite															40	40	40	40	40						200
		Prepare		Explore								Realize								Deploy		Run				

SAP has extensive experience in delivering successful upgrade projects, and through that experience we have gained an understanding of the resources needed to achieve successful delivery. SAP's team is structured to onboard the right resources at the right time. This promotes project efficiency, speeds implementation, and reduces impact on the State's facilities. Our objective for the State of Arkansas is to optimize the number of internal resources needed to deliver the project successfully, while minimizing the impact to daily business operations of the State. We also recognize that there is a delicate balance between too many resources and too few. To that end, we have carefully selected the appropriate number of State resources to represent each functional and technical discipline and to facilitate knowledge transfer back to their respective organization within the State. We anticipate that SAP resources will be co-located with State resources so that State resources can share information on the current legacy system and SAP resource can impart knowledge on the new environment.

2.0 Prospective Contractor Key Personnel

The Prospective Contractor should identify Key Personnel for the Engagement, as described in the RFP, including:

- Name

- Position in Prospective Contractor organization

- Proposed role on Engagement

- Focus of work effort

- % of time for that work effort

- Experience in the proposed role

- Qualifications for the proposed role

- Role in the last three (3) projects

Instructions: Complete the following Table detailing the Key Personnel identified for this Engagement. Add rows as necessary. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

Table 1.   Prospective Contractor Key Personnel

NAME	POSITION IN ORGANIZATION	PROPOSED ROLE ON ENGAGEMENT	FOCUS OF WORK EFFORT	% OF TIME FOR THAT WORK EFFORT	EXPERIENCE IN PROPOSED ROLE (YEARS)	QUALIFICATIONS FOR PROPOSED ROLE	ROLE IN LAST 3 PROJECTS
TBD	Delivery Executive	Delivery Executive	Executive engagement and project oversight	50%	See sample resume	Over 20+ years of executive engagement and management of complex global projects. Personally managed 3 upgrade projects. 23+ years of SAP hands-on experience in multiple industry verticals, with in-depth knowledge accumulated in a variety of complex business situations.	Over the last 3 projects this resource has served as a delivery executive providing executive engagement and overall project accountability from an SAP perspective
TBD	Senior Project Manager	Project Manager	Project management	100%	See sample resume	PMI certified Project Management Professional (PMP) Over 12 years of SAP project management experience Certified SAP upgrade ramp up coach (i.e. new product installation expert)	Over the last 3 projects this resource has served as a project manager responsible for day-to-day project activities Responsible for issue resolution, risk mitigation, scope control, project status, and overall project delivery
TBD	Principal Consultant	HANA Migration Specialist	Database migration	100%	See sample resume	Experienced Technology Consultant with over 17 years of SAP project experience focused in	Over the last 3 projects this resource has served as the

						the areas of SAP Technology Lead - Basis, Technical Architecture, SAP Security and significant experience in full life cycle Projects - installations, upgrades, hardware migrations on the same platform and day-to-day support for SAP systems.	overall technology lead and architect Served as chief basis resource and technical liaison with the customer
TD	Principal Consultant	ABAP Development Lead	ABAP remediation	100%	See sample resume	Seasoned ABAP development professional with over 12 years of expert level ABAP development ABAP experience. Expert level skills in the following: • ABAP development • ABAP for SAP HANA • Central Finance Technical Expert • SAP Landscape Transformation (SLT) Expert • Lead teams in the development of RICEF objects • Experience across multiple modules including HR, Payroll, FI, MM and SD (RICEF Objects)	This resource served as the development lead on their last 3 projects Responsible for leading development teams and hands on ABAP code development, remediation, and testing

SAP has provided representative resumes for key personnel. Upon project award, SAP will provide specific resumes for review prior to project start.

2.1 Subcontractor Key Personnel

The Prospective Contractor should identify the Subcontractor Key Personnel for the Engagement including:

- Name
- Position in subcontractor organization
- Proposed role on Engagement
- Focus of work effort
- % of time for that work effort
- Experience in the proposed role
- Qualifications for the proposed role
- Role in the last three (3) projects

This section should also detail the past work each listed person has had with the Prospective Contractor or their staff.

Instructions: Provide a listing of the Subcontractor Key Personnel. This Table should be replicated for each Subcontractor used. Add rows as necessary. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

SAP is not proposing the use of any subcontractor with our proposal response.

Table 2.   **Subcontractor Key Personnel**

NAME	POSITION IN ORGANIZATION	PROPOSED ROLE ON ENGAGEMENT	FOCUS OF WORK EFFORT	% OF TIME FOR THAT WORK EFFORT	EXPERIENCE IN PROPOSED ROLE (YEARS)	QUALIFICATIONS FOR PROPOSED ROLE	ROLE IN LAST 3 PROJECTS
Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.

3.0 Resumes

> The Prospective Contractor should attach professional resumes of all proposed Key Personnel to this section of the Proposal.
>
> Each resume should demonstrate experience germane to the position proposed. The resume should include work on projects cited under the Prospective Contractor's corporate experience, and the specific functions performed on such projects.
>
> Additionally, for technical staff, each resume should provide information that each proposed key personnel is SAP HANA certified.
>
> **Instructions:** Provide a resume for each proposed Key Personnel.

Consultant Profiles

The following resumes are for sample purposes only. SAP will provide the names and resumes of project team candidates as we move closer to an official project start date.

- Delivery Executive
- Project Manager
- Migration Specialist
- ABAP Developer Lead

See Appendix 2 to our response for Key Personnel Resumes.

Subcontractors

SAP does not anticipate the use of subcontractors on this project.

4.0 Roles and Responsibilities

> The Prospective Contractor should describe the roles and responsibilities they feel are needed by each party. The Prospective Contractor should take into account the tentative roles and responsibilities listed in the RFP when responding. Any discrepancies between the two should be discussed and notate why your approach would be more advantageous.
>
> **Instructions:** Provide a listing of roles and responsibilities for each party.

To develop the best solution for State of Arkansas, rapidly and accurately, it is essential to assemble a team with the proper balance of program management, technical management, ABAP development, and testing skills with deep technology, data, and solution expertise.

Sample roles and responsibilities based on the project structure are detailed below. Team resources are aligned to support efficiency, communication, and knowledge transfer. The goal is to prepare State of Arkansas's team for a flawless go-live and continued internal support.

Figure: Sample Project Organization
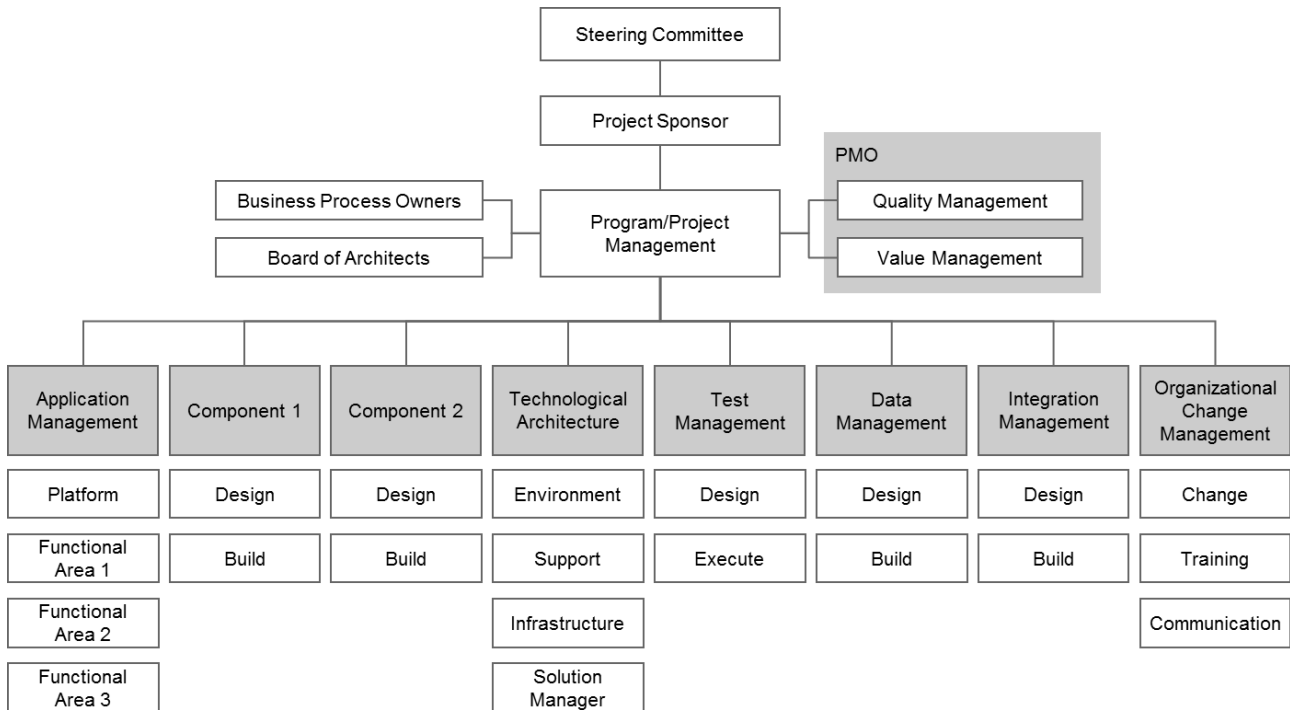
State of Arkansas' Team

Customer Project Sponsor

Responsibilities

The Customer Project Sponsor acts as a vocal and visible champion. He/she supports the project's goals and objectives, keeps abreast of major project activities, and is a decision maker for the project. He/she generally chairs the Steering Committee on large projects.

Tasks

- Helps provide resources, resolve difficult issues, deal with organizational politics, etc.
- Approves strategies, implementation plan, project scope and milestones.
- Drives and manages change throughout the organization.
- Prioritizes project goals with other ongoing projects.
- Communicates with other key organizational representatives.
- Participates in and/or leads project preparation/initiation; the development of the Project Charter.
- Takes appropriate decisions and final decision that are within the scope of the project.
- Participates in project planning (high level) and the development of the Prepare phase.
- Delegates any of the above responsibilities to other personnel either on or outside the project team.
- Provides support for the Project Manager; assists with major issues, problems, and policy conflicts; is active in planning the scope; approves scope changes; signs off on major deliverables.

Reporting to

- Steering Committee

Customer Steering Committee

Responsibilities

Depending on how the project is organized, the Steering Committee can provide resources, assist in securing funding, act as liaisons to executive groups, and fill other roles as defined by the project. The Customer Steering Committee generally includes management representatives from the key departments. This group will provide executive-level leadership and have the larger institutional vision perspective. The Steering Committee will make institutional policy decisions as necessary to ensure the success of the project.

Tasks

- Meets regularly to review project plan impact on respective departments.
- Approves project deliverables.
- Provides issue resolution and policy decisions.
- Steers the project to completion in an orderly and progressive manner.
- Assists in testing, training and implementation planning and support.
- Reviews and approves scope changes, and provides direction and guidance to the project.

Participants

- Project Sponsor (Chair)
- Program/Project Manager

Customer Project Manager

Responsibilities

The Project Manager ensures that the project has a clear purpose and that every core team member understands that purpose. He/she ensures that each team member has a clear role and that resources have been agreed with Line Managers to clarify the goals of the project, and that every action is moving the project towards those goals.

Tasks

- Provides advice and strategic direction.
- Creates, schedules, assigns and follows up on tasks.
- Holds project work team accountable for implementation.
- Steers the project to completion in an orderly and progressive manner.
- Resolves issues referred from Budget Resource Manager and Resource Managers.
- Reviews scope changes and change requests.
- Meets with project work team.
- Serves as communication conduit.
- Coordinates with Budget Resource Manager regarding ongoing budget process and documentation.
- Signs off on approvals to proceed to each succeeding project phase.

Reporting to

- Project Director, Steering Committee

Corresponding SAP role

- Project Manager

Customer Team Lead/Line-of-Business Manager (Decision Maker)

Responsibilities

The Customer Team Lead is responsible for the day-to-day management of his/her area of the overall implementation project. He/she has been designated to make project decisions on behalf of major business units that will use, or will be affected by, the product or service the project will deliver. He/she is responsible for achieving consensus of his/her business unit on project issues and outputs, and communicating it to the Project Manager. He/she develops, coordinates and manages multiple aspects of the project.

Tasks

- Ensures proper skillset availability for project team members.
- Reports on status and progress: risk, issues, scope changes and quality concerns.
- Monitors progress against the plan appropriately and regularly.
- Attends project meetings as requested by the Project Manager.
- Creates a realistic plan for his/her part of the project.
- Coordinates those activities to meet that plan and deals with any changes in a systematic way.
- Plans the assigned activities in more detail if needed.
- Completes assigned work within timeline and quality expectations.

Reporting to

- Project Manager

Corresponding SAP role

- Project Team Lead

Customer Technical Manager (IT) (Technology Architect)

Responsibilities

The Customer Technical Manager provides an overall view of the technological strategy and ongoing technological development. He/she defines the IT strategy and manages its operations based on standardized practices and KPIs.

Tasks

- Owns and drives the implementation of technological strategies.
- Is responsible for the cost effectiveness and value contribution of the IT organization.
- Anticipates future technical direction for the company.
- Defines and implements the IT process across all related components.

- Develops and reviews scope of technological work.
- Provides leadership and guidance to the technical resource team.
- Consults and mentors technical resources concerning methods, procedures, and standards to be used during design, development, and unit testing phases of system development projects.

Reporting to

- Program Manager, Project Manager, Board of Architects

Corresponding SAP role

- Integration Management Lead, Technological Architecture Team Lead

Customer Technical Subject Matter Expert (SME)

Responsibilities

The Customer Technical SME is responsible for managing and supporting the various environments (hardware and software components) during the implementation of the project. He/she consults with project team members to analyze operational procedures and to define the technical components of the solution.

Tasks

- Handles data migration and interfaces with other systems.
- Reports on the configuration and deployment of components.
- Sets up and maintains security rights and access permissions.
- Contributes to technical strategy, policy and procedure.
- Develops and executes technical testing programs.
- Produces technical documentation to agreed quality standards.
- Reports on progress/issues to project team.
- Installs and upgrades server and application software in collaboration with suppliers.
- Assists technical resources with database design.
- Provides assistance to project members of project with software-related issues or problems.

Reporting to

- Project Manager, Project Team Lead/Line-of-Business Manager

Corresponding SAP role

- Team Lead, Application Consultant

Customer System Administrator/Technical Infrastructure

Responsibilities

The Customer System Administrator is responsible for the technical architecture of the solution. He/she manages and supports the various environments (hardware and software components) during the entire lifecycle of technical solutions. He/she consults with technical and solution experts to identify operational procedures and technical components needed for the business solution. Responsibility

Tasks

- Identifies appropriate software/hardware components based on business solution requirements.
- Provides application software change control across the different environments.
- Provides technical system support across all phases of solution landscape planning and system operations.
- Identifies, analyzes, and resolves technical problems with applications.
- Installs and upgrades server and application software in collaboration with suppliers.
- Handles data migration and interfaces with other systems.
- Develops and executes technical testing procedures.
- Reports on the configuration and deployment of components.

Reporting to

- Project Manager, Team Lead/Line-of-Business Manager (different departments)

Corresponding SAP role

- Business Solution Architect, Team Manager (different departments)

Customer Test Coordinator

Responsibilities

The Customer Test Coordinator is responsible for the execution of the project test plan.

Tasks

- Prepares testing scenarios.
- Validates and reports system defects.
- Obtains final user acceptance and signs-off test results.
- Monitors and controls test process quality and results.
- Coordinates and manages of all test activities.
- Designs and executes non-functional tests (e.g. performance).
- Handles and reports on issues and errors.

Reporting to

- Project Manager, Project Team Manager

Corresponding SAP role

- Test Manager

Customer Team Members

Responsibilities

Customer Team Members are employees of the business units (departments/divisions) who are identified and made available to the project for their subject/functional area. Their responsibility is to represent their business

units' needs accurately to the project team. They are responsible for validating deliverables that describe the product or service that the project will produce.

Tasks

- Have specialist knowledge or expertise, represent their own business units.
- Bring specialist knowledge and advice to the other members of team.
- Complete the work assigned to them by the Team Managers.
- Report back to the team on their assignments.
- Contribute fully to the project, sharing knowledge and expertise.
- Provide functional expertise in an administrative process.
- Work with users to ensure the project meets business needs – training staff as needed.
- Document and analyze current and future processes/systems.
- Identify and map information needs.
- Define requirements for reporting and interfacing.
- Test the product or service the project is developing, use and evaluate it while providing feedback to the Project Team/Team Managers.

Reporting to

- Project Team Manager

Service Desk

Responsibilities

The Service Desk is a customer IT function that supports several IT operating processes, depending on the nature of the task. The Service Desk should be knowledgeable about the business IT operations, processes, and tools, and also the IT organization responsibilities within operations support. The Service Desk is the single point of contact ("SPOC") for end users and key users if incidents arise.

Tasks

- Assists in the distribution and configuration of workstations for users.
- Provides support for network problems, firewall problems, security problems, and access issues.
- Provides help-desk support during and after the implementation of the new project.
- Creates tickets in IT support tool and documents relevant data; provides first-level support; dispatches incidents for further processing; monitors and tracks incidents actively, especially very-high priority issues.
- Maintains and uses FAQ and other knowledge data bases for first-level user support.

Reporting to

- Service Desk Manager, Program/Project Manager

SAP's Team

Delivery Executive

Responsibilities

The Delivery Executive is the management focal point between the customer, strategic partners and SAP during the implementation and support of SAP global, multi-site and multi-project business processes and solutions.

Tasks

- Participates in program planning activities and oversees the delivery of multiple projects related to successful program execution.
- Leverages relationships with customer executive management, customer functional directors and partners.
- Works with customers as a key and influential member of their business planning teams to ensure a continuing delivery of outcomes through SAP solution and delivery teams.
- Works closely with the Program Sponsors and Program Review Boards to facilitate decisions necessary for program delivery.
- Translates generalized customer business goals and objectives into concrete program strategy and tactical plans.
- Supports those in the business solution architecture role in defining the global SAP strategy with the customer.
- Evaluates complex situations accurately and identify viable solutions that create successful outcome for the customer.
- Resolves resource, budgeting, change and legal issues affecting the program.
- Proactively manages program stakeholder satisfaction to secure customer success story.
- Serves as mentor/advisor/decision maker to Project Managers for the program for issues related to client relations, project quality, and project risk.

Special knowledge

- Substantial knowledge in project management methodology and long-term experience in managing projects

Reporting to

- Steering Committee, Program Sponsor, Executive Board

Corresponding customer Role

- Customer Program Manager

Project Manager

Responsibilities

The Project Manager is responsible for the overall day-to-day management of standard implementation and industry solution projects throughout its lifecycle.

Tasks

- Participates in the project planning activities and manage the execution of projects according to plan.

- Manages relationship with project stakeholders, including internal and external clients, keeping stakeholders informed of progress and issues in order to manage expectations on all project requirements and deliverables.
- Manages and communicates a clear vision of the project's objectives, and motivates the project team to achieve them; creates a project environment that enables peak performance by team members.
- Proactively identifies changes in work scope and ensures appropriate planning measures are taken with internal and external stakeholders to reassess and amend the scope of work requirements, budget and timeline.
- Manages the financial aspects of the project: budgeting and estimate to actual variance.
- Analyzes risk, establishes contingency plans and identifies trigger events and responsibilities for initiating mitigating action.
- Determines what constitutes successful closure for all parties; gains acceptance and sign-off by all parties when closure is attained.
- Proactively manages project stakeholder satisfaction to position and secure customer reference and success story.
- Ensures proper use of project management methodology, standards, tools, processes and procedures.
- Coaches to clarify assignments and deliverables to project team; reviews quality of work and manages integration of team members' work; provides performance input to project team members' functional management.
- Maintains work-life balance for the team; ensures breaks at defined milestones for leave, training etc.
- Appraises performance of the team members.

Special knowledge

- Substantial knowledge in project management methodology and experience in managing projects

Reporting to

- Steering Committee, Delivery Executive

Corresponding customer role

- Customer Project Manager

Program/Project Management Office (PMO)

Responsibilities

The Program/Project Office is responsible for the professional operation of the program/project office regarding to the following tasks.

Tasks

- Arranges meetings for project team including co-ordination of project team meetings and external events.
- Co-ordinates travel arrangements for the team.
- Books meeting rooms/venues for the team.
- Deals with general telephone and e-mail queries for the project team with the assistance of the team.
- Monitors the status of the project and distributes information accordingly to respective team members.

- Controls project tasks including reporting/statistics.
- Communicates with customer in the name of the project team.
- Prepares and manages content, like presentations for team or customer meetings.
- Acts as a Financial Project Analyst: focal point to capture and report financial and other metrics of engagement(s) and/or project(s).

Special knowledge

- Knowledge in project management methodology
- Business knowledge

Reporting to

- Program Manager, Project Manager

Corresponding customer role

- Customer Project Office Assistant

Quality Manager

Responsibilities

The Quality Manager ensures compliance of the QMS at the project level in an independent capacity and escalates quality related issues to Project Manager, Country Delivery Stakeholder Manager, Regional Delivery Stakeholder Manager and other key stakeholders.

Tasks

- Prepares the quality plan and ensures that it is approved:

  - Defines quality goals and quality gates.
  - Defines the quality activities (project processes, tests, reviews, monitoring and control, issue and error handling and reporting) in a QM plan to reach the quality goals.

- Plans, establishes and optimizes project processes (scope management, change management (technical), release management, risk management).
- Ensures that quality control activities are performed and that defects are tracked to closure.
- Reports the quality-related risks and issues on a periodic basis.
- Facilitates the root cause analysis meeting for defects and problems.
- Assesses the maturity of a client's QM organization and QM processes based on international QM standards.
- Defines requirements and coordinates setup of the technical test environment, test data management, test tool selection.
- Provides training/orientation to project team on QMS/processes.

Special knowledge

- Substantial knowledge and experience in quality assurance
- Business knowledge

Reporting to

- Directly to the Program/Project Manager

Corresponding customer role

- Customer Quality Manager

Technology Consultant

Responsibilities

The Technology Consultant is responsible for analyzing and executing hardware requirements, as well as operating the IT landscape.

Tasks

- Defines the operational production system environment.
- Provides detailed planning of IT implementation.
- Implements IT processes across all related IT components.
- Defines detailed blueprint for development requirements.
- Acts as expert consultant for IT components.
- Supports operating system and system optimization.

Special knowledge

- Substantial knowledge in hardware, equipment and platforms.
- Technical aptitude to manage the SAP hardware environment

Reporting to

- Program/Project Manager

Corresponding customer role

- Customer Operations Department

Test Management Consultant (Test Manager)

Responsibilities

The Test Manager is responsible for reaching the defined and agreed test goals.

Tasks

- Designs test concept according to quality goals: test strategy, test activities and responsibilities, test stages and methods, test cases.
- Defines requirements and coordinates setup of the technical test environment, test data management, test tool selection.
- Reviews project deliverables (test concept, test cases, scripts, test documentation, test reporting, error handling).

- Identifies, designs and monitors the execution of test processes/projects.
- Monitors and controls test process quality and results.
- Designs and executes non-functional tests (e.g. performance).
- Execute test services.
- Provides guidance and coaching by defining documentation and conventions.
- Coordinates and manages of all test activities.
- Handles and reports on issues and errors.
- Automates regression tests.

Special knowledge

- Substantial knowledge and experience in testing
- Knowledge of integration between applications and external systems
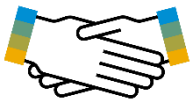- Business knowledge

Reporting to

- Program-/Project Manager

Corresponding customer role

- Test Manager, Test Coordinator

SECTION T-4: REQUIREMENTS APPROACH

1.0 Approach to Upgrade

Describe your overall approach and strategy to providing the upgrade to the State of Arkansas.

The overall migration approach and technical design depends on several factors. Time available for the migration, database size, target release of the upgraded system, availability of migration hardware, resource availability, and system functional and technical changes are a few of the factors that need to be considered. During the PREPARE phase of the project, technical experts from SAP lead a series of structured discussions and technical design workshops to verify our understanding of these factors as they relate to the upgrade goals as defined by the State. The goal of these workshops is to review the best practices and document the technical approach and design of the to-be delivered SAP enterprise solution as well as validate the recommended approach put forth in this proposal.

Overview of Migration Path Options
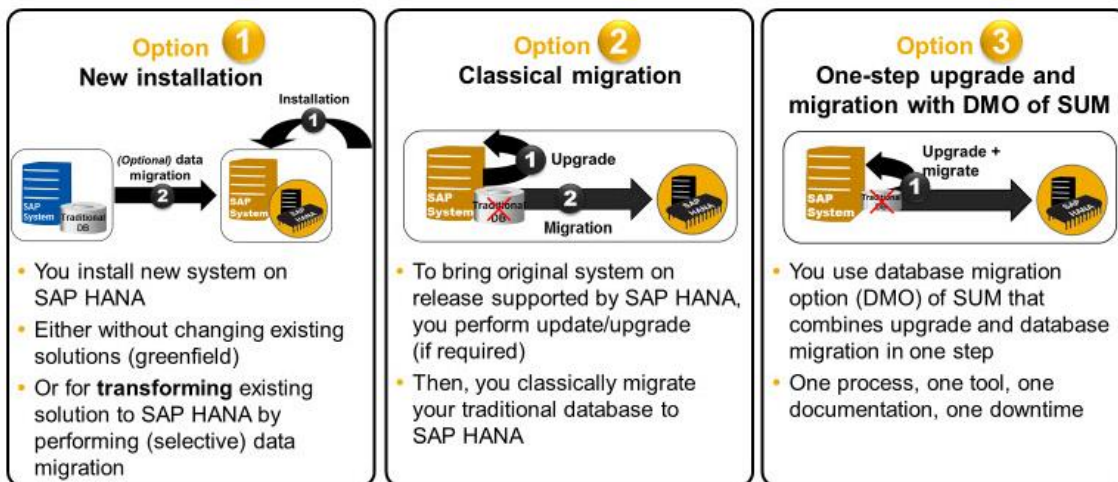
For ABAP-based SAP systems, the general recommendation is to use the database migration option (DMO) of SUM, as it has become our standard procedure for migrations to SAP HANA. Using this approach, the State can profit from a simplified migration to SAP HANA, performed by one tool, with minimized overall project cost and only one production downtime window.

Alternatively, the classical migration procedure using software provisioning manager can be applied if the database migration option of SUM does not fit the State's requirements. Reasons to deploy this option can

include the database migration option of SUM does not support your source release, or that you prefer a separation of concerns over a big bang approach as offered by DMO of SUM.

While the two methods above encompass the best upgrade and migration options, there are further migration procedures for special use cases, such as the consolidation of SAP systems during the migration project or the step-wise migration to SAP HANA. Based on our understanding of the State's requirements these additional options are not considered viable for this upgrade project.

General Recommendation

DMO of SUM
is the standard procedure for migrations to SAP HANA – profit from a simplified migration to SAP HANA with minimized overall project costs!

Reasonable Alternative

Classical migration
If DMO of SUM does not fit your requirements, consider to use classical migration with software provisioning manager (continuously improved for this migration use case)

Use as starting point for your individual assessment

Possible Exception

New installation for transformation
In addition, there are further migration procedures for special use cases, such as system consolidation or carve-out with SLO Shell Creation

It is important that the State to understand the pros and cons of each aforementioned option as well as embrace the benefits of the option proposed by SAP. Therefore, the following explanations are offered to enhance your understanding.

Classical Migration from ECC to Suite on HANA (SoH) and BW to BW on HANA

The classical migration approach is considered the minimum standard migration option.

Scope:

- Uses Software Provisioning Manager (SWPM)*
- Combine Unicode Conversion and HANA Migration into only one maintenance phase
- Database Export on Source
- Unicode Conversion
- System build using the DB export dump in HANA environment

Benefits:

- Database migration via heterogeneous database copy
- No additional patch updated needed before the migration

Cons:
- Manual optimization options for large tables
- Manual configuration for migration tools

> Please describe your organizations approach as it relates to DMO or an alternative. If providing an alternative approach, please include at a minimum, detailed description of the approach, pros/cons and expected outcomes utilizing the alternative approach.

SAP differentiates itself by leveraging a unique engineered service not available to other prospective vendors. The migration service is founded on the Rapid Deployment Solutions (RDS) for HANA Migration, and SAP has incorporated Engineering Service content on top of the RDS foundation that includes additional accelerators, tools, and re-usable knowledge artefacts based on our experience over numerous customer migrations. The lifecycle model that governs the deployment of the Engineered Service content uses an innovation adoption framework, which consists of best practices, accelerators, methodologies and configuration tools that expedites SAP solution implementations throughout the customer lifecycle.

The knowledge management repository in the lifecycle model for migrations consists of a solution database that is being frequently updated with real-time customer issues that have been faced during migration and its resolutions. This helps as a reference for faster troubleshooting of any migration related issues.

Some of the project delivery related accelerators that are part of the engineered services content (migration specific) are

- Project related Accelerators and Templates
- Project management collateral – project plan templates
- System turnover documents
- Kick-off presentation template
- Upgrade/Migration service issue log
- Upgrade/Migration cutover plan template
- Delivery acceptance documents

- Issue and Resolution internal database: Repository of all upgrade issues/resolution documented over the years
- Quality Management Framework, Life Cycle Model for Migrations
- QA Dashboards

SAP incorporates the above Engineered services and RDS content, Quality management framework and lifecycle models, to differentiate from other vendors thus creating a strategic advantage for the State by deploying our recommended option. The Activate project methodology developed by SAP will be used as a project methodology for the migration to HANA. SAP Activate is the innovation adoption framework that consists of best practices, accelerators, methodologies and configuration tools that expedites SAP solution implementations throughout the customer lifecycle. Activate supports faster, less service intensive deployments and is aiming at continuous adoption of innovations throughout the entire project lifecycle. With Activate, SAP can successfully support different starting points for customers to adopt SAP solutions in their business.

Because the migration from ECC to SoH is mostly a technical activity, a simpler variant of Activate methodology based on rapid deployment solution (RDS) / Engineered services will be used.
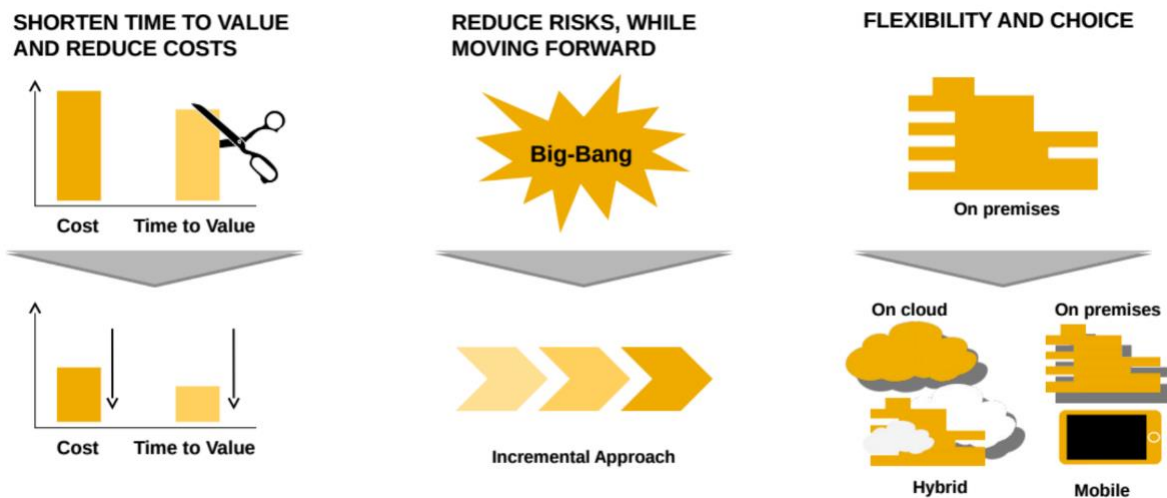

SAP proposes to leverage our DMO toolset for the data migration to HANA. With this tool, SAP can conduct an enhancement package (EHP) upgrade and the lift and shift activities in one step. This reduces scope, time, cost and risk. While the DMO for SUM option is available to other systems integrators, See the diagram below for more details.

Scope:

- Uses Database Migration Option for Software Update Manager (DMO for SUM)
- Combine Unicode Conversion and HANA Migration into only one maintenance phase
- Lower prerequisites for database start releases

- Built-in downtime optimization for SAP Business Suite on HANA
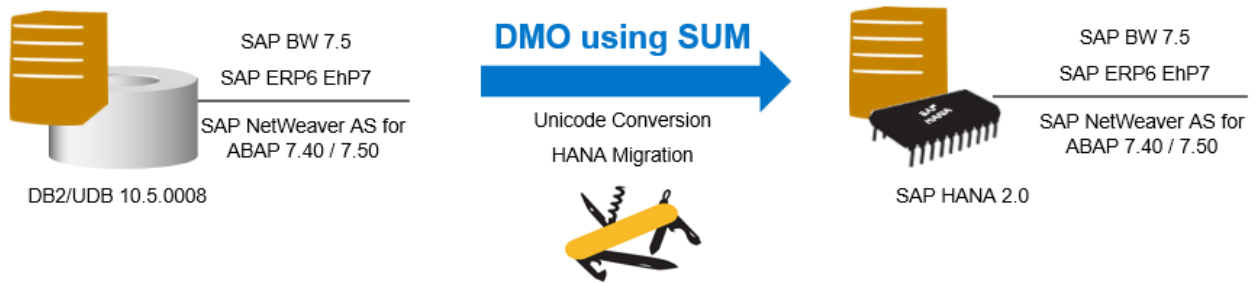
Benefits:

- Faster migration
- Reduced migration effort
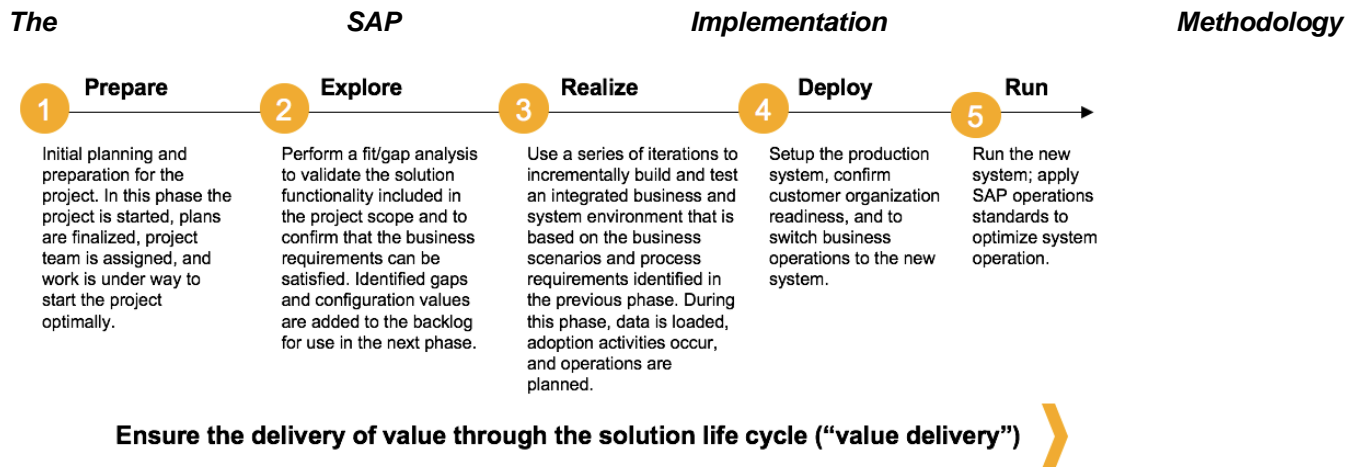- Shorter business downtime during database migration

Cons:

- Additional patch updates are required in the system to make the DMO tools available

2.0 Project Management

Describe your organizations approach in managing this project and how it meets or exceeds the requirements of the RFP.

The SAP Activate methodology is SAP's content rich, agile methodology for the implementation, upgrade and/or migration of SAP solutions across industries and customer environments. Built on our experience from tens of thousands of SAP projects, SAP Activate Methodology provides pre-built implementation content, accelerators, tools, and best practices that help consultants deliver consistent and successful results across industries and customer environments.

The phases of SAP Activate provide support throughout the project life cycle of SAP solutions. Underlying these phases is a series of value delivery and quality checks to verify that the solution, as implemented, delivers the expected value. The diagram below illustrates the phases of SAP Activate Methodology.

The   *SAP*   *Implementation*   *Methodology*

1 Prepare	2 Explore	3 Realize	4 Deploy	5 Run
Initial planning and preparation for the project. In this phase the project is started, plans are finalized, project team is assigned, and work is under way to start the project optimally.	Perform a fit/gap analysis to validate the solution functionality included in the project scope and to confirm that the business requirements can be satisfied. Identified gaps and configuration values are added to the backlog for use in the next phase.	Use a series of iterations to incrementally build and test an integrated business and system environment that is based on the business scenarios and process requirements identified in the previous phase. During this phase, data is loaded, adoption activities occur, and operations are planned.	Setup the production system, confirm customer organization readiness, and to switch business operations to the new system.	Run the new system; apply SAP operations standards to optimize system operation.

Ensure the delivery of value through the solution life cycle ("value delivery") ❯

Build Smart, Run Simple

SAP implementations, migrations and upgrades require a disciplined approach to project management. The SAP Activate methodology aligns with best practices recommended by the Project Management Institute (PMI)*, making it possible to minimize risk, streamline and accelerate the implementation project, and reduce the total cost of implementation or upgrade.

SAP Activate methodology incorporates a standardized work breakdown structure that helps project managers to define and manage project work in a deliverable-oriented, outcome focused manner. It is structured around these key project work streams:

- Project management
- Solution Design
- Solution Configuration
- Solution Walkthrough
- Integration Preparation
- Customer Team Enablement
- Data Migration
- Integration Setup
- Solution Testing
- Solution Adoption
- Support Readiness
- System Management
- Custom Extensions Management
- Cutover Management

During each methodology phase, the project team produces a prescribed set of deliverables that serve as inputs to subsequent phases. SAP Activate methodology provides example of key project deliverables, including procedure description explaining how to prepare and complete the deliverable. SAP Activate methodology also

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* This includes the Project Management Institute's *A Guide to the Project Management Body of Knowledge*.

provides accelerators for each phase and work stream. These include templates, questionnaires, checklists, guidebooks, and other tools that facilitate the efficient, consistent, and repeatable delivery of SAP implementations, upgrades and migrations.

3.0 Change Management

Describe your organizations approach to change management as it relates to the requirements of the RFP.

Change Management is an integral aspect of SAP's methodology. The key objectives of integrated change control are to:

- Identify changes in scope – or other unplanned activity – in advance and control them
- Protect the integrity of deliverables that have been approved (signed off)
- Check that new tasks and other requested changes are justified and cost justifiable, and that affected deliverables are identified and modified accordingly (re-baselined)
- Obtain authorization to proceed with the new tasks or changes and assign them to appropriate individuals to be completed
- Monitor the progress, cost, and value of approved changes

Integrated change control includes these components:

- Defining an integrated change control procedure
- Finalizing the project change request form
- Finalizing the project change control log

The integrated change control procedure outlines the process for requesting, evaluating, deciding on, and tracking possible changes to the project scope and all related activities and deliverables. The procedure elaborates on sections from the project management plan that pertain to integration and management change control. An effective change control system maintains control while allowing flexibility.

Scope Control focuses on influencing the factors that create project scope changes and controlling the impact of those changes. The figure below illustrates, at a high level, SAP's process executing scope control throughout a project.

SAP's Process for Controlling Scope

Step 1
Identify the need for change.

Step 2
Complete the Change Request Form.

Step 7
Finalize: Make the go/no-go decision.

Project Manager logs change requests: Status, changes, and so forth

Change Control Log

Step 6
Management/Steering Committee evaluate.

Step 3
Investigate.

Step 5
Measure the effect of the Change with Impact Analysis.

Step 4
Obtain approval from project managers.

This process provides a structured approach for identifying and formally requesting a project change, investigating and measuring its impact, and gaining the appropriate approvals before moving forward. This ensures that there are checks and balances as the project team weighs how the change will affect project cost, schedule, and the overall project scope.

4.0 Problem Resolution

Describe your organizations approach to problem resolution including an escalation matrix.

A well-established project governance and problem resolution mechanism is crucial to the overall success of the project. It starts with defining a formal Project structure including an executive steering committee, a Business advisory council, a Project Management Office and a structured Project Team.

The governance structure is underpinned by the following key principles:

- The intent of the governance structure is to provide: (a) visibility of project progress (b) interaction between the parties to resolve issues; and (c) visibility of any elements of the Project which may impact either party's ability to perform its duties.
- Day-to-day issues shall be resolved by regular interactions between relevant individuals within each work stream and work stream managers. Governance meetings shall focus on reviewing overall progress against objectives, managing escalated risks and resolving escalated issues.

All defined governance meetings shall have a pre-defined formal agenda and minutes must be recorded after each meeting. The party who is running or organizing that meeting shall be responsible for creating a formal agenda and recording minutes of the meeting.

The flowchart below outlines the standard problem resolution mechanism in a typical upgrade and/or migration project.
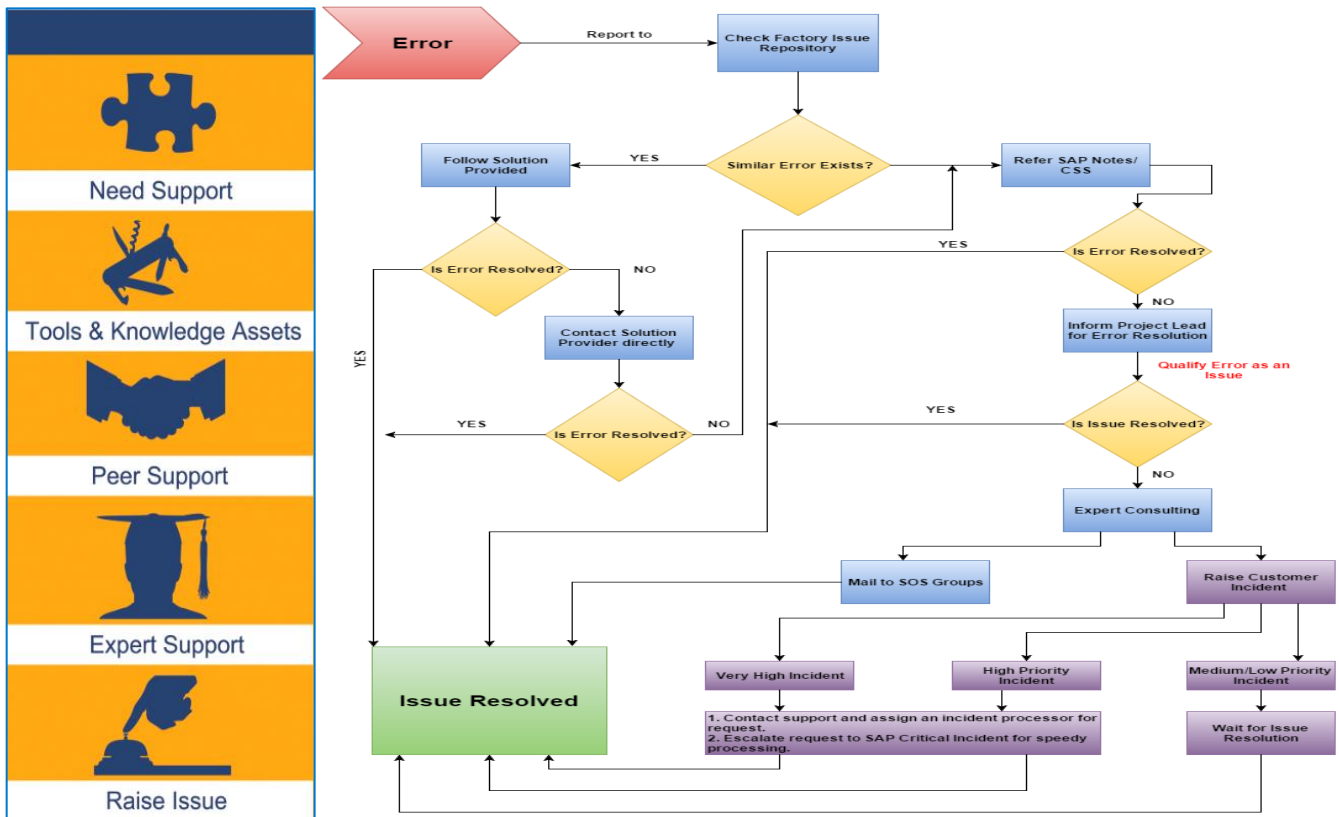
Escalation and Issue Management

A project specific proposed structure will be finalized during the Prepare phase. A model governance structure and communication plan is outlined as below:
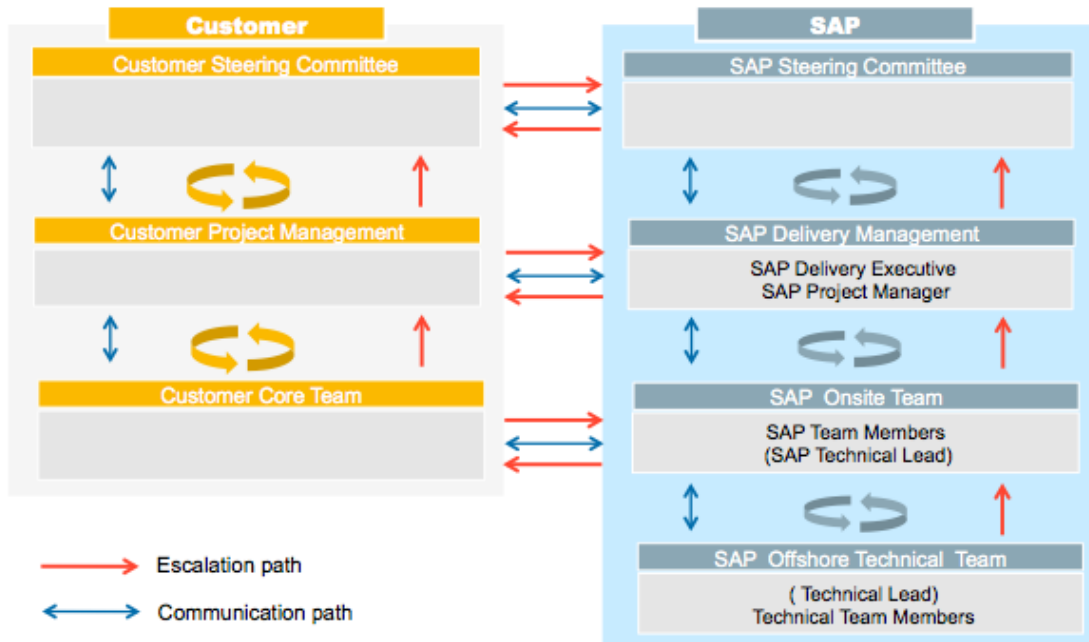
If there are any issues are not resolved by the project team the State and SAP shall be entitled to escalate such issue in accordance with the table below:

SAP representative	Discusses the issue with	State Representative	Time goal (not binding) for each level to resolve the issue before escalation to the next stage.
SAP Project Manager	Discusses the issue with	State Project Manager	1 Business Day
SAP Delivery Executive	Discusses the issue with	State Project Sponsor	2 Business Days

5.0 Knowledge Transfer

Describe your organizations approach to knowledge transfer and how you will ensure that State resources will be sufficiently trained prior to Go-Live.

SAP will work with the State of Arkansas to develop a knowledge transfer approach that allows the State of Arkansas to make informed decisions regarding system design, participate in project activities, and support the system once it is live.

Upgrade step-by-step procedural documentation, known as the cookbook, is produced by SAP and is a living document modified throughout the project life cycle. The document is further refined with every iteration in the target landscape. Issues or challenges encountered during the project execution are documented in the Issue Log where it is tracked to its closure.

Knowledge transfer is limited to the steps required to execute the migration of the system to the various components of the landscape. No additional classroom training for database maintenance and support is planned for IT staff during the scope of the project.

For the State to truly embrace the maintenance and support of their new HANA environment, the first step would be to participate in formal learning activities, which can be taken as public courses, onsite classes, or self-paced content, if it has not happened earlier. The goal is to build a foundation of understanding about the SAP solutions and each team member's work stream. Once the initial training has occurred, the State of Arkansas and SAP teams will agree upon specific activities, during which your team will learn how to support and maintain its landscape.

Although formal classroom training is not included in this proposal response, SAP does recommend, prior to the project start date, a 2-week Learning Needs Analysis (performed as a separate service not covered by this RFP) to identify knowledge gaps amongst the core project team, power users, SME's and IT. Although there will not

be major functional changes as a part of this migration, we believe it's critical to reevaluate skills, gaps and address any knowledge leakage. The Learning Needs Analysis consists of the following.

Assess project team skills
- Interview project team leads to identify the desired knowledge levels for team members.
- Interview each team member to measure and assess their current knowledge, and to find out how they prefer to learn.

Develop tailored learning plans
- Perform a gap analysis that compares current skill sets to the required knowledge level.
- Create tailored learning plans that identify specific classes by role and/or learner, and identify learning modes based on how individuals prefer to learn.
- Review the learning plans with managers, then present them to team members.

Create and present curriculum maps; deliver learning plans.
- Create curriculum maps within SAP Learning Hub for a functional support team role, or for individual team members.
- Assign and present curriculum maps to learners. Show learners how they can use the maps to manage their learning

Additionally, the State might consider purchasing SAP Learning Hub (additional cost to this proposal response).

SAP Learning Hub benefits for State of Arkansas

- Enables the project team, functional team and super users to build and maintain up-to-date skills and develop knowledge for all SAP solutions.
- Reduce costs associated with training and enabling Project Team, Functional Team and Super User community on any and all SAP solutions.
- Unlimited Access to thousands of training titles including e-learning courses, hand on simulations, handbooks and SAP Learning Rooms for a self-paced, dynamic social-learning opportunity.
- Access quarterly release notes, IT can evaluate the release and associated effort and impact to users.
- Tap into experts from SAP that deliver the latest comprehensive training for learners at every level — all in one place.
- Make personalized training available on demand, rather than on a fixed schedule
- Use the guided certification learning paths and course exercises/assessments to upskill users, prepare users for required HANA certifications or improve their knowledge.

6.0 Managing Go-Live and Post Go-Live Support

> Describe your organizations approach to managing Go-Live for this engagement.

A successful go live event is critical to the success of any HANA upgrade project. Careful planning is required to execute a timely and effective cutover to new production systems. SAP has launched many successful HANA upgrade cutover events by using an iterative cutover development approach. Starting with the cutover of the sandbox environment, SAP is careful to document every step required to transition to the new systems. After a minimum of two complete system upgrades, usually sandbox and development environments, SAP reviews the initial documentation for production cutover with the client. Timing, scope, SAP and client responsibilities, and potential risks and issues are discussed. The initial plan is then updated and used as an informal mock cutover in the QA environment. So, the first mock cutover is actually our third iteration of the documented cutover steps. The plan is then revised again and the team prepares for a final mock conversion that is staged to simulate the actual cutover weekend as closely as possible. Final touches are made to the plan and the team prepares for the actual cutover event. Included as Appendix 3 of our response is a draft go live plan from an actual inflight SAP led HANA upgrade project. Similar detail will be developed for the State of Arkansas upgrade project within 30 days of contract award.

> Describe your organizations approach to Post Go-Live support.

While SAP provides both toll-free telephone support and online incident support for all customers with an active maintenance support agreement, we want to ensure that the customer systems are functioning as expected after the project specific engagement, SAP also provides hyper care support for a specified duration after the project has gone Live. The duration of hyper care depends on the complexity of the engagement and the amount of changes involved in it. The purpose of hyper care is to ensure that SAP supports the customer while the systems are being released to its users and the users can get back to their regular tasks seamlessly.

All project specific issues related to migration will be fixed by the project team, and follow the project organization structure for reporting and escalation. However, no SLAs related to resolution time is included in the proposal. SAP team can agree with customer on a response time for issues raised. For the purpose of this engagement, SAP plans to have the platform specific subject matter expert fulltime for a period of 4 weeks at the project location to support any critical incident immediately arising out of the migration. Other subject matter experts will be made available remote for any support which may be needed for specific reasons. The onsite PM or the Platform SME is the single point of contact for raising all such post go live issues and the project team will provide the first level of resolution to the best of their abilities.

Roles	Location		Duration
Basis Lead	Onsite	Full Time	4 Weeks

| Project Manager | Onsite | Full Time | 4 Weeks |
| Functional Consultant (BW / Security) | Remote | Part Time | 4 Weeks |

To solve issues which are beyond the control of the project team and to address product related issues SAP will use the SAP support framework and standard SAP support SLAs will be followed.

Issues are classified as follows:

Issue Priority		Criteria
1	Very High	Production system shutdown, system shutdown, or severe restrictions in a production system that prevent productive work
2	High	Severe loss of functionality in a production system, significant restrictions in a production system
3	Medium	Individual function not performing properly in a production or test system
4	Low	Production or test system design, or documentation problem

7.0 Payment Milestone

The State described the preferred payment milestone schedule in Section 2.15 of the RFP. Please describe your organization's suggested milestone schedule and why you feel it is a better approach.

Note: Section 2.15 states that the State shall not pay more than 50% prior to Go-Live.

If selected for this Migration project, SAP would like to discuss payment terms as part of our contract negotiations. Because Given our long-term relationship with the State, the low risk nature of the upgrade, and the relatively short project duration, we are confident we can agree on terms that are acceptable to both SAP and the State.

8.0 Lessons Learned

Please describe any "lessons learned" from the Prospective Contractor's relevant experience and how those lessons learned will impact the Prospective Contractor's approach to this engagement.

SAP has learned many lessons over the last 40 years. We have found that our customers experience a successful project when they plan for the following:

- **Establish executive sponsorship and ownership** – Visible commitment and involvement from company executives will drive team accountability and alignment for the overall success of the project.
- **Organize frequent stakeholder engagement and communication** – Have open conversations and meaningful dialogue to ensure that the long-term vision and goals are shared and aligned.
- **Operate on trust and respect** – Work as "one team" who drives towards a common goal and focuses on outcomes collectively. Leverage each other's strengths and respect the contribution of the entire team.
- **Form a well-staffed project team** – When people with the right skills and experience are in charge of the process, everything moves more smoothly. It is important to have dedicated and empowered team members with appropriate background and access to the resources they will need to execute on the project plan.
- **Establish a solid knowledge transfer and change management plan** – The project can only succeed if people understand what you expect from them. Implementations that lack clear goals, processes, and modes of communication are likely to move more slowly and may result in a lower level of participation.
- **Minimize complexity by containing scope** – Business-led projects focus on reducing complexities and driving an agile and outcome-oriented delivery. Shorter implementation cycles can support faster time-to-implementation and realization of benefits.
- **Implement rigorous governance over delivery** – Leverage an effective governance model and demonstrate rapid escalation where required. This will support faster decision making and effective risk and issue management.

9.0 Issues, Challenges and Potential Risks

DFA is interested in any information that may help to identify issues, clarify the requirements, reduce risk of the procurement, and identify issues and challenges of managing and implementing the proposed Solution. Describe the primary concerns, risks, issues and recommendations for DFA as it proceeds with this SOW.

For any project, "risk" represent the potential for disruptions to project team's ability to achieve their objectives. To be successful, Arkansas needs a clear understanding of the risks you face as an organization, particularly as they relate to this implementation/testing effort and a plan to manage them.

During this project, the SAP project team will execute a standard, methodical process for identifying, analyzing, and responding to risk. This process includes continuous monitoring that enables the team to identify risks before they become project issues. The figure below illustrates, at a high level, the key elements of SAP's Project Risk Management Process.

SAP's Project Risk Management Process

Assess Risks and Develop/update the Project Risk Register

Continuous

```
Risk          Risk             Risk          Risk          Risk
Planning  →   Identification →  Analysis  →   Response  →   Monitoring
```
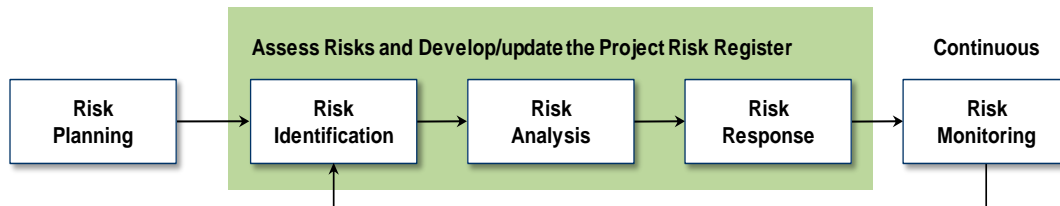
Develop a Risk Management Plan that will serve as the guidebook for identifying, analyzing, and responding to project risks.

After developing the initial Project Risk Register, which documents potential project risks, the project management team meets regularly to monitor identified risks and address new ones that may arise. If a risk becomes an issue that is affecting the project, it will be addressed by executing the project's Issue Management procedure.

Issue Management

Issue Management is a key to project success, and a key element to be managed for the State of Arkansas migration project. Issues are the barriers in place that restrict completion of the objectives of the project. On many projects, people are reluctant to raise issues, or they are concerned about how to raise them and what the consequences are, and therefore they do not raise the issues they see. Issues recognized early can typically be managed most efficiently; issues discovered much later in the process typically become much larger and require more effort to resolve. Issues should be managed early and often. This prevents issues from restricting the success of any project deliverables.

Issue management within the migration project will highlight problems that, if not addressed, will jeopardize the success of the project. Resolving or defining actions to be taken for these issues must to be taken urgently. An Issues Log should be used to identify, monitor, and document issues impacting the project.

Basic guiding principles include:

- Any issue that cannot be resolved by a project team should be captured on the Issues Log.
- There will be at least a weekly meeting to review the Issues Log for the project. The PMO and Team Leads are responsible for monitoring issues on the Issues Log and driving them to closure.
- An issue escalation procedure is to be followed to resolve issues where necessary, issues may need to be escalated to the Project Sponsor, Steering Committee or higher.
- To ensure a proposed resolution meets expectations, only the identified owner may close an issue (e.g. resolver may not close).
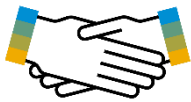
SECTION T-5: REQUIRED PLANS

1.0 Implementation Plan

> The Prospective Contractor should submit a Work Plan regarding the implementation of all services requested under this RFP. This Work Plan will demonstrate that the Prospective Contractor has a thorough understanding of all activities required. DFA requires that the Prospective Contractor provide a schedule with the shortest duration required to implement the services smoothly and without interruption to business operations.
>
> The Work Plan should show all key elements including details with responsibilities, timelines, durations, milestone dates, deliverables, and Prospective Contractor personnel hours by deliverables, State personnel hours, and all critical dependencies for the milestones and deliverables. The Work Plan may be an attachment to the Vendor's Technical Proposal and tabbed as such in the submission as well as an electronic soft copy (Microsoft Project ® or equivalent and Adobe ® PDF) version in the Prospective Contractor's electronic submission of the Technical Proposal.
>
> All content should be formatted for effective viewing in hard and soft copy.
>
> **Instructions:** Provide a Work Plan including at least:
>
> - High level Project schedule (Microsoft Project® preferred and Adobe ® PDF) including all deliverables and milestones, and timeline
>
> - A listing of what staff is assigned responsibility for each deliverable within the WBS to the level at which control will be exercised (i.e., DFA, Contractor staff)
>
> - Major milestones and target date(s) for each milestone
>
> - Definition of the review processes for each milestone and deliverable and a description of how the parties will conduct communication and status review
>
> Include or attach associated artifacts such as Gantt charts and flowcharts as appropriate.

Refer to SAP's Starting Project Plan, included as Appendix 4 to our response.

1.1 Implementation Plan Overview

> **Instructions:** Provide an explanation of your organizations upgrade timeline and the benefits.

SAP has developed a project timeline that minimizes risk to the State of Arkansas and meets the required timeline expected by the State. Assuming a project kickoff of June 18, 2018, SAP proposes production system go live, after twenty-one weeks, on the weekend of November 9, 2018. The figure below depicts the SAP Activate phases, high level activities accomplished during each phase, and high-level responsibility for performance of each activity. The timeline as depicted below minimizes the time required to perform the

complete upgrade for the Arkansas Administrative Statewide Information System (AASIS) technical system. This is accomplished by leveraging SAP's DMO using SUM tools and methodology.

During the first two weeks of the project, the team is assembled and final planning for the engagement takes place. Additionally, technical prerequisites are verified and logistics of the project are completed to facilitate the smooth running of the project.

To save time and maximize the use of resources, Cycle 1 – Sandbox Migration begins during the initial two weeks of the project. This allows for early preparation of the system while the project planning is still underway. During the Sandbox Migration, the team makes optimum use of time by overlapping activities to the maximum extent possible. This provides for a compressed timeline, makes maximum use of SAP tools, yet still allows for a thorough evaluation, performance, and documentation of the required steps and any required ABAP code remediation.

Based on learnings from the Sandbox Migration cycle the team can shorten the Development Cycle considerably. While there is still some overlap in the activities between the two cycles, the result is to refine the process and prepare for the final migration cycle prior to cutover.

Cycle three, QA Migration is where the team takes things a little more slowly. The migration time, steps, and documentation are thoroughly reviewed and documentation is finalized to facilitate the production cutover. Additional time is built into this cycle to accommodate detailed and systematic testing. With SAP's assistance the State of Arkansas will execute and approve critical functional tests to validate the final system migration prior to migrating the production system.

While the testing is underway, SAP has built in a fourth migration cycle to simulate the actual production cutover. This cycle overlaps the last half of testing to minimize impact to the schedule as well as allow for any final adjustments prior to the final cutover.

Cycle five, is generally the most efficient and easiest cycle. The process has been performed four times before the final cycle and all conditions will have been verified and give the green light for cutover. Timing for the cutover will have been verified for completion within a weekend cutover window with resources staged to minimize risk and prepare for live operations. As this final cycle is completed the team prepares for successful project closure and initiation of post go-live support.

	ACTIVITIES	RESP
PREPARE	**Project Setup & Concept** (2 week)	
	Finalize planning and delivery onboarding	ALL
	Preparation (team staffing, hardware, milestone plan,..)	ALL
	Technical Assessment for UCCHECK/HANA Code Assessment to	SAP
	System Preparation (cleaning, check prerequisites)	ALL
	Setup target HANA hardware	Customer
	Quality Gate	SAP
EXPLORE	**Cycle 1 - Sandbox Migration**	
	Sandbox System Build - Copy of PROD and Pre-Requisites completion	Customer
	Unicode enablement of custom programs on Source SBX	Customer
	SAP ERP - Unicode Conversion and HANA Migration (DMO)	SAP
	SAP ERP - HANA Code Remediation for ABAP	Customer
	SAP BW Migration (SBX)	SAP
	Functional test	Customer
	Cook Book, E2E Cutover plan creations (adjust in next cycle)	SAP
	Quality Gate	SAP
REALIZE	Development Soft Freeze (Double Maintenance)	
	Cycle 2 - Development Migration	
	Pre-Requisites completion	Customer
	SAP ERP - Unicode Conversion and HANA Migration (DMO)	SAP
	Delta HANA Code Remediation	Customer
	SAP BW - Migration (DEV)	SAP
	Unit testing	Customer
	Quality Gate	SAP
	Cycle 3 - QA Migration	
	Pre-Requisites completion	Customer
	SAP ERP - Unicode Conversion and HANA Migration (DMO)	SAP
	SAP BW Migration - QAS	SAP
	Integration Test / Regression Testing	SAP
	User Acceptance Testing	Customer
	Quality Gate	SAP
	Development Freeze (No Project or Production Support Changes)	
	Cycle 4 - Dry Run and Cutover planning	
	Build Dry Run system as latest copy of PRD and Pre-Requisites completion	Customer
	SAP ERP - Unicode Conversion and HANA Migration (DMO)	SAP
	SAP BW, EP Migration	SAP
	Infrastructure Testing (Backup /Restore, HA/DR tests)	Customer
	Migration Cutover Planning - Final verification Cutover plan and cookbook update	ALL
	Quality Gate	SAP
DEPLOY	**Cycle 5 - Production Cutover and Go-Live**	
	Pre-Requisites completion	Customer
	SAP BW (PRD), SOLMAN CONFIGURATION OF PRD	SAP
	SAP ERP - Unicode Conversion and HANA Migration (DMO)	SAP
RUN	**Post Go-Live (PRD System powered by HANA)** (4 weeks)	
	Post Go-Live Support	SAP
	Quality Gate	SAP

Figure – High Level AASIS Technical System Upgrade Timeline

2.0 Testing Plan

Instructions: Provide a Testing Plan.

The Testing Plan should demonstrate that the Prospective Contractor has a thorough understanding of all activities required to effectively test.

The testing plan should include the following: Unit Testing, Performance/Volume testing, System Integration Testing (SIT), Facilitation of User Acceptance Testing (UAT)

All content should be formatted for effective viewing.

Include or attach associated artifacts as appropriate.

Testing is an essential component of any migration project. SAP will work cooperatively with the State of Arkansas to prepare a Test Plan and verify business functionality and system performance prior to cutover of the production environment. To demonstrate that SAP fully understands the complexities of system and business testing during and post migration, we have attached a sample Test Plan (see Appendix 5) from one of our previous successful HANA migration projects for the State's evaluation. For this project, SAP proposes that SAP and State of Arkansas Project teams work cooperatively to develop a Test Plan for the Migration Project.

SAP's functional testing methodology supports the wave / sprint approach used in this program as shown in **Error! Reference source not found.**.
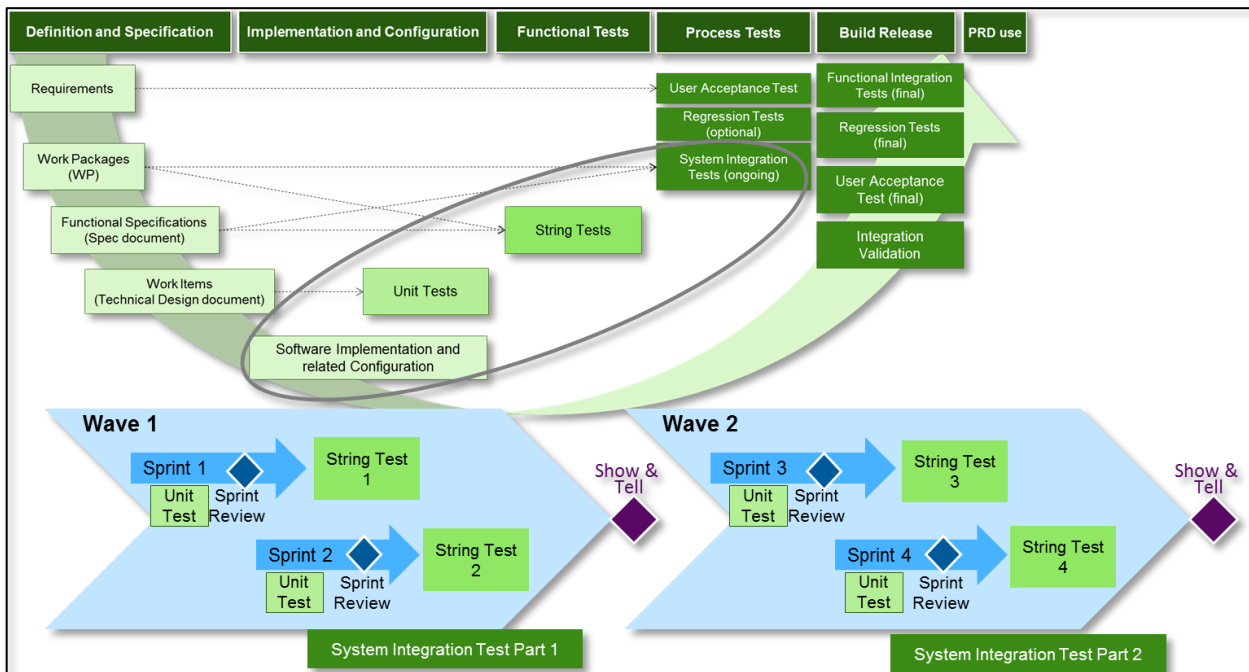
Each wave may comprise of several sprints. Each sprint will have a unit testing and a string testing phase. System integration testing and basic UAT testing can start in each wave too, which will use test automation. After this, a show and tell session will be done by the test team to demonstrate the solution developed in the wave to the State of Arkansas. Some basic regression testing will also be done after a wave has completed to check that previously working functionality is still functioning as expected. A final system integration validation phase and regression testing will take place once the waves are completed. After this, a final UAT test phase will be conducted by State of Arkansas.

A detailed test strategy and testing plan will be drafted in discussion with the State of Arkansas during the early stages of the project. A sample test strategy document and testing plan are included as Appendix 5 to our response.

As a standard practice, the ABAP objects that are impacted by the release upgrade will be unit tested for its correctness during the ABAP adjustment phase of the project. For this RFP, SAP shall also participate in the following:

• Unit Testing

- String/Link Testing to ensure that multiple transactions work in conjunction with each other without issue
- Integration Testing — Ensure the Solution supports end-to-end business processes
- SAP will check that the performance of the transactions in the target system is similar to the source system.

The following will be the responsibility of the State of Arkansas

- Performance/Stress Testing
- User Acceptance Testing
- Regression Testing
- Performance/Stress Testing

3.0 Knowledge Transfer Plan

Instructions: Provide a Knowledge Transfer Plan.

The Knowledge Transfer Plan should demonstrate that the Prospective Contractor has a thorough understanding of all activities required to effectively train staff. The Knowledge Transfer Plan should show all key elements including details with responsibilities, timelines, staffing, durations, and deliverables.   All content should be formatted for effective viewing.

Include or attach associated artifacts as appropriate.

SAP will work with the State of Arkansas to develop a knowledge transfer approach that allows the State of Arkansas to make informed decisions regarding system design, participate in project activities, and support the system once it is live.

Upgrade step-by-step procedural documentation, known as the cookbook, is produced by SAP and is a living document modified throughout the project life cycle. The document is further refined with every iteration in the target landscape. Issues or challenges encountered during the project execution are documented in the Issue Log where it is tracked to its closure.

Knowledge transfer is limited to the steps required to execute the migration of the system to the various components of the landscape. No additional classroom training for database maintenance and support is planned for IT staff during the scope of the project.

4.0 Go-Live Plan

Instructions: Provide a Go-Live Plan.

The Go-Live Plan should demonstrate that the Prospective Contractor has a thorough understanding of all activities required.

All content should be formatted for effective viewing.

Include or attach associated artifacts as appropriate.

A successful go live event is critical to the success of any HANA upgrade project. Careful planning is required to execute a timely and effective cutover to new production systems. SAP has launched many successful HANA upgrade cutover events by using an iterative cutover development approach. Starting with the cutover of the sandbox environment SAP is careful to document every step required to transition to the new systems. After a minimum of two complete system upgrades, usually sandbox and development environments, SAP reviews the initial documentation for production cutover with the client. Timing, scope, SAP and client responsibilities, and potential risks are issues that are discussed. The initial plan is then updated and used as an informal mock cutover in the QA environment. So, the first mock cutover is actually our third iteration of the documented cutover steps. The plan is the revised again and the team prepares for a final mock conversion that is staged to simulate the actual cutover weekend as closely as possible. Final touches are made to the plan and the team prepares for the act cutover event. Included as Appendix 3 is a draft go live plan from an actual inflight Sap led HANA upgrade project. Similar detail will be developed for the State of Arkansas upgrade project within 30 days of contract award.
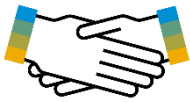
SECTION T-6: SUBMISSION CHECKLIST

1.0 Prospective Contractor Response Checklist

The Prospective Contractor should complete the following Tables to verify that all the RFP response requirements have been completed as instructed. The Prospective Contractor should provide specific references to Proposal locations (e.g., section and page numbers) for each Template included. During the evaluation process, OSP will perform an initial review of the Proposals to confirm these are included. If the items identified in this checklist are not included, the Proposal may be disqualified.

Instructions: Complete the following Table. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

Table 1.   Prospective Contractor General Requirements

PROPOSAL RESPONSE ITEM	COMPLETED AND PROVIDED AS INSTRUCTED?	
Prospective Contractor's Proposal's stamped date meets date and time specified in the RFP	YES ☒	NO ☐
Proposal is sealed	YES ☒	NO ☐
Technical Proposal and Cost Proposal are sealed in separate envelopes or boxes within the "Sealed Bid." Each Proposal should be clearly marked "Technical Proposal" or "Cost Proposal"	YES ☒	NO ☐
Minimum Mandatory Requirements – The Prospective Contractor has documented proof that it meets the minimum mandatory requirements outlined in the RFP.	YES ☒	NO ☐

Table 2.   Prospective Contractor Package 1 Checklist

SECTION / TEMPLATE	PROPOSAL RESPONSE ITEM	COMPLETED AND PROVIDED AS INSTRUCTED?		REFERENCE TO PROPOSAL RESPONSE SECTION
T-1	Cover Letter and Executive Summary	YES ☒	NO ☐	
T-2	Prospective Contractor Experience	YES ☒	NO ☐	
T-3	Prospective Contractor Engagement Organization and Staffing	YES ☒	NO ☐	
T-4	Requirements Approach	YES ☒	NO ☐	
T-5	Required Plans	YES ☒	NO ☐	
T-6	RFP Response Checklist	YES ☒	NO ☐	

Table 3.   Prospective Contractor Package 2 Checklist

SECTION / TEMPLATE	PROPOSAL RESPONSE ITEM	COMPLETED AND PROVIDED AS INSTRUCTED?		REFERENCE TO PROPOSAL RESPONSE SECTION
C-1	Cost Workbook	YES ☒	NO ☐	

Table 4.   Prospective Contractor General Requirements

Prospective Contractor should provide the following documents with their technical proposal response.

PROPOSAL RESPONSE ITEM	COMPLETED AND PROVIDED AS INSTRUCTED?	
EO 98-04 Disclosure Form. (See *Standard Terms and Conditions, #27. Disclosure*.)	YES ☐	NO ☒
Copy of Prospective Contractor's *Equal Opportunity Policy*. (See *Equal Opportunity Policy*.)	YES ☒	NO ☐
Voluntary Product Accessibility Template (VPAT). (See *Technology Access*.)	YES ☒	NO ☐

There are no instructions in the RFP to complete this form EP-98-04. However, looking up the form publicly, this does not appear to pertain to SAP (not an individual, and we are a public company, so no individual owners of 10% or more listed.)

VPAT – for the products relevant to this RFP, the only VPAT available is for Test Data Migration Server. That VPAT is attached as Appendix 6 to our response.

EOE – SAP is an Equal Opportunity Employer, please see Employee Diversity and Inclusion at SAP, included as Appendix 8 of our response.

2.0 Prospective Contractor Attachments

The Prospective Contractor should identify all attachments that are part of the Technical or Cost Proposals. The Prospective Contractor should provide specific references to Proposal locations (e.g., section and page numbers) for each attachment included. All attachments must be included in both soft and hard Proposal copies.

Instructions: Complete the following Table with any attachments to the Technical or Cost Proposals. Add rows as necessary. Do not change any of the completed cells. Any changes to the completed cells could lead to the disqualification of the Proposal.

Table 5.   Prospective Contractor Attachment Checklist

ATTACHMENT ID	ATTACHMENT NAME	ATTACHMENT PROVIDED?		REFERENCE TO PROPOSAL RESPONSE SECTION
SAP Appendix 1	SoAR SP-18-0087 - SAP Appendix 1 – Dun and Bradstreet Report	YES ☒	NO ☐	Section T-2, 4.1
SAP Appendix 2	SoAR SP-18-0087– SAP Appendix – Key Personnel Resumes	YES ☒	NO ☐	Section T-3, 3.0
SAP Appendix 3	SoAR SP-18-0087– SAP Appendix 3 – Sample Go-Live Plan	YES ☒	NO ☐	Sections T-4, 6.0 and T-5, 4.0
SAP Appendix 4	SoAR SP-18-0087– SAP Appendix 4 – Starting Project Plan	YES ☒	NO ☐	Section T-5, 1.0
SAP Appendix 5	SoAR SP-18-0087– SAP Appendix 5 – Sample Test Plan and Text Strategy	YES ☒	NO ☐	Section T-5, 2.0
SAP Appendix 6	SoAR SP-18-0087– SAP Appendix 6 – VPAT	YES ☒	NO ☐	Sections T-6, 1.0 Table 4, and T-6, 3.0
SAP Appendix 7	SoAR SP-18-0087– SAP Appendix 7 – Existing Agreement	YES ☒	NO ☐	Section T-6, 3.0
SAP Appendix 8	SoAR SP-18-0087– SAP Appendix 8 – Employee Diversity and Inclusion at SAP	YES ☒	NO ☐	Section T-6, 1.0 Table 4

3.0 Exceptions

> Any requested exceptions to items in this RFP which are <u>NON-mandatory</u> **must** be declared below or as an attachment to this page. Prospective Contractor **must** clearly explain the requested exception, and should label the request to reference the specific solicitation item number to which the exception applies.
>
> Exceptions to Requirements **shall** cause the Prospective Contractor's proposal to be disqualified.

SAP proposes use of the existing agreement with State of Arkansas, which includes a Professional Services Agreement. We have included a copy of the current agreements as Appendix 7 to our response.

SAP's proposal responses, including but not limited to its offered pricing, are based on the assumption that a direct contractual relationship will exist between SAP and State of Arkansas using as the contracting vehicle the current SAP Agreement.

If State of Arkansas selects SAP as a vendor SAP and State of Arkansas will execute an SAP Order Form to the SAP Agreement. The Order form will set out the licensed products, cloud services, or professional services with applicable metrics and quantities, the license and support fees and any other business terms mutually agreed upon by SAP and State of Arkansas during negotiations. A sample Order Form is available upon request.

SAP reserves the right to negotiate and takes a general exception to any and all terms and conditions set forth in the RFP to the extent they are in addition to or are inconsistent with the terms and conditions set forth in the SAP Agreement. SAP's response to this RFP is not acceptance of State of Arkansas's terms and conditions. If, upon State of Arkansas's review of SAP's proposal, State of Arkansas considers that certain provisions of the RFP must remain applicable, State of Arkansas and SAP shall enter into good faith negotiations and incorporate those terms that are mutually acceptable to both parties.

SAP's proposal response is based on the functionality of the SAP software and cloud services as it existed at the time of review, SAP's understanding of State of Arkansas's requirements as described in the RFP, the business processes built into the SAP software, and SAP's recommendation of such processes to State of Arkansas. As such, SAP does not agree to incorporate such functionality responses, SAP's proposal response, or the proposal itself into the resultant contract.

SAP is solely in the business of developing, manufacturing, licensing, and supporting its proprietary commercial software. SAP does not provide hardware or system integration services. SAP cannot advise on all third-party software, hardware, or other services that State of Arkansas may need to fully implement the proposed Software.

In addition, the following pricing assumptions apply to the pricing included in SAP's proposal:

 (i)   SAP's pricing for the proposed software and related support services will be valid December 31, 2018.

(ii)   All SAP software, software documentation, screenshots, functionality design matrix, commercial pricing, functional descriptions, and licensing/support terms, as well as ideas and work product of SAP contained in the proposal, are considered trade secrets and confidential and proprietary to SAP. SAP does not agree that those ideas and work product shall be owned by State of Arkansas. State of Arkansas shall have the right to use any or all such ideas contained in the proposal solely for evaluation purposes, and any other use of such work product without SAP permission constitutes an infringement of SAP's intellectual property or theft of trade secrets. State of Arkansas's right to duplicate, use and disclose the related portions of the proposal, in whole or in part, shall be authorized solely as necessary for evaluation purposes or to the extent required by applicable state law. Any and all software documents, screenshots, and functionality design matrix included in the proposal shall be considered exempt from any public disclosure to the fullest extent allowed under law.

Specific SAP Clarifications to State of Arkansas SAP HANA Upgrade Installation Services RFP include the following:

RFP Section 1.24, Technology Access	SAP is committed to delivering software solutions that are accessible to individuals with disabilities. This includes addressing Section 508 standards and W3C WAI WCAG 2.0 (Level A and AA) guidelines, both of which are incorporated into the SAP accessibility standard, which is used for developing SAP products. While the solutions proposed implement a number of accessibility features, they are currently not fully optimized for accessibility. Supported accessibility features are provided by SAP solutions in combination with third-party assistive technologies such as the screen reader JAWS. JAWS and most other assistive technologies may require SAP and or customer furnished client-side software. Detailed VPATs addressing Section 508 of the Workforce Rehabilitation Act requirements and WCAG2.0 documents for many SAP applications are available for review upon request.

	SAP shall perform its Services in a manner that does not make any existing SAP Software that previously Supported section 508 requirements, as listed in 1194.21 or 1194.22, less accessible as a result of the Services. Available VPAT and WCAG docs (for SAP Test Data Migration Server only) are included as Appendix 6 to our response.

SAP APPENDICES

The following appendices are included in this section:

SAP Appendix 1 – Dun & Bradstreet Report

Dun & Bradstreet One-Stop Report

Sap America, Inc.

9 January 2018

Sap America, Inc. [in]

3999 W Chester Pike
Newtown Square, PA
19073-2305
United States

Tel: 610-661-1000
Fax: 610-661-4020

D-U-N-S® Number:	18-361-6317
Employees:	13,888
Company Type:	Private Subsidiary
Corporate Family:	476 Companies
Ultimate Parent:	Sap Se

Incorporation Date: 1988

Financials in:	As Reported (mil)
Reporting Currency:	US Dollar
Annual Sales:	1,000.0
Total Assets:	NA

Business Description

SAP America represents its German parent, SAP, in the US, providing enterprise software and services for managing accounting, distribution, human resources, and manufacturing functions. The company's products include business intelligence, enterprise resource planning, customer relationship management, and supply chain management software. SAP America offers industry-specific applications for markets ranging from aerospace and defense to wholesale distribution. Its services include consulting and support, as well as custom development and application hosting. SAP America accounts for more than one-quarter of SAP's sales.

Source: D&B

Industry

Industry	Software and Programming
ANZSIC 2006:	7000 - Computer System Design and Related Services
ISIC Rev 4:	6202 - Computer consultancy and computer facilities management activities
NACE Rev 2:	6202 - Computer consultancy activities
NAICS 2012:	541511 - Custom Computer Programming Services
UK SIC 2007:	6202 - Computer consultancy activities
US SIC 1987:	7371 - Computer Programming Services

Key Executives   (Emails Available)

Name	Title	Source
Anita Gibbings	Senior Analyst Office Of The Chief Executive Officer Portfolio Strategic	D&B
Scott Russell	President - SAP APJ	D&B
Stephen Shute	EVP and Chief Business Officer, Americas and Asia Pacific Japan (APJ)	D&B
Audrey Agasse	Partner Certification Auditor	D&B
Ken Agena	Venture Service and Support Partner	D&B

News

Title	Date
Spotlight On Upcoming Oral Arguments January 2018 Mondaq Business Briefing (835 Words)	9-Jan-2018
SAP's 2017 Diversity and Inclusion Accomplishments - and the Road Ahead ENP Newswire (443 Words)	3-Jan-2018
Dallas advocacy group raises $500,000 to assist abused children in court Dallas Morning News (TX) (539 Words)	30-Nov-2017
TESARO, Inc. Co-Founders named Entrepreneur Of The Year® 2017 National Overall Award winners PR Newswire US (1058 Words)	20-Nov-2017
Ellis Hilton Garden Inn Celebrates Ribbon Cutting In Newtown Square, Pa Citybizlist (391 Words)	14-Nov-2017
SIMPSON MANUFACTURING CO INC /CA/ - 10-Q - Management's Discussion and Analysis of Financial Condition and Results of Operations. Edgar Glimpses (8364 Words)	9-Nov-2017

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D-U-N-S® Number: 18-361-6317   Key ID^{SM} Number: 326967

1 - Profit & Loss Item Exchange Rate: USD 1 = USD 1
2 - Balance Sheet Item Exchange Rate: USD 1 = USD 1

Sap America, Inc.

Newtown Square, Pennsylvania, United States, Tel: 610-661-1000

Board of Directors

Name	Title	Function	Source
Carlos Burks View Email	Awards Co-Chair	Chairman	D&B
Susan Vickers View Email	Executive Management (Chairman / Chief Executive Officer / Chief Financial Officer)	Chairman	D&B
Martin Hill View Email	Vice President and General Manager Iot and Digital Supply Chain Mee	Vice-Chairman	D&B
Kai Sachs View Email	Vice Chair	Vice-Chairman	D&B
Stefan Schulz View Email Social: in	Vice Chairman	Vice-Chairman	D&B
Marc Astor View Email	Director	Director/Board Member	D&B
Stephan Bahr View Email	Director	Director/Board Member	D&B
Manuel Barrera View Email	Director	Director/Board Member	D&B
Daniel Beringer View Email	Director, Director Midsize Enterprise Marketing at SAP	Director/Board Member	D&B
Rohit Bhalla View Email Social: in	Director	Director/Board Member	D&B
Panagiotis Bissiritsas View Email Social: in	Member Supervisory Board	Director/Board Member	D&B
Walter Bradley View Email	Director	Director/Board Member	D&B
John Branstrator View Email	Director	Director/Board Member	D&B
Jim Brett View Email	Director	Director/Board Member	D&B
Chrissa Brinley View Email	Director	Director/Board Member	D&B
Joseph Busillo View Email Social: in	Director	Director/Board Member	D&B
Jack Cai	Director	Director/Board Member	D&B
Andrea Carson View Email	Director	Director/Board Member	D&B
Will Caseber View Email	Director	Director/Board Member	D&B
Emmanuel Cassimatis View Email	Director	Director/Board Member	D&B
Luis Castro View Email	Director	Director/Board Member	D&B

Executives

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Name	Title	Function	Source
Anita Gibbings View Email	Senior Analyst Office Of The Chief Executive Officer Portfolio Strategic	Chief Executive Officer	D&B
Al Hilwa View Email	Office of the Chief Executive Officer Seattle Area	Chief Executive Officer	D&B
Harald Hirsch View Email	Chief Executive Officer Sap Primary Support	Chief Executive Officer	D&B
Verena Lommatzsch View Email	Fellowship In The Office Of The Co-Chief Executive Officer	Chief Executive Officer	D&B
Susan Vickers View Email	Executive Management (Chairman / Chief Executive Officer / Chief Financial Officer)	Chief Executive Officer	D&B
Tanja Wageck View Email	Board Area Human Resources Business Partner - Office of the Chief Executive Officer	Chief Executive Officer	D&B
Jan Abadschieff View Email	Principal Enterprise Architect	President	D&B
Henry Bailey View Email Social:	Industry Principal At Sap	President	D&B
Parag Bakde View Email	S and Owner Principal Consultant	President	D&B
Srinivasan Balasubramanian View Email	Principal Solution Architect - Value Prototyping / Solution Assembly & Knowledge Packaging	President	D&B
Gwendolyn Balfour View Email	Principal HCM Consultant	President	D&B
Rohit Balu View Email	Product Owner- Public Sector Packages (SA&P Emerging Industries)	President	D&B
Frank Baranski View Email	Principal Business Consultant	President	D&B
Gary Bellis View Email	Principal Development Architect 3999 West Chester Pike	President	D&B
Satish Bhat View Email	Principal. Value Engineering	President	D&B
Niraj H Bhatt View Email	Principal Consultant - SAP CRM	President	D&B
Edwin Bijlsma View Email	Principal Consultant SCM	President	D&B
Nico Bresseleers View Email	SAP Principal Consultant	President	D&B
Kevin Brophy View Email	Life Sciences Industry Principal	President	D&B
Heike Busch View Email	Principal Solution Architect	President	D&B
Bob Caswell View Email	Product Owner, User Experience - Rapid Deployment	President	D&B
Joe Celentano View Email	Principal Solutions Consultant	President	D&B
Jorge Certified View Email	Project Principal	President	D&B

Corporate Family

Sap America, Inc.
Total Corporate Family Members: 476

Company Name	Company Type	Location	Country	Industry	Sales (mil)	Employees	Source
Sap Se	Parent	Walldorf, Baden-Württemberg	Germany	Computer Programming	22,062.0	80,609	D&B
Sap Asia Pte. Ltd.	Subsidiary	Mapletree Business City	Singapore	Computer System Design Services	523.6	82,426	D&B
Sybase (Singapore) Pte. Ltd.	Subsidiary	Singapore	Singapore	Computer, Office Equipment and Software Merchant Wholesalers	13.0	100	D&B
Sap Asia (Vietnam) Company Limited	Subsidiary	Ho Chi Minh, Ho Chi Minh City	Viet Nam	Computer Programming	86,872.0	90	D&B
S A P Middle East & North Africa Llc	Subsidiary	Dubai, Dubai	United Arab Emirates	Computer, Office Equipment and Software Merchant Wholesalers		51,500	D&B
Sap America, Inc.	Subsidiary	Newtown Square, PA	United States	Computer Programming	1,000.0	13,888	D&B
Concur Technologies, Inc.	Subsidiary	Bellevue, WA	United States	Software	352.8	4,900	D&B
Trx, Inc.	Subsidiary	Atlanta, GA	United States	Data Processing	68.4	794	D&B
Trx, Inc.	Branch	Milton, FL	United States	Travel and Reservation Services		280	D&B
Trx, Inc.	Branch	Bensenville, IL	United States	Data Processing		2	D&B
Trx Luxembourg Sarl	Subsidiary	Luxembourg	Luxembourg	Holding Companies	0.4		D&B
Concur Technologies, Inc.	Branch	Eden Prairie, MN	United States	Software		148	D&B
Hipmunk, Inc.	Subsidiary	San Francisco, CA	United States	Travel and Reservation Services	13.8	50	D&B
Concur Technologies, Inc.	Branch	Oakland, CA	United States	Software		50	D&B
Concur Technologies, Inc.	Branch	Redmond, WA	United States	Software		14	D&B
Concur Technologies, Inc.	Branch	San Francisco, CA	United States	Software		8	D&B
Concur Technologies, Inc.	Branch	San Francisco, CA	United States	Nonclassifiable Establishments		8	D&B
Concur Technologies, Inc.	Branch	Allen, TX	United States	Electronics and Appliances Stores		7	D&B
Concur Technologies, Inc.	Branch	Saint Louis Park, MN	United States	Software	0.1	5	D&B
Concur Technologies, Inc.	Branch	Alexandria, VA	United States	Software		4	D&B
Concur Technologies, Inc.	Branch	Minneapolis, MN	United States	Research and Development Services		4	D&B
Concur Technologies, Inc.	Branch	Atlanta, GA	United States	Miscellaneous Professional Services	0.0	3	D&B
Concur Technologies, Inc.	Branch	Lewisville, TX	United States	Software		2	D&B

Concur Technologies, Inc.	Branch	Canfield, OH	United States	Software		1	D&B
Sybase, Inc.	Subsidiary	San Ramon, CA	United States	Software	275.0	3,819	D&B
Sybase, Inc.	Branch	Reston, VA	United States	Computer System Design Services		250	D&B
Financial Fusion, Inc.	Subsidiary	Burlington, MA	United States	Computer Programming	27.0	110	D&B
Financial Fusion, Inc.	Branch	Lehi, UT	United States	Computer, Office Equipment and Software Merchant Wholesalers		4	D&B
Sybase Software (India) Private Limited	Subsidiary	Mumbai, Maharashtra	India	Computer Programming	1,178.8	100	D&B
Sybase Software (India) Private Limited	Branch	Bengaluru, Karnataka	India	Computer Programming			D&B
Sybase Software (India) Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sybase Software (India) Private Limited	Branch	Chennai, Tamil Nadu	India	Miscellaneous Professional Services			D&B
Sybase Software (India) Private Limited	Branch	New Delhi, Delhi	India	Computer Programming			D&B
Sybase Software (India) Private Limited	Branch	New Delhi, Delhi	India	Miscellaneous Professional Services			D&B
Sybase Software (India) Private Limited	Branch	Kanchipuram, Tamil Nadu	India	Miscellaneous Professional Services			D&B
Sybase Software (India) Private Limited	Branch	Mumbai, Maharashtra	India	Nonclassifiable Establishments			D&B
Sybase Software (India) Private Limited	Branch	Pune, Maharashtra	India	Computer Programming			D&B
Sybase Software (India) Private Limited	Branch	Pune, Maharashtra	India	Nonclassifiable Establishments			D&B
Sybase Software (India) Private Limited	Branch	Pune, Maharashtra	India	Miscellaneous Professional Services			D&B
Sybase Software (India) Private Limited	Branch	Pune, Maharashtra	India	Miscellaneous Professional Services			D&B
Sybase Software (India) Private Limited	Branch	Karnataka, Karnataka	India	Nonclassifiable Establishments			D&B
Sybase Software (India) Private Limited	Branch	Mumbai, Maharashtra	India	Miscellaneous Professional Services			D&B
Sybase Software (India) Private Limited	Branch	Thane, Maharashtra	India	Miscellaneous Professional Services			D&B
Sybase, Inc.	Branch	Boulder, CO	United States	Computer Programming		100	D&B
Sybase, Inc.	Branch	Alpharetta, GA	United States	Computer System Design Services		73	D&B
Sybase, Inc.	Branch	Parsippany, NJ	United States	Software		70	D&B

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Sybase, Inc.	Branch	Southfield, MI	United States	Software		50	D&B
Sybase, Inc.	Branch	Chicago, IL	United States	Computer Programming		50	D&B
Sybase, Inc.	Branch	Houston, TX	United States	Computer Programming		50	D&B
Sybase, Inc.	Branch	Charlotte, NC	United States	Computer, Office Equipment and Software Merchant Wholesalers		45	D&B
Sybase, Inc.	Branch	Tampa, FL	United States	Computer, Office Equipment and Software Merchant Wholesalers		45	D&B
Sybase, Inc.	Branch	Bellevue, WA	United States	Computer, Office Equipment and Software Merchant Wholesalers		45	D&B
Sybase, Inc.	Branch	American Fork, UT	United States	Computer, Office Equipment and Software Merchant Wholesalers		45	D&B
Sybase, Inc.	Branch	Bethesda, MD	United States	Computer, Office Equipment and Software Merchant Wholesalers		45	D&B
Sybase, Inc.	Branch	Phoenix, AZ	United States	Software		38	D&B
Sap Business Services Center Nederland B.V.	Subsidiary	's-Hertogenbosch, Noord-Brabant	Netherlands	Computer, Office Equipment and Software Merchant Wholesalers	284.6	30	D&B
Sybase, Inc.	Branch	Dallas, TX	United States	Software		30	D&B
Sybase De México, S. De R.L. De C.V.	Subsidiary	Ciudad De Mexico, Ciudad De Mexico	Mexico	Data Processing		30	D&B
Sybase, Inc.	Branch	Burlington, MA	United States	Computer and Peripheral Equipment Manufacturing		27	D&B
Sybase, Inc.	Branch	Concord, NH	United States	Computer Programming		16	D&B
Sybase Argentina S.A.	Subsidiary	Ciudad De Buenos Aires	Argentina	Electronics and Appliances Stores	0.8	14	D&B
Sybase Philippines Inc	Subsidiary	Makati, Manila	Philippines	Computer Programming	0.4	10	D&B
Sybase, Inc.	Branch	Englewood, CO	United States	Software		10	D&B
Sybase, Inc.	Branch	Irvine, CA	United States	Software		10	D&B
Sybase, Inc.	Branch	Boston, MA	United States	Nonclassifiable Establishments		7	D&B
Sybase, Inc.	Branch	Wayne, PA	United States	Electronics and Appliances Stores		4	D&B
Sybase, Inc.	Branch	Albany, NY	United States	Computer, Office Equipment and Software Merchant Wholesalers		3	D&B
Sybase Incorporated	Subsidiary	Weybridge	United Kingdom	Nonclassifiable Establishments		3	D&B
Mobileway Asia Pacific Pte Ltd	Subsidiary	Kuala Lumpur, Kuala Lumpur	Malaysia	Miscellaneous Professional Services	0.1	2	D&B

Name	Type	Location	Country	Industry	Sales	Employees	Source
Sybase, Inc.	Branch	San Diego, CA	United States	Computer System Design Services		1	D&B
Sybase, Inc.	Branch	Clearwater, FL	United States	Computer System Design Services		1	D&B
Sybase, Inc.	Branch	Novi, MI	United States	Computer System Design Services		1	D&B
Sybase, Inc.	Branch	Dublin, CA	United States	Computer System Design Services		1	D&B
Ariba, Inc.	Subsidiary	Palo Alto, CA	United States	Software	175.1	2,432	D&B
Ariba, Inc.	Branch	Pittsburgh, PA	United States	Software		100	D&B
Quadrem Peru S.A.C.	Subsidiary	Lima, Lima	Peru	Consulting Services	3.1	89	D&B
Ariba, Inc.	Branch	Alpharetta, GA	United States	Software		80	D&B
Ariba, Inc.	Branch	Bridgewater, NJ	United States	Software		43	D&B
B-Process	Subsidiary	Levallois Perret, Hauts De Seine	France	Computer System Design Services	11.8	26	D&B
Ariba, Inc.	Branch	Mountain View, CA	United States	Software		25	D&B
Nihon Ariba K.K.	Subsidiary	Chiyoda-Ku, Tokyo	Japan	Software	0.4	15	D&B
Ariba, Inc.	Branch	Chicago, IL	United States	Software		12	D&B
Ariba, Inc.	Branch	Philadelphia, PA	United States	Software		10	D&B
Ariba, Inc.	Branch	Bellevue, WA	United States	Software		10	D&B
Ariba, Inc.	Branch	Phoenix, AZ	United States	Software		10	D&B
Ariba, Inc.	Branch	Huntington Beach, CA	United States	Nonclassifiable Establishments		7	D&B
Ariba, Inc.	Branch	Atlanta, GA	United States	Nonclassifiable Establishments		7	D&B
Ariba Technologies Netherlands B.V.	Subsidiary	's-Hertogenbosch, Noord-Brabant	Netherlands	Publishing	0.5	5	D&B
Ariba Technologies India Private Limited	Subsidiary	Bengaluru, Karnataka	India	Computer Programming	2,510.4	782	D&B
Ariba Technologies India Private Limited	Branch	Gurgaon, Haryana	India	Computer System Design Services			D&B
Ariba Technologies India Private Limited	Branch	Bengaluru, Karnataka	India	Computer System Design Services			D&B
Ariba, Inc.	Branch	Lisle, IL	United States	Software		5	D&B
Ariba, Inc.	Branch	Irvine, CA	United States	Software		5	D&B
Ariba, Inc.	Branch	Pittsburgh, PA	United States	Electronics and Appliances Stores		5	D&B
Ariba, Inc.	Branch	Chesterfield, MO	United States	Software		4	D&B
Ariba, Inc.	Branch	Vienna, VA	United States	Software		3	D&B
Ariba, Inc.	Branch	Ringoes, NJ	United States	Software		3	D&B

Ariba, Inc.	Branch	Washington, DC	United States	Software		3	D&B
Ariba, Inc.	Branch	Detroit, MI	United States	Software		2	D&B
Ariba, Inc.	Branch	Dublin, OH	United States	Software		1	D&B
Ariba Middle East	Subsidiary	Dubai, Dubai	United Arab Emirates	Consulting Services	1.3		D&B
Ariba Inc. Shanghai Representative Office	Branch	Shanghai, Shanghai	China	Miscellaneous Professional Services			D&B
Ariba Inc. Shenzhen Office	Branch	Shenzhen, Guangdong	China	Miscellaneous Professional Services			D&B
Successfactors, Inc.	Subsidiary	South San Francisco, CA	United States	Computer Programming	75.4	1,047	D&B
Plateau Systems, LLC	Subsidiary	Reston, VA	United States	Software	29.1	350	D&B
Plateau Systems, LLC	Branch	San Antonio, TX	United States	Computer Programming		15	D&B
Successfactors, Inc.	Branch	Washington, DC	United States	Computer Programming		30	D&B
Successfactors, Inc.	Branch	Reston, VA	United States	Computer Programming		8	D&B
Successfactors, Inc.	Branch	Los Angeles, CA	United States	Nonclassifiable Establishments		7	D&B
Successfactors, Inc.	Branch	San Antonio, TX	United States	Software		3	D&B
Successfactors, Inc.	Branch	Evergreen, CO	United States	Computer Programming		3	D&B
Successfactors, Inc.	Branch	Menlo Park, CA	United States	Computer Programming		2	D&B
Successfactors (Philippines), Inc.	Subsidiary	Pasig, Manila	Philippines	Consulting Services	0.4		D&B
Sap Labs, LLC	Subsidiary	Palo Alto, CA	United States	Computer Programming	46.1	640	D&B
Sap Labs, LLC	Branch	Concord, MA	United States	Computer Programming		100	D&B
Sap Labs, LLC	Branch	Boston, MA	United States	Computer Programming		53	D&B
Sap Labs, LLC	Branch	Palo Alto, CA	United States	Computer Programming		53	D&B
HMS Software, Inc.	Subsidiary	Harker Heights, TX	United States	Software	0.3	10	D&B
Sap Labs, LLC	Branch	Westchester, IL	United States	Computer Programming		6	D&B
Sap Labs Lcc	Branch	Lysaker, Akershus	Norway	Computer Programming			D&B
Sap America, Inc.	Branch	Plano, TX	United States	Electronics and Appliances Stores		450	D&B
Crystal Decisions (UK) Ltd.	Subsidiary	London	United Kingdom	Computer System Design Services		288	D&B
Crystal Decisions (Uk) Limited	Branch	Ipswich	United Kingdom	Software		2	D&B
Crystal Decisions (Uk) Limited	Branch	Livingston	United Kingdom	Software		2	D&B
Sap Public Services, Inc.	Subsidiary	Washington, DC	United States	Computer Programming	15.0	209	D&B
Sap Public Services, Inc.	Branch	Newtown Square, PA	United States	Computer Programming		13	D&B
Sap Public Services, Inc.	Branch	Philadelphia, PA	United States	Nonclassifiable Establishments		7	D&B

Sap Public Services, Inc.	Branch	Newtown Square, PA	United States	Computer Programming		4	D&B
Sap Public Services, Inc.	Branch	Houston, TX	United States	Data Processing		3	D&B
Sap Public Services, Inc.	Branch	Palo Alto, CA	United States	Data Processing		3	D&B
Sap America, Inc.	Branch	Westchester, IL	United States	Computer Programming		156	D&B
Tomorrownow, Incorporated	Subsidiary	Bryan, TX	United States	Computer System Design Services	10.8	150	D&B
Tomorrownow, Incorporated	Branch	Kennesaw, GA	United States	Computer System Design Services		7	D&B
Tomorrownow, Incorporated	Branch	Houston, TX	United States	Computer System Design Services		7	D&B
Sap America, Inc.	Branch	La Crosse, WI	United States	Computer Programming		136	D&B
Sap America, Inc.	Branch	Southfield, MI	United States	Computer Programming		80	D&B
Sap America, Inc.	Branch	Englewood, CO	United States	Electronics and Appliances Stores		70	D&B
Sap America, Inc.	Branch	Miami, FL	United States	Computer Programming		60	D&B
Sap America, Inc.	Branch	New York, NY	United States	Computer Programming		50	D&B
Sap America, Inc.	Branch	Palo Alto, CA	United States	Computer Programming		44	D&B
Sap International, Inc.	Holding	Miami, FL	United States	Computer Programming	2.9	40	D&B
Sap America, Inc.	Branch	Cincinnati, OH	United States	Computer Programming		38	D&B
Sap America, Inc.	Branch	New Haven, CT	United States	Computer Programming		38	D&B
Sap America, Inc.	Branch	Scottsdale, AZ	United States	Computer Programming		38	D&B
Sap America, Inc.	Branch	Burlington, MA	United States	Computer Programming		38	D&B
Sap America, Inc.	Branch	Palo Alto, CA	United States	Computer Programming		38	D&B
Sap America, Inc.	Branch	Bellevue, WA	United States	Computer Programming		38	D&B
Sap America, Inc.	Branch	Houston, TX	United States	Computer Programming		35	D&B
Sap America, Inc.	Branch	Atlanta, GA	United States	Computer Programming		30	D&B
Sap America, Inc.	Branch	Irving, TX	United States	Computer Programming		27	D&B
Sap Industries, Inc.	Subsidiary	Newtown Square, PA	United States	Computer Programming	1.5	21	D&B
Sap National Security Services, Inc.	Subsidiary	Newtown Square, PA	United States	Computer Programming	1.4	20	D&B
Sybase 365, LLC	Subsidiary	Dublin, CA	United States	Administrative Services	1.2	16	D&B
Sap America, Inc.	Branch	Downers Grove, IL	United States	Computer, Office Equipment and Software Merchant Wholesalers		16	D&B
Sap America, Inc.	Branch	Irvine, CA	United States	Computer Programming		15	D&B
Ariba Inc.	Subsidiary	Newtown Square, PA	United States	Software	0.9	12	D&B
Sap America, Inc.	Branch	Houston, TX	United States	Computer Programming		10	D&B

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Sap America, Inc.	Branch	Philadelphia, PA	United States	Nonclassifiable Establishments		8	D&B
Crystal Decisions Holdings Limited	Holding	Dublin, Co Dublin	Ireland	Computer Programming	0.6	5	D&B
Sap America, Inc.	Branch	Los Angeles, CA	United States	Electronics and Appliances Stores		4	D&B
Sap America, Inc.	Branch	Bristol, PA	United States	Computer Programming		3	D&B
Sap America, Inc.	Branch	Saint Louis, MO	United States	Computer Programming		3	D&B
Sapmarkets, Inc.	Subsidiary	Palo Alto, CA	United States	Computer Programming	0.1	2	D&B
Sap America, Inc.	Branch	Highland Park, NJ	United States	Computer Programming		2	D&B
Sap Investments Inc	Subsidiary	Newtown Square, PA	United States	Holding Companies		2	D&B
Sap America, Inc.	Branch	Cardiff By The Sea, CA	United States	Computer Programming		2	D&B
Sap America, Inc.	Branch	Southington, CT	United States	Computer Programming		2	D&B
Sap Dritte Beteiligungs-Und Vermögensverwaltungs Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Pensions and Funds	0.2	1	D&B
Sap Projektverwaltungs-Und Beteiligungs Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Holding Companies	0.2	1	D&B
Sap Labs India Private Limited	Subsidiary	Bengaluru, Karnataka	India	Computer Programming	22,100.6	7,011	D&B
Sap Labs India Private Limited	Branch	Gurgaon, Haryana	India	Computer Programming			D&B
Sap Labs India Private Limited	Branch	Kolkata, West Bengal	India	Health and Personal Care Wholesale			D&B
Sap Labs India Private Limited	Branch	Chandigarh, Punjab	India	Health and Personal Care Wholesale			D&B
Sap Labs India Private Limited	Branch	New Delhi, Delhi	India	Health and Personal Care Wholesale			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sap Labs India Private Limited	Branch	Pune, Maharashtra	India	Health and Personal Care Wholesale			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Health and Personal Care Wholesale			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Health and Personal Care Wholesale			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Computer Programming			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Computer Programming			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sap Labs India Private Limited	Branch	Bengaluru, Karnataka	India	Computer Programming			D&B
Sap Labs India Private Limited	Branch	Mumbai, Maharashtra	India	Health and Personal Care Wholesale			D&B

Business Objects Inc.	Subsidiary	Palo Alto, CA	United States	Computer, Office Equipment and Software Merchant Wholesalers	315.9	5,208	D&B
Business Objects Inc.	Branch	La Crosse, WI	United States	Computer Programming		200	D&B
Business Objects Inc.	Branch	Dublin, CA	United States	Computer Programming		101	D&B
Business Objects Inc.	Branch	New York, NY	United States	Computer, Office Equipment and Software Merchant Wholesalers		40	D&B
Business Objects Inc.	Branch	Atlanta, GA	United States	Computer, Office Equipment and Software Merchant Wholesalers		11	D&B
Business Objects Inc.	Branch	Chicago, IL	United States	Nonclassifiable Establishments		7	D&B
Business Objects Inc.	Branch	Carol Stream, IL	United States	Nonclassifiable Establishments		7	D&B
Business Objects Inc.	Branch	Edison, NJ	United States	Computer, Office Equipment and Software Merchant Wholesalers		4	D&B
Business Objects Inc.	Branch	Saint Peters, MO	United States	Semiconductor and Other Electronic Component Manufacturing		3	D&B
Business Objects Inc.	Branch	Troy, MI	United States	Computer, Office Equipment and Software Merchant Wholesalers		2	D&B
Business Objects Inc.	Branch	Iselin, NJ	United States	Computer Programming		2	D&B
Business Objects Inc.	Branch	San Francisco, CA	United States	Computer, Office Equipment and Software Merchant Wholesalers		1	D&B
Business Objects Inc.	Branch	Tempe, AZ	United States	Non-store Retail		1	D&B
Business Objects Inc.	Branch	Cumming, GA	United States	Computer Programming		1	D&B
Business Objects Inc.	Branch	Englewood, CO	United States	Computer, Office Equipment and Software Merchant Wholesalers		1	D&B
Business Objects Inc.	Branch	Westborough, MA	United States	Electronics and Appliances Stores		1	D&B
Business Objects Inc.	Branch	Berwyn, PA	United States	Computer Programming		1	D&B
SAP Canada Inc	Subsidiary	North York, ON	Canada	Software	428.6	2,172	D&B
SAP Canada Inc	Branch	Waterloo, ON	Canada	Computer Programming		250	D&B
SAP Canada Inc	Branch	Vancouver, BC	Canada	Computer Programming		100	D&B
SAP Canada Inc	Branch	Montréal, QC	Canada	Software		90	D&B
SAP Canada Inc	Branch	Calgary, AB	Canada	Software		70	D&B
SAP Canada Inc	Branch	Ottawa, ON	Canada	Computer Programming		55	D&B
SAP Canada Inc	Branch	Toronto, ON	Canada	Miscellaneous Educational Services		40	D&B
SAP Canada Inc	Branch	Vancouver, BC	Canada	Software		32	D&B
SAP Canada Inc	Branch	Montréal, QC	Canada	Software		25	D&B

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SAP Canada Inc	Branch	Toronto, ON	Canada	Computer Programming		20	D&B
SAP Financial Inc	Subsidiary	North York, ON	Canada	Holding Companies	0.1	1	D&B
SAP Canada Inc	Branch	Montréal, QC	Canada	Computer System Design Services		1	D&B
SAP Canada Inc	Branch	Scarborough, ON	Canada	Software		1	D&B
SAP Canada Inc	Branch	Vancouver, BC	Canada	Software		1	D&B
SAP Canada Inc	Branch	Ottawa, ON	Canada	Computer Programming		1	D&B
Sap India Private Limited	Subsidiary	Bengaluru, Karnataka	India	Nonclassifiable Establishments	36,197.8	1,773	D&B
Sap India Private Limited	Branch	Mumbai, Maharashtra	India	Banking		500	D&B
Sap India Private Limited	Branch	New Delhi, Delhi	India	Software		12	D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Nonclassifiable Establishments			D&B
Sap India Private Limited	Branch	Mumbai, Maharashtra	India	Food Manufacturing			D&B
Sap India Private Limited	Branch	New Delhi, Delhi	India	Computer Programming			D&B
Sap India Private Limited	Branch	Gurgaon, Haryana	India	Data Processing			D&B
Sap India Private Limited	Branch	New Delhi, Delhi	India	Software			D&B
Sap India Private Limited	Branch	Hyderabad, Telangana	India	Software			D&B
Sap India Private Limited	Branch	Pune, Maharashtra	India	Computer Programming			D&B
Sap India Private Limited	Branch	Pune, Maharashtra	India	Computer Programming			D&B
Sap India Private Limited	Branch	Mumbai, Maharashtra	India	Semiconductor and Other Electronic Component Manufacturing			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Software			D&B
Sap India Pvt. Ltd.	Branch	Lysaker	Norway	Computer Programming			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Computer Programming			D&B
Sap India Private Limited	Branch	Mumbai, Maharashtra	India	Nonclassifiable Establishments			D&B
Sap India Private Limited	Branch	New Delhi, Delhi	India	Computer Programming			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Software			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Software			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Miscellaneous Professional Services			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Computer Programming			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Software			D&B
Sap India Private Limited	Branch	Pune, Maharashtra	India	Consulting Services			D&B

Sap India Private Limited	Branch	Vadodara, Gujarat	India	Nonclassifiable Establishments			D&B
Sap India Private Limited	Branch	Kolkata, West Bengal	India	Computer Programming			D&B
Sap India Private Limited	Branch	Kolkata, West Bengal	India	Computer Programming			D&B
Sap India Private Limited	Branch	Mumbai, Maharashtra	India	Software			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Software			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Software			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Software			D&B
Sap India Private Limited	Branch	Bengaluru, Karnataka	India	Software			D&B
Sap India Private Limited	Branch	Mumbai, Maharashtra	India	Software			D&B
Sap (UK) Ltd.	Subsidiary	Feltham	United Kingdom	Software	907.4	1,585	D&B
Sap (Uk) Limited	Branch	Bulandet	Norway	Computer Programming			D&B
Sap Brasil Ltda	Subsidiary	Sao Paulo, Sao Paulo	Brazil	Consulting Services	48.0	1,400	D&B
Sap Brasil Ltda	Branch	Belo Horizonte, Minas Gerais	Brazil	Consulting Services			D&B
Sap Brasil Ltda	Branch	Rio De Janeiro, Rio De Janeiro	Brazil	Consulting Services			D&B
Sap Brasil Ltda	Branch	Sao Leopoldo, Rio Grande Do Sul	Brazil	Consulting Services			D&B
Sap Brasil Ltda	Branch	Belo Horizonte, Minas Gerais	Brazil	Consulting Services			D&B
Sap Australia Pty Ltd	Subsidiary	North Sydney, NSW	Australia	Computer, Office Equipment and Software Merchant Wholesalers	934.9	1,166	D&B
Sap Japan Co., Ltd.	Subsidiary	Chiyoda-Ku, Tokyo	Japan	Computer Programming	100,009.0	1,100	D&B
Sap Japan Co., Ltd.	Branch	Osaka, Osaka	Japan	Computer Programming			D&B
Sap Japan Co., Ltd.	Branch	Nagoya, Aichi	Japan	Computer Programming			D&B
Sap Japan Co., Ltd.	Branch	Fukuoka, Fukuoka	Japan	Computer Programming			D&B
Sap Japan Co., Ltd.	Branch	Osaka, Osaka	Japan	Computer Programming			D&B
Sap Japan Co., Ltd.	Branch	Osaka, Osaka	Japan	Computer Programming			D&B
Sap Japan Co., Ltd.	Branch	Osaka, Osaka	Japan	Computer, Office Equipment and Software Merchant Wholesalers			D&B
Sap Services S.R.O.	Subsidiary	Praha - Stodulky (Praha 13), Hlavní Mesto Praha	Czech Republic	Consulting Services	1,027.6	1,000	D&B
Sap Hungary Rendszerek, Alkalmazások És Termékek Az Adatfeldolgozásban Informatikai Korlát	Subsidiary	Budapest, Budapest	Hungary	Computer Programming	27,375.7	873	D&B
Sap Service And Support Centre (Ireland) Limited	Subsidiary	Dublin, Co Dublin	Ireland	Securities	128.2	764	D&B

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Sap Sng, Ooo	Subsidiary	Moscow	Russian Federation	Computer System Design Services	25,428.9	750	D&B
Sap Labs, Ooo	Subsidiary	Moscow	Russian Federation	Research and Development Services	1,773.7	750	D&B
Sap Labs Bulgaria Eood	Subsidiary	Sofia	Bulgaria	Computer Programming	58.6	687	D&B
Sap Labs Bulgaria	Branch	Lysaker, Akershus	Norway	Computer Programming			D&B
Hybris Ag	Subsidiary	Zug, Zug	Switzerland	Software	70.1	660	D&B
Hybris Gmbh	Subsidiary	München, Bayern	Germany	Computer Programming	58.3	266	D&B
Hybris (u.s.) Corporation	Subsidiary	Chicago, IL	United States	Computer Programming	8.7	70	D&B
Hybris (u.s.) Corporation	Branch	Wilmington, DE	United States	Computer Programming		10	D&B
Hybris (u.s.) Corporation	Branch	Boston, MA	United States	Computer, Office Equipment and Software Merchant Wholesalers		4	D&B
Hybris (u.s.) Corporation	Branch	Boulder, CO	United States	Computer Programming		3	D&B
Hybris (u.s.) Corporation	Subsidiary	New York, NY	United States	Computer Programming	0.1	3	D&B
Sap Labs Israel Ltd	Subsidiary	Raanana	Israel	Nonclassifiable Establishments	509.0	650	D&B
Sap (Schweiz) Ag	Subsidiary	Biel-Bienne, Bern	Switzerland	Software	844.0	647	D&B
Concur (Switzerland) Gmbh	Subsidiary	Zürich, Zürich	Switzerland	Computer System Design Services	0.5	7	D&B
Sap (Schweiz) Ag	Branch	Regensdorf, Zürich	Switzerland	Software			D&B
Sap (Schweiz) Ag	Branch	Bulandet	Norway	Computer Programming			D&B
Sap (Schweiz) Ag	Branch	Lausanne, Vaud	Switzerland	Software			D&B
Fieldglass, Inc.	Subsidiary	Chicago, IL	United States	Computer System Design Services	120.0	637	D&B
Fieldglass, Inc.	Branch	Naperville, IL	United States	Computer Programming		15	D&B
Fieldglass Europe Ltd.	Subsidiary	London	United Kingdom	Miscellaneous Professional Services		2	D&B
Sap Nederland B.V.	Subsidiary	's-Hertogenbosch, Noord-Brabant	Netherlands	Computer, Office Equipment and Software Merchant Wholesalers	482.9	630	D&B
S.A.P. Italia Sistemi Applicazioni Prodotti In Data Processing Spa	Subsidiary	Vimercate, Monza E Brianza	Italy	Software	508.3	673	D&B
S.A.P. Italia Sistemi Applicazioni Prodotti In Data Processing Spa	Branch	Roma, Roma	Italy	Software			D&B
S.A.P. Italia Sistemi Applicazioni Prodotti In Data Processing Spa	Branch	Roma, Roma	Italy	Software			D&B
Sap España Sistemas Aplicaciones Y Productos En La Informatica Sa	Subsidiary	Madrid, Madrid	Spain	Computer System Design Services	312.0	549	D&B
Sap España Sistemas Aplicaciones Y Productos En La	Branch	Barcelona, Barcelona	Spain	Computer System Design Services			D&B

Informatica Sa							
Sap España Sistemas Aplicaciones Y Productos En La Informatica Sa	Branch	Barcelona, Barcelona	Spain	Computer System Design Services			D&B
Sap España Sistemas Aplicaciones Y Productos En La Informatica Sa	Branch	Bilbao	Spain	Computer System Design Services			D&B
Concur Holdings (Netherlands) B.V.	Subsidiary	Amsterdam, Noord-Holland	Netherlands	Pensions and Funds	3.4	14	D&B
Concur (Philippines) Inc.	Subsidiary	Makati, Manila	Philippines	Miscellaneous Professional Services	40.1	726	D&B
Concur Technologies (India) Private Limited	Subsidiary	Bengaluru, Karnataka	India	Computer Programming	31.9	724	D&B
Concur Technologies (India) Private Limited	Branch	Bengaluru, Karnataka	India	Computer System Design Services		29	D&B
Concur Technologies (India) Private Limited	Branch	Mumbai, Maharashtra	India	Software			D&B
Concur Technologies (UK) Ltd.	Subsidiary	Maidenhead	United Kingdom	Software	43.1	381	D&B
Contgo Ltd.	Subsidiary	London	United Kingdom	Miscellaneous Professional Services		7	D&B
Contgo Consulting Ltd.	Subsidiary	London	United Kingdom	Computer System Design Services	1.7	10	D&B
Concur (Czech) S.R.O.	Subsidiary	Praha - Stodulky, Hlavní Mesto Praha	Czech Republic	Computer Programming	440.3	300	D&B
Globalexpense Ltd.	Subsidiary	Slough	United Kingdom	Computer System Design Services		82	D&B
Concur (Germany) Gmbh	Subsidiary	Frankfurt Am Main, Hessen	Germany	Software	1.8	25	D&B
Concur (New Zealand) Limited	Subsidiary	Wellington,	New Zealand	Consulting Services	0.8	2	D&B
Concur (Austria) Gmbh	Subsidiary	Wien, Wien	Austria	Miscellaneous Professional Services	0.1	1	D&B
Concur Holdings France Sas	Subsidiary	Paris, Paris	France	Holding Companies	0.7		D&B
Concur (France) Sas	Subsidiary	Paris, Paris	France	Computer System Design Services	17.4	103	D&B
Concur Technologies (Singapore) Pte. Ltd.	Subsidiary	Singapore	Singapore	Data Processing	0.7		D&B
Sap M'xico, S.A. De C.V.	Subsidiary	M'xico, Ciudad De Mexico	Mexico	Computer, Office Equipment and Software Merchant Wholesalers		567	D&B
Sap M'xico, S.A. De C.V.	Branch	San Pedro Garza García, Nuevo Leon	Mexico	Grocery Stores		22	D&B
Sap Romania Srl	Subsidiary	Bucuresti	Romania	Computer Programming	255.9	401	D&B

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Sap Romania S.R.L.	Branch	Lysaker	Norway	Computer Programming			D&B
Sap Romania Srl	Branch	Timisoara	Romania	Nonclassifiable Establishments			D&B
Sap Österreich Gmbh	Subsidiary	Wien, Wien	Austria	Computer, Office Equipment and Software Merchant Wholesalers	222.2	400	D&B
Sap Österreich Gmbh	Branch	Linz, Oberösterreich	Austria	Computer, Office Equipment and Software Merchant Wholesalers			D&B
Sap Österreich Gmbh	Branch	Lysaker	Norway	Computer Programming			D&B
Sap Labs France	Subsidiary	Mougins, Alpes Maritimes	France	Computer Programming	63.4	387	D&B
Sap Labs France	Branch	Levallois Perret, Hauts De Seine	France	Computer Programming		100	D&B
Sap Labs France	Branch	Caen, Calvados	France	Computer Programming		50	D&B
Sap Labs France	Branch	Bulandet, Sogn Og Fjordane	Norway	Computer Programming			D&B
Sap Korea Limited	Subsidiary	Seoul, Seoul	Korea, Republic of	Computer Programming	338,362.0	381	D&B
Sap Danmark A/S	Subsidiary	København, Hovedstaden	Denmark	Publishing	1,430.4	350	D&B
Sap Danmark	Branch	Lysaker	Norway	Computer Programming			D&B
Sap Portugal - Sistemas, Aplicações E Produtos Informáticos, Sociedade Unipessoal, Lda	Subsidiary	Porto Salvo, Oeiras	Portugal	Computer System Design Services	104.7	306	D&B
Sap Argentina S.A.	Subsidiary	Munro, Buenos Aires	Argentina	Software	12.7	293	D&B
Sap Agencia En Chile	Branch	Santiago, Santiago	Chile	Computer Programming		101	D&B
Sap Cr, Spol. S R.O.	Subsidiary	Praha 4, Hlavní Mesto Praha	Czech Republic	Computer Programming	1,500.0	281	D&B
Sap Colombia S A S	Subsidiary	Bogota, D.C.	Colombia	Computer Programming	482,210.6	273	D&B
Sap Belgium - Systems Applications And Products Sa	Subsidiary	Bruxelles, Bruxelles-Capitale	Belgium	Data Processing	218.0	265	D&B
Sap Belgium - Systems Applications And Products	Branch	Lysaker	Norway	Computer Programming			D&B
Sap Global Marketing Inc.	Subsidiary	New York, NY	United States	Computer Programming	23.0	257	D&B
Sap Portals Israel Ltd	Subsidiary	Raanana	Israel	Computer System Design Services	13.7	226	D&B
Sap Turkiye Yazilim Uretim Ve Ticaret Anonim Sirketi	Subsidiary	Istanbul (Anatolia)	Turkey	Miscellaneous Professional Services	18.9	220	D&B
Sap Philippines, Inc.	Subsidiary	Taguig, Manila	Philippines	Software	3,546.8	207	D&B
Sap Philippines, Inc.	Branch	Pasig, Manila	Philippines	Software			D&B
Sap Philippines, Inc.	Branch	Pasig, Manila	Philippines	Software			D&B
Sap Andina Y Del Caribe, C.A.	Subsidiary	Caracas, Distrito Federal	Venezuela	Computer, Office Equipment and Software Merchant Wholesalers	16.7	200	D&B
Sap Peru S.A.C.	Subsidiary	Lima, Lima	Peru	Computer Programming	121.8	75	D&B

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Sap Andina Y Del Caribe Inc	Branch	Guaynabo, PR	United States	Computer Programming		4	D&B
Sap Slovensko S.R.O.	Subsidiary	Bratislava-Ruzinov	Slovakia	Computer Programming	41.6	173	D&B
Sap Taiwan Co., Ltd.	Subsidiary	Taipei City, Taipei	Taiwan	Computer, Office Equipment and Software Merchant Wholesalers	18.1	140	D&B
Sap Polska Sp Z O O	Subsidiary	Warszawa, Mazowieckie	Poland	Software	352.7	136	D&B
Sap Polska Spolka Z Organiczona Odpowiedzialnoscia	Branch	Lysaker	Norway	Computer Programming			D&B
Sap Malaysia Sdn. Bhd.	Subsidiary	Kuala Lumpur, Kuala Lumpur	Malaysia	Computer Programming	218.3	130	D&B
Sap Emea Inside Sales Sl	Subsidiary	Barcelona, Barcelona	Spain	Computer System Design Services	18.3	129	D&B
Sap Finland Oy	Subsidiary	Espoo, Uusimaa	Finland	Computer Programming	138.5	113	D&B
Sap Labs Finland Oy	Subsidiary	Espoo, Uusimaa	Finland	Computer Programming	8.4	53	D&B
Merlin Systems Oy	Subsidiary	Espoo, Uusimaa	Finland	Computer Programming	10.2	30	D&B
Sap Hong Kong Co. Limited	Subsidiary	Causeway Bay, Hong Kong	Hong Kong	Computer, Office Equipment and Software Merchant Wholesalers	48.0	106	D&B
Sap Svenska Ab	Subsidiary	Stockholm, Stockholm	Sweden	Computer Programming	1,822.5	100	D&B
Sap Svenska Aktiebolag	Branch	Lysaker	Norway	Computer Programming			D&B
Sap Saudi Arabia Software Services Limited	Subsidiary	Riyadh	Saudi Arabia	Computer, Office Equipment and Software Merchant Wholesalers	12.9	100	D&B
Sap Ukraina, Tov	Subsidiary	Kyiv	Ukraine	Internet and Web Services	407.8	99	D&B
Sap Norge As	Subsidiary	Lysaker, Akershus	Norway	Publishing	692.1	86	D&B
Fedem Technology As	Subsidiary	Trondheim, Sør-Trøndelag	Norway	Publishing	7.7	30	D&B
Systems Applications Products Nigeria Ltd	Subsidiary	Abuja	Nigeria	Computer Programming	3.4	70	D&B
Sap Indonesia, Pt	Subsidiary	Jakarta, Jakarta	Indonesia	Computer Programming	44.2	60	D&B
Sap Israel Ltd	Subsidiary	Raanana	Israel	Computer System Design Services	201.0	60	D&B
Sap Israel	Branch	Lysaker	Norway	Employment Services			D&B
Sap Hellas S.A.	Subsidiary	Palaio Faliro	Greece	Computer Programming	49.3	56	D&B
Sap-Bulgaria Eood	Subsidiary	Sofia	Bulgaria	Computer System Design Services	12.2	12	D&B
Start Up Farms It Private Limited	Branch	Chandigarh, Punjab	India	Computer Programming		50	D&B
Sap Business Compliance Services Gmbh	Subsidiary	Siegen, Nordrhein-Westfalen	Germany	Computer System Design Services	5.5	46	D&B
Sap New Zealand Limited	Subsidiary	Auckland,	New Zealand	Computer, Office Equipment and Software Merchant Wholesalers	127.8	40	D&B

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Name	Type	Location	Country	Industry	Revenue	Employees	Source
Sap West Balkans Doo Beograd	Subsidiary	Beograd (Novi Beograd)	Serbia	Computer Programming	1,978.9	33	D&B
Plat.one Inc.	Subsidiary	Palo Alto, CA	United States	Computer Programming	3.0	30	D&B
Plat.One Lab Srl	Subsidiary	Genova, Genova	Italy	Software	0.1	1	D&B
Ariba India Private Limited	Subsidiary	Gurgaon, Haryana	India	Computer Programming	1.3	29	D&B
Ariba India Private Limited	Branch	New Delhi, Delhi	India	Nonclassifiable Establishments			D&B
Ariba India Private Limited	Branch	Gurgaon, Haryana	India	Computer Programming			D&B
Ariba India Private Limited	Branch	Gurgaon, Haryana	India	Nonclassifiable Establishments			D&B
Ariba India Private Limited	Branch	Gurgaon, Haryana	India	Nonclassifiable Establishments			D&B
Ariba India Private Limited	Branch	Mumbai, Maharashtra	India	Nonclassifiable Establishments			D&B
Ariba India Private Limited	Branch	Gurgaon, Haryana	India	Nonclassifiable Establishments			D&B
Sap D.O.O.	Subsidiary	Ljubljana	Slovenia	Computer System Design Services	19.5	26	D&B
Sap Puerto Rico Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Computer, Office Equipment and Software Merchant Wholesalers	22.7	19	D&B
Altiscale, Inc.	Subsidiary	Palo Alto, CA	United States	Computer Programming	3.1	19	D&B
Sap Ireland Limited	Subsidiary	Dublin, Co Dublin	Ireland	Computer System Design Services	1.1	16	D&B
Sap Ireland Limited	Branch	Lysaker	Norway	Computer Programming			D&B
Sap Public Services Hungary Korlátolt Felelösségü Társaság	Subsidiary	Budapest, Budapest	Hungary	Computer Programming	1,134.2	7	D&B
Sap Latvia Sia	Subsidiary	Riga	Latvia	Electronics and Appliances Stores	3.7	4	D&B
Sap France Holding	Holding	Levallois Perret, Hauts De Seine	France	Holding Companies	0.8	4	D&B
Sap France	Subsidiary	Levallois Perret, Hauts De Seine	France	Computer Programming	1,105.4	1,539	D&B
Sap France	Branch	Paris, Paris	France	Computer Programming		50	D&B
Sap France	Branch	Lyon, Rhone	France	Computer Programming		20	D&B
Sap France	Branch	Toulouse, Haute Garonne	France	Computer Programming		20	D&B
Business Objects Software Limited	Subsidiary	Dublin, Co Dublin	Ireland	Computer Programming	938.3	1,000	D&B
Crystal Decisions (Ireland) Limited	Subsidiary	Dublin, Co Dublin	Ireland	Computer Programming	0.4	3	D&B
Sap Ireland Us-Financial Services Designated Activity Company	Subsidiary	Dublin, Co Dublin	Ireland	Mortgage and Credit	0.1	2	D&B
Sap Holdings (UK) Ltd.	Holding	Feltham	United Kingdom	Holding Companies		3	D&B
Business Objects Argentina S.R.L.	Subsidiary	Ciudad De Buenos Aires	Argentina	Computer Programming	0.6		D&B
Business Objects Holding B.V.	Subsidiary	's-Hertogenbosch, Noord-Brabant	Netherlands	Computer, Office Equipment and Software Merchant Wholesalers	11.1	54	D&B

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Sap France Sa	Branch	Lysaker	Norway	Computer Programming			D&B
Sap Cyprus Limited	Subsidiary	Nicosia	Cyprus	Computer Programming	4.0	3	D&B
Sap Uab	Subsidiary	Vilnius	Lithuania	Computer Programming	3.9	3	D&B
Sap Belgium - Systems Applications And Products Soc. Etrangere	Subsidiary	Luxembourg	Luxembourg	Computer Programming	193.8	2	D&B
Sap Beteiligungs Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Holding Companies	0.4	2	D&B
Sap Deutschland Se & Co. Kg	Subsidiary	Walldorf, Baden-Württemberg	Germany	Computer System Design Services	3,540.2	4,414	D&B
Sap Deutschland Se & Co. Kg	Branch	Dresden, Sachsen	Germany	Computer System Design Services			D&B
Sap Deutschland Ag & Co Kg	Branch	Lysaker, Akershus	Norway	Computer Programming			D&B
Sap Deutschland Se & Co. Kg	Branch	Hamburg, Hamburg	Germany	Computer System Design Services			D&B
Sap Vierte Beteiligungs- Und Vermögensverwaltungs Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Holding Companies	0.4	2	D&B
Sap Retail Solutions Beteiligungsges. Mbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Administrative Services	0.1	2	D&B
Sap Business Services Ltd.	Branch	Iver	United Kingdom	Investment Services		2	D&B
Sap Portals Europe Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Computer Programming	0.3	1	D&B
CONCUR (CANADA), INC.	Subsidiary	North York, ON	Canada	Travel and Reservation Services	0.3	1	D&B
Sap Portals Holding Beteiligungs Gmbh	Holding	Walldorf, Baden-Württemberg	Germany	Administrative Services	0.1	1	D&B
Sap Nederland Holding B.V.	Holding	's-Hertogenbosch, Noord-Brabant	Netherlands	Pensions and Funds	0.2		D&B
Sap Se, Predstavitelstvo	Branch	Moscow	Russian Federation	Advertising Services		1	D&B
Sap Systems, Applications And Products In Data Processing (Thailand) Limited	Subsidiary	Bang Rak, Bangkok	Thailand	Computer, Office Equipment and Software Merchant Wholesalers	3,925.2		D&B
Sap India (Holding) Pte. Ltd.	Holding	Singapore	Singapore	Holding Companies	18.4		D&B
Systems Applications Products (Africa) (Pty) Ltd	Subsidiary	Johannesburg, Gauteng	South Africa	Holding Companies	15.2		D&B
Systems Applications Products (South Africa) (Pty) Ltd	Subsidiary	Johannesburg, Gauteng	South Africa	Software	5.1		D&B
Systems Applications Products (South Africa) (Pty) Ltd	Branch	Cape Town, Western Cape	South Africa	Nonclassifiable Establishments			D&B
Systems Applications Products (South Africa) (Pty) Ltd	Branch	Durban, Kwazulu-Natal	South Africa	Nonclassifiable Establishments			D&B
Systems Applications Products (South Africa) (Pty) Ltd	Branch	Centurion, Gauteng	South Africa	Nonclassifiable Establishments			D&B
Systems Applications Products (South Africa) (Pty) Ltd	Branch	Terscent, Faeri Glen, Gauteng	South Africa	Nonclassifiable Establishments			D&B
Ambin Properties (Pty) Ltd	Subsidiary	Johannesburg, Gauteng	South Africa	Software	0.8		D&B

Systems Applications Products (Africa Region) (Pty) Ltd	Subsidiary	Johannesburg, Gauteng	South Africa	Software	0.8		D&B
Cleartrip Inc	Subsidiary	Ebene	Mauritius	Holding Companies	15.2		D&B
Cleartrip Private Limited	Subsidiary	Mumbai, Maharashtra	India	Travel and Reservation Services	2,537.0	528	D&B
Cleartrip Private Limited	Branch	Gurgaon, Haryana	India	Computer Programming		450	D&B
Cleartrip Private Limited	Branch	Mumbai, Maharashtra	India	Travel and Reservation Services		250	D&B
Cleartrip Private Limited	Branch	Bengaluru, Karnataka	India	Travel and Reservation Services			D&B
Cleartrip Private Limited	Branch	Mumbai, Maharashtra	India	Travel and Reservation Services			D&B
Cleartrip Private Limited	Branch	Mumbai, Maharashtra	India	Travel and Reservation Services			D&B
Cleartrip Private Limited	Branch	Mumbai, Maharashtra	India	Nonclassifiable Establishments			D&B
Sap Infotech Private Limited	Subsidiary	Ahmedabad, Gujarat	India	Computer System Design Services	7.9		D&B
Sap Infotech Private Limited	Branch	Ahmedabad, Gujarat	India	Nonclassifiable Establishments			D&B
Sap North West Africa Ltd	Subsidiary	Casablanca	Morocco	Civil Engineering	17.6		D&B
Sybase Angola, Lda	Subsidiary	Luanda	Saint Helena	Associations and Organizations	1.4		D&B
Sap Foreign Holdings Gmbh	Holding	Walldorf, Baden-Württemberg	Germany	Holding Companies	0.7		D&B
Outlooksoft Deutschland Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Internet and Web Services	0.1		D&B
Sap Ventures Investment Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Holding Companies	0.7		D&B
Saphosting Beteiligungs Gmbh	Subsidiary	St. Leon-Rot, Baden-Württemberg	Germany	Investment Services	0.2	1	D&B
Sap Siebte Beteiligungs- Und Vermögensverwaltungs Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Administrative Services	0.2	1	D&B
Sybase 365 Ltd.	Subsidiary	Road Town, Tortola	Virgin Islands (British)	Holding Companies	0.5		D&B
All Tax Platform - Soluções Tributarias S/A	Subsidiary	Sao Paulo, Sao Paulo	Brazil	Holding Companies	0.5		D&B
Sap Erste Beteiligungs -Und Vermögensverwaltungs Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Investment Services	0.4		D&B
Sap Zweite Beteiligungs - Und Vermögensverwaltungs Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Holding Companies	0.4		D&B
Sap Estonia Oü	Subsidiary	Tallinn	Estonia	Miscellaneous Professional Services	0.3		D&B
Sap Commercial Services Ltd	Subsidiary	Valetta	Malta	Miscellaneous Professional Services	0.3		D&B
Sap Sechste Beteiligungs- Und Vermögensverwaltungs Gmbh	Subsidiary	Walldorf, Baden-Württemberg	Germany	Administrative Services	0.1		D&B
Sap Ag	Branch	Lysaker, Akershus	Norway	Computer Programming			D&B

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Sap Se	Branch	Göttingen, Niedersachsen	Germany	Wired Telecommunications Carriers		D&B
Sap Se	Branch	Ratingen, Nordrhein-Westfalen	Germany	Software		D&B
Sap Se	Branch	Karlsruhe, Baden-Württemberg	Germany	Computer Programming		D&B
Sap Se	Branch	Bensheim, Hessen	Germany	Computer Programming		D&B
Sap Se	Branch	Hallbergmoos, Bayern	Germany	Computer Programming		D&B
Sap Se	Branch	Hamburg, Hamburg	Germany	Computer Programming		D&B
Sap Se	Branch	Herrenberg, Baden-Württemberg	Germany	Software		D&B
Sap Se	Branch	Stuttgart, Baden-Württemberg	Germany	Computer Programming		D&B
Sap Se	Branch	Raunheim, Hessen	Germany	Computer Programming		D&B
Sap Se	Branch	Frankfurt Am Main, Hessen	Germany	Software		D&B
Sap Se	Branch	Markdorf, Baden-Württemberg	Germany	Computer Programming		D&B
Sap Se	Branch	Freiberg Am Neckar, Baden-Württemberg	Germany	Computer Programming		D&B
Sap Se	Branch	Dresden, Sachsen	Germany	Computer Programming		D&B
Sap Se	Branch	Mörfelden-Walldorf, Hessen	Germany	Computer Programming		D&B
Sap Se	Branch	Dresden, Sachsen	Germany	Computer Programming		D&B
Sap Se	Branch	Potsdam, Brandenburg	Germany	Computer Programming		D&B
Sap Se	Branch	Markdorf, Baden-Württemberg	Germany	Computer Programming		D&B
Sap Se	Branch	Wildau, Brandenburg	Germany	Computer Programming		D&B
Sap Se	Branch	Markdorf, Baden-Württemberg	Germany	Computer Programming		D&B
Sap Se	Branch	Hannover, Niedersachsen	Germany	Software		D&B
Sap Se	Branch	Ratingen, Nordrhein-Westfalen	Germany	Computer Programming		D&B
Sap Se	Branch	Siegen, Nordrhein-Westfalen	Germany	Computer Programming		D&B
Sap Se	Branch	Hamburg, Hamburg	Germany	Computer and Office Machine Repair and Maintenance		D&B
Sap Se	Branch	St. Ingbert, Saarland	Germany	Computer Programming		D&B
Sap Se	Branch	Berlin, Berlin	Germany	Computer Programming		D&B
Sap Se	Branch	St. Leon-Rot, Baden-Württemberg	Germany	Computer Programming		D&B

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Corporate linkage data:
Published by Dun & Bradstreet, Inc., 2018

Sap America, Inc. — Corporate Overview

Location
3999 W Chester Pike
Newtown Square, PA, 19073-2305
Delaware County
United States

Tel: 610-661-1000
Fax: 610-661-4020

Suggest Company URL

Sales USD(mil):	1,000.0
Assets USD(mil):	NA
Employees:	13,888
D-U-N-S® Number:	18-361-6317
KeyID^{SM}:	326967
Industry:	Software and Programming

Incorporation Date:	1988
Company Type:	Private Subsidiary
Quoted Status:	Not Quoted
Chief Executive Officer Sap	Harald
Primary Support:	Hirsch

Contents
Industry Codes
Business Description
Financial Data

Key Corporate Relationships
Additional Information

Corporate Highlights

Women Owned:	No
Owns/Rents:	Owns
Minority Owned:	No
Franchise Status:	Not a Franchise
Prescreen Score:	Medium Risk
Parent D-U-N-S® Number:	31-626-8655
Ultimate Parent D-U-N-S® Number:	31-626-8655

Key Corporate Relationships

Bank: Citibank International Plc, Banc Of America Leasing & Capital Llc

Industry Codes

ANZSIC 2006 Codes:
7000 - Computer System Design and Related Services

ISIC Rev 4 Codes:
6202 - Computer consultancy and computer facilities management activities

NACE Rev 2 Codes:
6202 - Computer consultancy activities

NAICS 2012 Codes:
541511 - Custom Computer Programming Services

US SIC 1987:
7371 - Computer Programming Services

UK SIC 2007:
6202 - Computer consultancy activities

Business Description

SAP America represents its German parent, SAP, in the US, providing enterprise software and services for managing accounting, distribution, human resources, and manufacturing functions. The company's products include business intelligence, enterprise resource planning, customer relationship management, and supply chain management software. SAP America offers industry-specific applications for markets ranging from aerospace and defense to wholesale distribution. Its services include consulting and support, as well as custom development and application hosting. SAP America accounts for more than one-quarter of SAP's sales.
Source: D&B

dun&bradstreet

<u>More Business Descriptions</u>

Sap America, Inc. is primarily engaged in providing computer programming services on a contract or fee basis. Establishments of this industry perform a variety of additional services, such as computer software design and analysis; modifications of custom software; and training in the use of custom software.
Source: D&B

Financial Data

Financials in: USD(mil)

		1 Year Growth
Revenue:	1,000.0	NA

Additional Infomation

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Spotlight On Upcoming Oral Arguments – January 2018

Monday, January 8, 2018

Alexsam, Inc. v. WildCard Systems, Inc., No. 17-1682, Courtroom 201

This appeal arises from a Southern District of Florida decision denying Alexsam's motion to remand to state court and granting summary judgment against Alexsam on its breach of contract claim. The district court held that Fidelity's invalidity counterclaim conferred subject matter jurisdiction and also that Alexsam's breach of contract claim raised substantial patent issues. Alexsam filed suit against Fidelity for breach of the parties' license agreement. In its answer, Fidelity alleged that Alexsam's patents were invalid and sought a declaratory judgment of invalidity and filed a notice of removal. On appeal, Alexsam argues that the mere fact that an issue of patent law is relevant to the contract dispute is insufficient to establish subject matter jurisdiction. Alexsam further argues that Fidelity's counterclaim was not compulsory, and therefore cannot independently establish jurisdiction. Fidelity argues that Alexsam's breach of contract claim necessarily raised disputed and substantial patent issues, which is sufficient to establish federal question jurisdiction. Fidelity further argues that federal courts have jurisdiction over counterclaims arising under the patent laws irrespective of their compulsory or permissive nature.

Tuesday, January 9, 2018

Queens University at Kingston v. Samsung Electronics Co. Ltd., No. 16-2723, 16-2725, Courtroom 402

Queen's University appeals from a PTAB decision finding the challenged claims invalid as anticipated. Queen's University argues that its due process rights were violated because Samsung introduced a new enablement argument in its Reply Brief, it was not provided an opportunity to present rebuttal evidence, and the PTAB ultimately relied exclusively on the new enablement argument in the Final Written Decision. Samsung argues that the PTAB properly refused Queen's University's request to submit additional evidence because the enablement argument was disclosed in Samsung's petitions and Samsung's Reply Brief merely reiterated its argument.

Wednesday, January 10, 2018

SAP America, Inc. v. Wellogix, Inc., No. 17-1176, Courtroom 203

In this appeal arising from the Southern District of Texas, the Federal Circuit has been asked to consider whether a district court may consider the merits of an inter partes review or reexamination when determining whether a case is "exceptional" under Section 285. SAP argues that the district court is required to review the "totality of the circumstances" and its successful invalidation of all of the asserted claims is a relevant and undisputed fact that should have been considered by the district court. Wellogix argues that the text of Section 285 indicates that external litigation should not be considered, and thus, the district court should not consider the results of the PTAB proceedings.

Thursday, January 11, 2018

SimpleAir, Inc. v. Google LLC, No. 16-2738, Courtroom 201

SimpleAir appeals from an Eastern District of Texas decision granting Google's motion to dismiss. Google argues that the doctrine of claim preclusion bars SimpleAir's suit asserting infringement against the same Defendant and the same product when the asserted claims are from a terminally disclaimed continuation patent of earlier patents adjudged not infringed. SimpleAir argues that its infringement claim is not precluded because while the accused product is the same, it asserted infringement of a different patent that was never previously asserted and the cause of action accrued after the filing of the previous cases.

Tinnus Enterprises, LLC v. Telebrands Corporation, No. 17-2194, Courtroom 201

In this appeal, the Federal Circuit will consider whether a district court must resolve a venue challenge before issuing a preliminary injunction and whether improper venue is a basis for vacating a preliminary injunction. Telebrands argues that venue is a threshold determination that must be determined before proceeding on the merits and that the district court's injunction must be vacated. Tinnus argues that venue relates to the convenience of the litigants, not the power of

Related Companies:	
Wildcard Systems, Inc.	[profile]
Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.	[profile]
Sap Se	[profile]
Samsung Electronics Co., Ltd.	[profile]

Related Geographies:

North America

United States

Florida

New York

North Dakota

Texas

District of Columbia

Related Topics:

Patents

Litigation

Legal

Related Industries:

Colleges and Universities	[profile]
Courts, Justice and Public Safety	[profile]

the court, and that the possibility of improper venue should not prevent a court from issuing a "critical injunction." Tinnus further argues that the venue issue is not ripe as the district court has not ruled on the issue.

Friday, January 12, 2018

Energy Heating, LLC v. Heat On-The-Fly, LLC, No. 16-1559, 16-1893, 16-1894, Courtroom 402

This appeal arises from a District of North Dakota decision canceling Heat On-The-Fly's ("HOTF") trademark after a jury found the mark was generic. HOTF appeals, arguing that the district court lacked subject matter jurisdiction. HOTF argues that Energy Heating failed to provide evidence of an affirmative act by HOTF to enforce its trademark, thus there was no case or controversy sufficient to establish declaratory judgment jurisdiction over Energy Heating's trademark claims. Energy Heating argues that the generic nature of HOTF's mark prevented it from describing its product and services to potential consumers, thus a case or controversy sufficient to confer jurisdiction existed.

The content of this article is intended to provide a general guide to the subject matter. Specialist advice should be sought about your specific circumstances.

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SAP's 2017 Diversity and Inclusion Accomplishments - and the Road Ahead

ENP Newswire
3 January, 2018

With the close of another year, we are presented with an opportunity to assess how far we've come in the pursuit of a culture of inclusion.

By many measures, SAP has been successful in building a workforce that reflects the world around us - driving our growth in large part because we all support one another and our diversity of experiences, perspectives, and skills.

Just last month, SAP was honored to receive two accolades: Based on feedback from our employees, Glassdoor named SAP America as the 11th best workplace in the United States and the No. 1 best workplace in Canada, and we were recognized by Fortune Magazine as one of the top 20 companies doing the most to create a diverse and inclusive culture. This is the second consecutive year we have made the list, and the effect doesn't wane. It's a tremendous honor to be recognized and an important validation of our efforts.

This is in addition to dozens of recognitions this year, including:

Best places to work for LGBTQ Equality by the Human Rights Campaign, and receiving a perfect score on their LGBTQ Equality Index for the fifth consecutive year.

Fortune Magazine and Great Place to Work's best places to work for overall, as well as for parents, for women, for millennials, for giving back and in technology.

People Magazine's 50 Best Companies that Care

Best Large Employers by Forbes America and Forbes Canada

Top Companies for Flexible Jobs by FlexJobs

In addition to being recognized across North America, receiving accolades as an employer of choice in Atlanta, Chicago, Philadelphia, Phoenix, Pittsburgh, San Francisco, and Toronto.

Related Companies:

Sap Se   [profile]

Related Geographies:

North America
Canada
United States

Related Topics:

Management Team

It is certainly rewarding when others acknowledge and validate that we're building something quite special. That said, it's equally important that we recognize there is still a lot of work to be done. We operate in an industry that is in its relative youth, and we're seeing rapid growth by early stage companies that don't have the benefit of the decades of leadership that SAP has. We have a responsibility to continue to serve as an example, to not rest on our laurels but to push for greater equality, diversity, and continued respect for each other. And I know we will.

I'm incredibly proud to come to work each day and be surrounded by people who are passionate about what we do and who have come together as the fabric of our culture of inclusion. I look forward to building upon last year's success, reaching more diversity and inclusion milestones in 2018, and strengthening our position as the employer of choice in North America.

DJ Paoni is president of North America Sales at SAP.

Dallas advocacy group raises $500,000 to assist abused children in court

Dallas Morning News (TX)
30 November, 2017
By Holly Haber, The Dallas Morning News

Nov. 30--Dallas CASA grossed more than $500,000 at the 20th anniversary Champion of Children dinner on Nov. 16 at the Fairmont Dallas.

Priscilla and Corey Anthony and Laura and John Losinger served as co-chairs for the event, which attracted 525 people -- the largest audience ever.

The charity presented the Judge Barefoot Sanders Champion of Children Award to the Junior League of Dallas, which has supplied grants and volunteers to the children's advocacy agency since 1996.

It also honored longtime volunteers Larry Dolan and Sandra Teter and former Dallas County Commissioner Mike Cantrell.

Donors included:

$25,000: AT&T, Fran and Mark S. Berg, Exxon Mobil, Pioneer Natural Resources and Jim Thompson.

$15,000: Citi and Linda and Rob Swartz.

$10,000: Baldridge Foundation, Jana and Mike Brosin, Sandy and Dave Capps, Marion and Bennet Glazer/Barbara and Shelly I. Stein/Southern Glazer's Wine & Spirits, Hirsch Family Foundation, Hoglund Foundation, J.P. Morgan, Nokia, Kay and Bob Schleckser and Wilemia Shaw Consulting.

$5,000: Suzanne McCarron and Robert Andrews/Ricki and Randy Ebner, Priscilla and Corey Anthony, Christie Carter, Comerica Bank, Suzanne and John Gibson, Audrey and John Labanowski, Deborah Ackerman and John Lozier, Cynt and Ken Marshall, Retta A. Miller/Jackson Walker, Stephen B.L. Penrose, Margaret and Jaime Spellings and Thompson & Knight Foundation.

$2,500: Accelerate Resources, Mavis and Shawn Ball, Bank of Texas, Christine and Jonathan Bassham, Suzanne Bryan, Children's Health, CB Choi Family Foundation, Eiseman Jewels, NorthPark Center, Terri Train Greenspan and Alan Greenspan, Lana Harder/Dallas Foundation, Caroline Rose Hunt, Junior League of Dallas Inc., Junior League of Dallas -- friends of Christie Carter, KPMG, Cynthia and David Krause, Lisa and Dave Kroencke, Locke Lord, Parsons Commercial Roofing, Gina and Randall Porter, Helen and Frank Risch, Rosewood Corp., SAP America Inc., Virginia and Edward Schaefer, Myra and Darwin Smith, Tech Mahindra and Lori and James Wales.

Bark + Build design competition

The SPCA of Texas netted about $72,000 from the Bark + Build luxury doghouse design competition held at NorthPark Center.

Constructed by area architects and builders, the 24 creative projects were auctioned at a Nov. 19 party, but they remain on display through Sunday. Vote for your favorite at spca.org/vote.

The event kicked off the annual Home for the Holidays pet adoption drive through Dec. 23 at NorthPark in the corridor between Victoria's Secret and Starbucks. Expect to find dogs, cats and possibly rabbits and hamsters awaiting a loving home. Joan and Dr. Larry Rogers are the

Related Companies:

The Rosewood Corporation	[profile]
Southern Glazer's Wine & Spirits	[profile]
AT&T Inc.	[profile]
Spca of Texas	[profile]
Dallas Foundation	[profile]
Bank of Texas	[profile]
Sap Se	[profile]
Dallas Casa	[profile]
Halton District School Board	[profile]
Comerica Bank	[profile]

Related Geographies:

United States

Texas

Related Industries:

Architecture and Engineering	[profile]
Primary and Secondary Education	[profile]

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presenting sponsors.

Alexander Mansion tours

The Dallas Women's Forum hosts Christmas at the Alexander Mansion tours and lunch on Friday through Sunday.

Tickets are $12 for the tour of the historic home on Ross Avenue. Reservations are required for an optional $15 lunch, which is served daily from 11 a.m. to 2 p.m.

In addition, the organization presents Holiday European Tea Room at the Alexander, a champagne tea at noon daily Dec. 6-10 and Dec. 13-17. Get $50 tickets in advance by calling 214-823-4533 or visiting dallaswomansforum.org.

Proceeds benefit Birdie Alexander Elementary School, Landauer Child Care, Alley's House and the Alexander Mansion.

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TESARO, Inc. Co-Founders named Entrepreneur Of The Year® 2017 National Overall Award winners

PR Newswire US
20 November, 2017

PALM SPRINGS, Calif., Nov. 20, 2017 /PRNewswire/ -- Lonnie Moulder, CEO and Co-founder, and Mary Lynne Hedley, PhD, President, COO and Co-founder, of TESARO, Inc. have been named Entrepreneur Of The Year® 2017 National Overall Award winners. Now in its 31st year, the Entrepreneur Of The Year Award recognizes leaders and visionaries who demonstrate excellence and extraordinary success in innovation, financial performance and personal commitment to building world-class businesses and supporting their communities. Moulder and Hedley received the award for their success in providing transformative therapies to people facing cancer and for serving as a trusted partner to the cancer community.

"Since founding TESARO in 2010, Lonnie Moulder and Mary Lynne Hedley have led the charge in developing life-changing cancer treatments and bringing them to market, fueling the company's rapid growth as a leader in life sciences," said Debra von Storch, Entrepreneur Of The Year Americas Director, EY. "We are proud to present EY's most prestigious honor for entrepreneurship to two such deserving business and community leaders, both of whom demonstrate the ability to achieve unprecedented business growth while also helping to forge a better future."

In just seven years, Moulder and Hedley have expanded TESARO from four employees in 2010 to 500 employees in 19 countries today. The firm has commercialized two drugs that treat ovarian cancer and chemotherapy-induced side effects, respectively, and started clinical trials on several others, while establishing a deep pipeline of cancer treatment products in development.

TESARO is dedicated to cancer treatment as well as patient outreach and advocacy. Partnering with the National Ovarian Cancer Coalition (NOCC) and the Ovarian Cancer Research Fund Alliance (OCRFA), TESARO created Our Way Forward, a program that addresses the unmet educational needs of women living with ovarian cancer. TESARO also recently announced the U.S. Food and Drug Administration approved an intravenous version of its drug (VARUBI) to treat chemotherapy-induced side effects in adults, which affects up to 80 percent of cancer patients.

For additional details on Moulder and Hedley and the story behind their award, visit here.

Moulder and Hedley were recognized at Entrepreneur Of The Year US national gala, which is the culminating event of the Strategic Growth Forum® in Palm Springs, California. Founded and produced by EY, the Forum is the nation's premier gathering of high-growth, market-leading companies.

In addition to the Entrepreneur Of The Year National Overall Award, 11 other awards were given in

Related Companies:

Tesaro, Inc.	[profile]
Xtreme Solutions, Inc.	[profile]
Ernst and Young LLP	[profile]
Ernst & Young Global Limited	[profile]
Ernst & Young LLP	[profile]
Intren, LLC	[profile]
Ernst & Young Global Ltd.	[profile]
Sap Se	[profile]
Kendra Scott, LLC	[profile]
Ingredion Incorporated	[profile]
The Ewing Marion Kauffman Foundation	[profile]

Related Geographies:

North America

Europe

United Kingdom

United States

California

Related Topics:

Company Leadership

Marketing

Conferences, Seminars & Conventions

Management Team

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industry-specific categories. Winners were selected by an independent panel of judges from more than 260 regional award recipients.

Entrepreneur Of The Year national category winners
"EY's category winners have created the products, services and jobs that help our economy and communities grow and have encouraged others to follow suit," von Storch said. "This year, our winners employed over 230,000 people with job growth of 20 percent, while also generating revenue of more than $77 billion — more than 33 percent annual revenue growth."

By category, they include:

Consumer Products and Retail: Kendra Scott, Founder & CEO — Kendra Scott, LLC, Austin, TXDistributing and Manufacturing: Ilene S. Gordon, Chief Executive Officer — Ingredion Incorporated, Westchester, ILEmerging: Dan Flaherty, Founder, and Jason McCann, CEO — VARIDESK, Coppell, TXEnergy, Cleantech and Natural Resources: Loretta F. Rosenmayer, Founder — INTREN L.L.C., Union, ILFamily Business: Neal Schuman, CEO — Schuman Cheese, Fairfield, NJFinancial Services: Asif Ramji, President and CEO — Paymetric, Roswell, GALife Sciences: Mary Lynne Hedley, PhD, President, COO and Co-founder, and Lonnie Moulder, CEO & Co-founder — TESARO, Inc., Waltham MAMedia, Entertainment and Communications: Jeff Green, CEO and Cofounder, and Dave Pickles, CTO and Cofounder — The Trade Desk, Ventura, CAReal Estate, Hospitality and Construction: Bill Bayless, CEO — American Campus Communities, Austin, TXServices: Joseph E. Fluet III, CEO and Chairman of the Board — MAG Aerospace, Woodbridge, VATechnology: Phyllis Winchester Newhouse, CEO — Xtreme Solutions, Inc., Atlanta, GA

Notes to editors

Videos and photos
To view video of all of the Entrepreneur Of The Year Award winners, please visit ey.com/us/eoy.

Sponsors
Founded and produced by EY, the Entrepreneur Of The Year Awards are nationally sponsored in the US by SAP America, Merrill Corporation and the Ewing Marion Kauffman Foundation.

About Entrepreneur Of The Year®
Entrepreneur Of The Year® is the world's most prestigious business awards program for entrepreneurs, chosen from an independent panel of judges including entrepreneurs and prominent leaders from business, finance, and local community leaders. The program makes a difference through the way it encourages entrepreneurial activity among those with potential and recognizes the contribution of people who inspire others with their vision, leadership and achievement. As the first and only truly global awards program of its kind, Entrepreneur Of The Year celebrates those who are building and leading successful, growing and dynamic businesses, recognizing them through regional, national and global awards programs in more than 145 cities in more than 60 countries. ey.com/eoy

About EY's Growth Markets Network
EY's worldwide Growth Markets Network is dedicated to serving the changing needs of high-growth companies. For more than 30 years, we've helped many of the world's most dynamic and ambitious companies grow into market leaders. Whether working with international mid-cap companies or early stage, venture-backed businesses, our professionals draw upon their extensive experience, insight and global resources to help your business succeed. For more information, please visit us at ey.com/sgm or follow news on Twitter @EY_Growth.

About EY
EY is a global leader in assurance, tax, transaction and advisory services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

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This news release has been issued by Ernst & Young LLP, a member of the global EY organization that provides services to clients in the US.

View original content with multimedia:http://www.prnewswire.com/news-releases/tesaro-inc-co-founders-named-entrepreneur-of-the-year-2017-national-overall-award-winners-300559523.html

SOURCE EY

Related Industries:

Research and Development Services   [profile]

Ellis Hilton Garden Inn Celebrates Ribbon Cutting In Newtown Square, Pa

Citybizlist
14 November, 2017

Hotel to Officially Open on November 22 Equus Capital Partners, Ltd ., one of the nation's leading private equity fund managers, and the Mullen Family celebrated the completion of Ellis Hilton Garden Inn in a ribbon cutting ceremony held on November 14. The …

http://www.citybizlist.com

Related Companies:	
Hilton Garden Inn	[profile]
Sunoco, Inc.	[profile]
Sap America, Inc.	[profile]
Equus Capital Partners, Ltd.	[profile]
Sap Se	[profile]
Related Geographies:	
North America	
United States	
Pennsylvania	
District of Columbia	
Related Topics:	
Management Team	
Related Industries:	
Fitness and Recreation Centers	[profile]
Hotels and Accommodation	[profile]

SIMPSON MANUFACTURING CO INC /CA/ - 10-Q - Management's Discussion and Analysis of Financial Condition and Results of Operations.

Edgar Glimpses
9 November, 2017

The following is a discussion and analysis of the consolidated financial condition and results of operations for the Company for the three months and nine months ended September 30, 2017. The following discussion and analysis should be read in conjunction with the interim Condensed Consolidated Financial Statements and related Notes included in Part I, Item 1, "Financial Statements" of this Quarterly Report on Form 10-Q. The following discussion and analysis contain forward-looking statements that reflect our plans, estimates, and beliefs as discussed in the "Note About Forward-Looking Statements" at the beginning of this Quarterly Report on Form 10-Q. Our actual results could differ materially from those plans, estimates, and beliefs. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this Quarterly Report on Form 10-Q as well as the factors discussed in Part I, Item 1A, "Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2016. Business Overview

We design, manufacture and sell building construction products that are of high quality and performance, easy to use and cost-effective for customers. We operate in three business segments determined by geographic region: North America, Europe and Asia/Pacific.

Our primary business strategy is to grow through increasing our market share and profitability in Europe; growing our share in the concrete space; and continuing to develop our software to support our core wood products offering while leveraging our strengths in engineering, sales and distribution, and our strong brand name. We believe these initiatives and objectives are crucial to not only offer a more complete solution to our customers and bolster our sales of core wood connector products, but also to mitigate the cyclicality of the U.S. housing market. On October 30, 2017, we announced the 2020 Plan to provide additional transparency into our strategic plan and

Related Companies:	
Gbo Fastening Systems Ab	[profile]
Simpson Manufacturing Co., Inc.	[profile]
Sap Se	[profile]
Related Geographies:	
North America	
Europe	
Norway	
Poland	
Romania	
Sweden	
United States	
California	
Related Topics:	

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financial objectives. Subject to future events and circumstances, our 2020 Plan is centered on three key operational objectives as further described below. • First, a continued focus on organic growth with a goal to achieve organically a net sales compound annual growth rate of approximately 8% from $860.7 million reported in fiscal 2016 through fiscal 2020. • Second, rationalizing our cost structure to improve company-wide profitability by reducing total operating expenses, as a percent of net

sales from 31.8% in fiscal 2016 to a range of 26.0% to 27.0% by fiscal

2020. We expect to achieve this initiative, aside from top-line growth,

through cost reduction measures in Europe and our concrete product line,

zero-based budgeting for certain expense categories and a commitment to remaining headcount neutral (except in the production and sales departments to meet demands from sales growth). Offsetting these reductions will be the Company's ongoing investment in its software initiatives as well as the expenses associated with our ongoing SAP implementation. • Third, improving working capital management primarily through the

reduction of inventory levels by aggressively eliminating 25 to 30% of the

Company's product SKUs and implementing Lean principles in many factories.

We believe we can achieve an overall 30% reduction of our raw material and

finished good inventory over the next three years without impacting day-to-day production and shipping procedures.

We believe our efforts to achieve the 2020 Plan will contribute to improved business performance and operating results, improve returns on invested capital(1) and allow us to be more aggressive in repurchasing shares of our stock in the near-term.

We believe our ability to achieve industry-leading margins from a gross profit and operating income standpoint is due to the high level of value-added services that we provide to our customers. Aside from our strong brand recognition and trusted reputation, Simpson is unique due to our extensive product testing capabilities and our state-of-the-art test lab; strong customer support and education for engineers, builders and contractors; deep 40-plus year relationships with engineers that get our products specified on the blueprint and pulled through to the job site; product availability with delivery in typically 24 hours or less; and an active involvement with code officials to improve building codes and construction practices. Based on current information, we expect the competitive environment to be relatively stable. We also expect U.S. single-family housing starts to continue to grow as a percentage in the mid to high single digits over the next few years, which should support a sustainable organic revenue growth outlook in North America for many of our products. We have invested in strategic initiatives to help us perform throughout all industry cycles, such as scaling up our wood construction products operations in Europe and ongoing development of our software solutions, including truss software, as our market strategy is to sell engineered product solutions. In support of this effort, we acquired Gbo Fastening Systems AB ("Gbo Fastening Systems") 24
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and CG Visions, Inc. ("CG Visions") in January 2017, as we believe these two acquisitions fit into our current business model and growth strategy.

While acquisitions were part of a dual-fold approach to growth in the past, our go-forward strategy will focus on organic growth, supported by strategic capital investments in the business. As such, we will de-emphasize acquisitions activities going forward, especially as it relates to the concrete space. An exception may occur if the right opportunity were to arise in our core fastener space, which is the particular area where we believe it would be beneficial to gain additional production capacity to support our wood business.

Factors Affecting Our Results of Operations

Unlike lumber or other products that have a more direct correlation to housing starts, our products are used to a greater extent in areas that are subject to natural forces, such as seismic or wind events. Our products are generally used in a sequential process that follows the construction process. Residential and commercial construction begins with the foundation, followed by the wall and the roof systems, and then the installation of our products, which flow into a project or a house according to these schedules. Foundation product sales could be considered a leading indicator for our product sales. Sales of foundation products in the third quarter of 2017 increased compared to the same period in 2016. Our sales also tend to be seasonal, with operating results varying from quarter to quarter. With some exceptions, our sales and income have historically been lower in the first and fourth quarters than in the second and third quarters of a fiscal year, as our customers tend to purchase construction materials in the late spring and summer months for the

construction season. In addition, weather conditions, such as extended cold or wet weather, which affect and sometimes delay installation of some of our products, could negatively affect our results of operations. Political and economic events can also affect our sales and profitability. Operating expenses as a percentage of net sales were under 28% for the third quarter of 2017 and down 104 basis points from the prior year quarter as well as down 185 basis points compared to the second quarter of 2017, primarily due to lower stock-based compensation expense and cash profit sharing expense on lower operating income and reduced payouts under our executive officer cash profit sharing plan. Acquisitions North America In January 2017, we acquired CG Visions for approximately $20.8 million subject to specified holdback provisions and post-closing adjustments. This acquisition is expected to enable us to build closer partnerships with builders by offering software and services to help them control costs and increase efficiency at all stages of the home building process. We expect to look for opportunities to incorporate our products into CG Visions' building information modeling ("BIM") packages and apply CG Visions' expertise to our existing and future software initiatives. Europe In January 2017, we acquired Gbo Fastening Systems for approximately $10.2 million. Gbo Fastening Systems manufactures and sells a complete line of European approved CE-marked structural fasteners, mostly in northern and eastern Europe, which we expect to eventually distribute and sell in western Europe. We have begun distributing into the Nordic countries wood connector products that were manufactured in the Company's manufacturing facilities in western Europe. Further, we expect to access Gbo Fastening Systems' expertise in product development and testing, and proficiency in fastener manufacturing and surface treatment, to strengthen Gbo Fastening Systems' global presence and contribute engineering expertise in automatic fastening systems and fastener collation to help broaden its fastener and structural connectors lines. In July 2017, the Company entered into an agreement to sell all of the outstanding shares in Gbo Fastening Systems' Poland and Romania subsidiaries ("Gbo Poland" and "Gbo Romania", respectively). The sale of Gbo Poland closed on September 29, 2017, and the sale of Gbo Romania closed on October 31, 2017. The Company will retain Gbo Fastening Systems' operations in Sweden and Norway.

ERP Integration

In July 2016, our Board of Directors (the "Board") approved a plan to replace our current in-house enterprise resource planning ("ERP") and externally sourced accounting platforms with a fully integrated ERP platform from SAP America, Inc. ("SAP") in multiple phases by location over a period of three to four years at all facilities plus our headquarters, with a focus on configuring, 25 -- instead of customizing, the standard SAP modules. We anticipate the ERP implementation project will cost approximately $30 million to $34 million through 2019, including capital expenditures. Annual operating expenses will increase from 2017 to 2024 as a result of the ERP project, partly due to the amortization of related capitalized costs. We believe that the ERP project has progressed well in the first nine months of 2017 and is currently on track and on budget. As of September 30, 2017, we have capitalized $8.3 million of the costs associated with the ERP project. We expect to go live with our first locations in the first quarter of 2018. We anticipate that, as the project progresses further into 2018, we will spend more time and resources in training our staff for the new platform, as opposed to configuring the SAP modules, and we expect to record the cost associated with such training as expense.

Business Segment Information

Our North America segment has generated revenues primarily from wood construction products compared to concrete construction products. Due to improved economic conditions, including an increase in housing starts, net sales in regions of the segment have trended up, primarily due to increases in unit sales volumes and an approximately 4% price increase for our connector products in the United Stated effective on December 1, 2016, as well as added revenues from CG Visions. See "North America" below. Our truss sales decreased slightly in the third quarter of 2017. Our truss specialists continue to convert small to medium size truss customers to our design and management software in 2017. During the third quarter of 2016, we initiated a multi-year plan to increase our North America factory production efficiency, aiming to achieve a 75% factory utilization rate on two full shifts by moving high-volume connector production from both our Riverside and Western Canada facilities to our other three manufacturing locations in North America. As of September 30, 2017, we had relocated 100% of our planned high-volume connector production. Our factory utilization was approximately 45% when this project began and we are currently operating at approximately 60% factory utilization. Based on current information and subject to future events and circumstances, we estimate this transition will save approximately $3.0 million per year, mostly in production costs. Both the Riverside and Western Canada locations will continue as sales and distribution locations, and maintain the capability to manufacture custom orders to continue to meet the Company's service and product availability commitments to customers in the Southwestern region of the United States and Western region of Canada. In late 2016, we collaborated with The Home Depot, Inc. ("The Home Depot") to roll out our mechanical anchor line of products that are available at The Home Depot. This collaboration increased a portion of our finished goods inventory and we expect to continue to introduce our mechanical anchor line of products through approximately 1,900 of The Home Depot store locations

throughout 2017 and beyond. Once the rollout is completed, we anticipate this opportunity will meaningfully contribute to our concrete business lines going forward and estimate that on an annualized basis it could potentially increase our net sales by approximately $30 million. In addition, we are presenting the BIM platform acquired from CG Visions to various builders to showcase the software and for us to determine which modules and services that builders might be interested in using to support their business. Our Europe segment generates more revenues from wood construction products than concrete construction products. Wood construction product sales increased 67% in the third quarter of 2017 compared to the third quarter of 2016, primarily due to the acquisition of Gbo Fastening Systems. Concrete construction product sales are mostly project based and net sales increased 11% in the third quarter of 2017 compared to the third quarter of 2016, primarily due to the completion of large projects during the third quarter of 2017. We are uncertain whether concrete construction product net sales will continue to grow at this pace for the remainder of 2017. In connection with the Gbo Fastening Systems acquisition, we estimated demand for wood connector products for the Nordic region and have placed inventory in Sweden. Our Western European locations are working on sales and marketing plans for a complete line of fastener products and expect to introduce them to our customers by the end of 2017. See "Europe" below. Our Asia/Pacific segment has generated revenues from both wood and concrete construction products. We have closed our sales offices located in China, Thailand and Dubai; and discontinued our selling activities in Hong Kong, due to continued losses in the regions. We believe that the Asia/Pacific segment is not significant to our overall performance.

(1) When referred to above, the Company's return on invested capital ("ROIC")

for a fiscal year is calculated based on (i) the net income of that year as

presented in the Company's consolidated statements of operations prepared

pursuant to generally accepted accounting principles in the U.S. ("GAAP"),

as divided by (ii) the average of the sum of the total stockholders' equity

and the total long-term liabilities at the beginning of and at the end of such year, as presented in the Company's consolidated balance sheets

prepared pursuant to GAAP for that applicable year. As such, the Company's

ROIC, a ratio or statistical measure, is calculated using exclusively

financial measures presented in accordance with GAAP.
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Results of Operations for the Three Months Ended September 30, 2017, Compared with the Three Months Ended September 30, 2016

Unless otherwise stated, the results announced below, when providing comparisons (which are generally indicated by words such as "increased," "decreased," "unchanged" or "compared to"), compare the results of operations for the three months ended September 30, 2017, against the results of operations for the three months ended September 30, 2016. Unless otherwise stated, the results announced below, when referencing "both quarters," refer to the three months ended September 30, 2016 and the three months ended September 30, 2017. To avoid fractional percentages, all percentages presented below were rounded to the nearest whole number. Unless otherwise stated, the Company's results below, when referencing "recent acquisitions," refer to the August 2016 acquisition of Multi Services Dêcoupe S.A. ("MS Decoupe") and the January 2017 acquisitions of Gbo Fastening Systems and CG Visions; when referencing "recently acquired businesses," refer to MS Decoupe, Gbo Fastening Systems and/or CG Visions, as applicable; and when referencing "acquired net sales," refer to net sales of such acquired businesses, as applicable. When referencing the "recent North America acquisition," the Company's results below refer to the CG Vision acquisition; and when referencing "recent Europe acquisitions," refer to the MS Decoupe and Gbo Fastening Systems acquisitions.

Third Quarter 2017 Consolidated Financial Highlights

The following table illustrates the differences in the our operating results for the three months ended September 30, 2017, from the three months ended September 30, 2016, and the increases or decreases for each category by segment:

Three Months Three Months Ended Increase (Decrease) in Operating Segment Ended September 30, North Asia/ Admin & September 30, (in thousands) 2016 America Europe Pacific All Other 2017 Net sales $ 230,974$ 15,795$ 15,652$ 55 $ - $ 262,476 Cost of sales 117,499 13,691 11,084 357 (40) 142,591 Gross profit 113,475 2,104 4,568 (302) 40 119,885 Research and development and other engineering expense 10,932 (2,331) 116 (38) - 8,679 Selling expense 24,304 2,007 1,839 6 - 28,156 General and administrative expense 32,543 2,892 1,384 173 (491) 36,501 Loss (gain) on sale of assets (81) (80) (11) 25 - (147) Income from operations 45,777 (384) 1,240 (468)

531 46,696 Loss in equity method investment, before tax - (13) - - - (13) Interest expense, net (82) 23 (249) 30 (18) (296) Gain (adjustment) on bargain purchase of a business - - (2,052) - - (2,052) Gain on disposal of a business - 443 - 443 Income before income taxes 45,695 (374) (618) (438) 513 44,778 Provision for income taxes 15,898 (657) 433 (123) 1,030 16,581 Net income $ 29,797$ 283$ (1,051)$ (315)$ (517)$ 28,197 Net sales increased 14% to $262.5 million from $231.0 million. Recently acquired businesses accounted for $15.8 million (50%) of the increase in net sales. Net sales to contractor distributors, dealer distributors, home centers and lumber dealers increased primarily due to increased home construction activity and average net sales unit prices. Wood construction product net sales, including sales of connectors, truss plates, fastening systems, fasteners and shearwalls, represented 86% and 84% of the Company's total net sales in the third quarters of 2017 and 2016, respectively. Concrete construction product net sales, including sales of adhesives, chemicals, mechanical anchors, powder actuated tools and reinforcing fiber materials, represented 14% and 16% of the Company's total net sales in the third quarters of 2017 and 2016, respectively. 27

Gross profit increased to $119.9 million from $113.5 million. Gross profit margins decreased to 46% from 49%. Recently acquired businesses had an average gross profit margin of 31% in the third quarter of 2017. The gross profit margins, including some inter-segment expenses, which were eliminated in consolidation, and excluding other expenses that are allocated according to product group, decreased to 46% from 50% for wood construction products and increased to 35% from 32% for concrete construction products.

Research and development and engineering expense decreased 21% to $8.7 million from $10.9 million, mostly due to a reclassification of $2.5 million year-to-date expenses associated with recent the North America acquisition from engineering expense to selling expense and general and administrative expense as well decreases of $0.4 million in cash profit sharing expense and $0.3 million in stock-based compensation expense. Selling expense increased 16% to $28.2 million from $24.3 million primarily due to increases of $3.2 million in personnel costs, $0.8 million in advertising costs and $0.6 million in amortization expense, which was partly offset by decreases of $0.7 million in stock-based compensation expense and $0.5 million in cash profit sharing expense. Recent acquisitions increased selling expense by $2.0 million, including the reclassification of $0.3 million year-to-date expenses associated with the North America acquisition from engineering expense to selling. General and administrative expense increased 12% to $36.5 million from $32.5 million, primarily due to increases of $4.0 million in personnel costs, $1.6 million in depreciation expense, $1.0 million in professional fees and $0.7 million in software licensing and maintenance and hosting expense, which was partly offset by decreases of $2.4 million in cash profit sharing expense on lower income from operations (or "operating income") and reduced payouts under our executive officer cash profit sharing plan and $1.0 million in stock-based compensation. Recent acquisitions increased general and administrative expenses by $5.2 million, including the reclassification of $2.2 million year-to-date expenses, associated with the North America acquisition from engineering expense to selling expense. Gain (adjustment) on bargain purchase of a business - On January 3, 2017, we acquired Gbo Fastening Systems for approximately $10.2 million. This transaction was recorded as a business combination and resulted in a preliminary bargain purchase gain estimate of $8.4 million, which represented an estimate of the excess fair value of the net assets acquired and liabilities assumed over the consideration exchanged as of the acquisition date. In the third quarter of 2017, we completed our estimate of the fair value for the assets acquired and liabilities assumed and concluded that the fair value of the assets acquired and liabilities assumed was $16.5 million, which resulted in an adjusted bargain purchase gain of $6.3 million and a decrease of the bargain purchase gain of $2.1 million. This nonrecurring, non-operating income gain adjustment is included in the line item "Gain (adjustment) on bargain purchase of a business" in our results of operations for the three months ended September 30, 2017. Gain on a disposal of a business - On September 29, 2017, we sold all of the outstanding shares of Gbo Poland for approximately $10.2 million, resulting in a gain of $0.4 million (both amounts are subject to post-closing adjustments).

Our effective income tax rate increased to 37% from 35%, primarily due to a reduction of the nonrecurring gain on a bargain purchase related to the Gbo Fastening Systems acquisition (see "Gain (adjustment) on bargain purchase of a business" above), which was not taxable.

Net income was $28.2 million compared to $29.8 million. Diluted net income per common share was $0.59 compared to $0.62. The decrease in net income was primarily due to the $2.1 million reduction on the nonrecurring bargain purchase gain (see "Gain (adjustment) on bargain purchase of a business" above), which decreased diluted net income by $0.04 per common share.

Net sales

The following table represents net sales by segment for the three-month periods ended September 30, 2016 and 2017, respectively:

North Asia/

(in thousands) America Europe Pacific Total Three months ended September 30, 2016 197,459 31,485 2,030 $ 230,974 September 30, 2017 213,254 47,137 2,085 262,476 Increase

$ 15,795$ 15,652$ 55$ 31,502 Percentage increase 8 % 50 % 3 % 14 % 28 ---

The following table represents segment net sales as percentages of total net sales for the three-month periods ended September 30, 2016 and 2017, respectively:

North Asia/ America Europe Pacific Total

Percentage of total 2016 net sales 85 % 14 % 1 % 100 % Percentage of total 2017 net sales 81 % 18 % 1 % 100 %

Gross profit

The following table represents gross profit by segment for the three-month periods ended September 30, 2016 and 2017, respectively:

North Asia/ Admin & (in thousands) America Europe Pacific All Other Total Three months ended September 30, 2016 $ 99,524$ 13,500$ 511$ (60)$ 113,475 September 30, 2017 101,628 18,068 209 (20)

119,885

Increase (decrease) $ 2,104$ 4,568$ (302)$ 40$ 6,410 Percentage increase 2 % 34 % *

* 6 %

* The statistic is not meaningful or material.

The following table represents gross profit as a percentage of sales by segment for the three months ended September 30, 2016 and 2017, respectively:

North Asia/ Admin & (in thousand) America Europe Pacific All Other Total 2016 gross profit percentage 50 % 43 % 25 % * 49 % 2017 gross profit percentage 48 % 38 % 10 % * 46 %

* The statistic is not meaningful or material.

North America

• Net sales increased 8% primarily due to increases in average net sales unit

prices as well as in sales volumes. Canada's net sales increased for the

quarter primarily due to increased sales volumes. Canada's net sales were

not significantly affected by foreign currency translation.

• Gross profit as a percentage of net sales decreased to 48% from 50%

primarily due to increased material, factory and overhead and labor expenses.

• Research and development and engineering expense decreased $2.3 million

primarily due to a $2.5 million reclassification of year-to-date expenses

associated with the recent North America acquisition from engineering

expense to selling and general and administrative expense as well as

decreases of $0.5 million in cash profit sharing expense and $0.3 million in

stock-based compensation.

• Selling expense increased $2.0 million, primarily due to increases of $1.7

million in personnel costs, $0.7 million in advertising costs and $0.6

million in amortization expense, which was partly offset by decreases of

$0.7 million in stock based compensation expense and $0.5 million in cash

profit sharing expense. The recent North America acquisition increased

selling expense by $0.3 million, due to the reclassification of year-to-date

expenses associated with the recent North America acquisition from engineering expense to selling expense. 29 --

• General and administrative expense increased $2.9 million primarily due to

the $2.2 million reclassification of year-to-date expenses associated with

the recent North America acquisition from engineering expense to general and

administrative expense as well as an increase of $1.6 million in

depreciation expense, partly offset by decreases of $1.7 million in cash

profit sharing expense and $0.6 million in stock-based compensation.

• Income from operations decreased $0.4 million mostly due to increased

operating expenses, which was partially offset by increased gross profits.

Europe

• Net sales increased 50% primarily due to acquired net sales of $14.3

million, which accounted for 92% of the increase in net sales in Europe. Net

sales were positively affected by approximately $1.3 million in foreign

currency translations primarily related to the strengthening of the Euro and

Polish zloty against the United States dollar. In local currency, Europe net

sales increased primarily due to increased average net sales unit prices.

• Gross profit margin decreased to 38% from 43% primarily due to the recent

Europe acquisitions, which had an average gross profit margin of 24% in the

third quarter of 2017.

• Selling expense increased $1.8 million primarily due to an increase of $1.4

million in personnel costs mostly related to the recent Europe acquisitions,

which increased selling expense by $1.7 million.

• Income from operations increased $1.2 million mostly due to increased gross

profit, partially offset by higher operating expenses.

Asia/Pacific

• For information about the Company's Asia/Pacific segment, please refer to

the table above setting forth changes in our operating results for the three

months ended September 30, 2017 and 2016.

Administrative and All Other

• General and administrative expenses decreased primarily due to a decrease of

$0.9 million in cash profit sharing expense.

Business Outlook

Based on current information and subject to future events and circumstances, the Company currently estimates that:

• It will recognize severance charges between $3.0 and $3.5 million in the

fourth quarter of 2017.

• Market prices for steel will be stable for the remainder of 2017.

• Gross profit margin for the full-year of 2017 will be approximately 45% to

46%.

• Depreciation expense for the full-year 2017 will be approximately $28

million to $29 million.

• Amortization expense for the full-year 2017 will be approximately $6 million

to $7 million.

• The effective tax rate for the full-year of 2017 will be between 35% and

36%, affected by the nonrecurring bargain purchase gain recorded in 2017 and

the adoption of ASU 2016-09, which requires all excess tax benefits and tax

deficiencies be recognized as income tax expense or benefit in the income

statement.

Results of Operations for the Nine Months Ended September 30, 2017, Compared with the Nine Months Ended September 30, 2016

Unless otherwise stated, the results announced below, when providing comparisons (which are generally indicated by words such as "increased," "decreased," "unchanged" or "compared to"), compare the results of operations for the nine months ended September 30, 2017, against the results of operations for the nine months ended September 30, 2016. Unless otherwise stated, the results announced below refer to the nine months ended September 30, 2016 and the nine months ended September 30, 2017. To avoid fractional percentages, all percentages presented below were rounded to the nearest whole number. Unless otherwise stated, the Company's results below, when referencing "recent acquisitions," refer to the August 2016 acquisition of MS Decoupe and the January 2017 acquisitions of Gbo Fastening Systems and CG Visions; when referencing "recently acquired businesses," refer to MS Decoupe, Gbo Fastening Systems and/or CG Visions, as applicable; and when referencing "acquired net 30
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sales," refer to net sales of such acquired businesses, as applicable. When referencing the "recent North America acquisition," the Company's results below refer to the CG Vision acquisition; and when referencing "recent Europe acquisitions," refer to the MS Decoupe and Gbo Fastening Systems acquisitions.

Year-to-Date (9-month) 2017 Consolidated Financial Highlights

The following table illustrates the differences in our operating results for the nine months ended September 30, 2017, from the nine months ended September 30, 2016, and the increases or decreases for each category by segment: Nine Months Nine Months Ended Increase (Decrease) in Operating Segment Ended September September 30, North Asia/ Admin & 30, (in thousands) 2016 America Europe Pacific All Other 2017 Net sales 660,470 $ 43,567$ 40,749$ 559 $ - $ 745,345 Cost of sales 342,985 27,405 29,562 1,762 65 401,779 Gross profit 317,485 16,162 11,187 (1,203) (65) 343,566 Research and development and other engineering expense 33,807 876 349 19 - 35,051 Selling expense 74,313 6,750 4,921 166 - 86,150 General and administrative expense 96,786 10,039 2,668 253 (1,697) 108,049 Gain on sale of assets (763) 673 (14) (43) - (147) Income from operations 113,342 (2,176) 3,263 (1,598) 1,632 114,463 Loss in equity method investment, before tax - (53) - - - (53) Interest expense, net (400) 109 (257) 248 (385) (685) Gain (adjustment) on bargain purchase of a business - - 6,336 - - 6,336 Gain on disposal of a business - - 443 - - 443

Income before income taxes 112,942 (2,120) 9,785 (1,350) 1,247 120,504 Provision for income taxes

40,601 86 885 (489) (111) 40,972 Net income $ 72,341$ (2,206)$ 8,900$ (861)$ 1,358$ 79,532 Net sales increased 13% to 745.3 million from $660.5 million. Recent acquisitions accounted for $43.4 million (51%) of the increase in net sales. Net sales to dealer distributors, lumber dealers, contractor distributors and home centers increased, primarily due to increased home construction activity and average net unit price. Wood construction product net sales, including sales of connectors, truss plates, fastening systems, fasteners and shearwalls, represented 86% and 85% of the Company's total net sales in the first nine months of 2017 and 2016, respectively. Concrete construction product net sales, including sales of adhesives, chemicals, mechanical anchors, powder actuated tools and reinforcing fiber materials, represented 14% and 15% of the Company's total net sales in the first nine months of 2017 and 2016, respectively. Gross profit increased to $343.6 million from $317.5 million. Gross profit margins decreased to 46% from 48%. Recently acquired businesses had an average gross profit margin of 31% in the first nine months of 2017. The gross profit margins, including some inter-segment expenses, which were eliminated in consolidation, and excluding other expenses that are allocated according to product group, decreased to 47% from 49% for wood construction products and

decreased to 34% from 36% for concrete construction products. Research and development and engineering expense increased 4% to $35.1 million from $33.8 million primarily due to increases of $1.1 million in personnel costs mainly attributable to the addition of staff and pay rate increases instituted on January 1, 2017, and $0.5 million in product development and support, partly offset by a decrease of $0.6 million in cash profit sharing on lower operating income. Selling and marketing expense increased 16% to $86.2 million from $74.3 million primarily due to recent acquisitions, which increased selling expense by $5.5 million, as well as increases of $3.8 million in personnel costs, $2.7 million in point of purchase, trade show and sale promotion costs and $0.7 million in amortization expense, partly offset by a decrease of $0.9 million in cash profit sharing costs on lower operating income. 31
-- General and administrative expense increased 12% to $108.0 million from $96.8 million primarily due to increases of $6.8 million in personnel costs mostly related to recent acquisitions and the addition of staff and pay rate increases instituted on January 1, 2017, $5.3 million in legal and professional fees mostly related to strategic initiatives such as software and systems integration and compensation and governance changes, $3.4 million in software licensing, maintenance and hosting fees, $1.5 million in stock-based compensation and $0.9 million in depreciation expense, which was partly offset by a decrease of $5.1 million in cash profit sharing expense on lower operating income and reduced payouts under our executive officer cash profit sharing plan as well as an increase of $1.9 million from favorable net foreign currency translations. Recently acquired businesses were responsible for $8.3 million of the total increase in general and administrative expenses. Gain (adjustment) on bargain purchase of a business - On January 3, 2017, we acquired Gbo Fastening Systems for approximately $10.2 million. This transaction was recorded as a business combination in accordance with the business acquisition method. We recorded a bargain purchase gain of $6.3 million, which represents an estimate of the excess fair value of the net assets acquired and liabilities assumed over the consideration exchanged as of the acquisition date. This nonrecurring, non-operating income gain is included in the line item "Gain (adjustment) on bargain purchase of a business" in our results of operations for the nine months ended September 30, 2017. Gain on a disposal of a business - On September 29, 2017, we sold all of the outstanding shares of Gbo Poland for approximately $10.2 million, resulting in a gain of $0.4 million (both amounts are subject to post-closing adjustments). Our effective income tax rate decreased to 34% from 36%. The decrease was primarily due to a nonrecurring gain on a bargain purchase related to the Gbo Fastening Systems acquisition, which was not taxable, and the adoption of ASU 2016-09 in 2017 as highlighted above. Net income was $79.5 million compared to $72.3 million. Diluted net income per common share was $1.66 compared to $1.49. The increase in net income was primarily due to the nonrecurring $6.3 million gain on a bargain purchase, which increased diluted net income by $0.13 per common share.

Net sales

The following table represents net sales by segment for the nine-month periods ended September 30, 2016 and 2017, respectively:

North Asia/

(in thousands) America Europe Pacific Total Nine Months Ended September 30, 2016 569,198 86,003 5,269 $ 660,470September 30, 2017 612,765 126,752 5,828 745,345 Increase

$ 43,567$ 40,749$ 559$ 84,875

Percentage increase 8 % 47 % 11 % 13 %

The following table represents segment net sales as percentages of total net sales for the nine-month periods ended September 30, 2016 and 2017, respectively:

North Asia/ America Europe Pacific Total

Percentage of total 2016 net sales 86 % 13 % 1 % 100 % Percentage of total 2017 net sales 82 % 17 % 1 % 100 %

32 --

Gross profit

The following table represents gross profit by segment for the nine-month periods ended September 30, 2016 and 2017, respectively:

North Asia/ Admin & (in thousands) America Europe Pacific All Other Total Nine Months Ended September 30, 2016 280,940 34,746 1,867 (68) $

317,485

September 30, 2017 297,102 45,933 664 (133) 343,566 Increase (decrease) $ 16,162$ 11,187$

(1,203)$ (65)$ 26,081 Percentage increase 6 % 32 % * * 8 %

* The statistic is not meaningful or material.

The following table represents gross profit as a percentage of sales by segment for the nine-month periods ended September 30, 2016 and 2017, respectively:

North Asia/ Admin & (in thousand) America Europe Pacific All Other Total 2016 gross profit percentage 49 % 40 % 35 % * 48 % 2017 gross profit percentage 49 % 36 % 11 % * 46 %

* The statistic is not meaningful or material.

North America

• Net sales increased 8% mostly due to increased average unit price in the

United States and increased overall sales volumes. Canada's net sales

increased primarily due to increased sales volumes on flat average net sales

unit prices. Canada's net sales were not significantly affected by foreign

currency translation. The recent North America acquisition increased net sales by $4.5 million.

• Gross profit margin was unchanged at 49% as the effect of increased average

net sales unit prices was offset by increases in factory and overhead expenses.

• Research and development and engineering expense increased $0.9 million

primarily due to increases of $0.8 million in personnel costs mainly related

to the addition of staff and pay rate increases instituted on January 1,

2017, and $0.5 million in product development and support, partly offset by

a decrease of $0.7 million in cash profit sharing expense.

• Selling expense increased $6.8 million, primarily due to increases of $3.8

million in personnel costs mostly related to the addition of staff and pay

rate increases instituted on January 1, 2017, $2.7 million in point of

purchase, trade show and sale promotion costs and $0.7 million in

amortization expense, partly offset by a decrease of $0.9 million in cash

profit sharing costs on lower operating income.

• General and administrative expense increased $10.0 million, primarily due to

increases of $4.7 million in personnel costs, mostly related to the North

America acquisition and the addition of staff and pay rate increases

instituted on January 1, 2017, $4.9 million in legal and professional fees,

mostly related to strategic initiatives such as software and systems

integration and compensation and governance changes, $3.0 million in

software licensing, maintenance and hosting fees, $0.9 million in

stock-based compensation, $0.8 million in depreciation expense and $0.5

million in intangible amortization expense, partly offset by a decrease of

$3.3 million in cash profit sharing expense. The recent North America

acquisition increased general and administrative expense by $4.6 million.

• Income from operations decreased $2.2 million, mostly due to increased

operating expenses, which were partially offset by higher gross profit.

33 --

Europe

• Net sales increased 47% primarily due acquired net sales of $39.0 million, which accounted for 96% of the total increase. Net sales were negatively affected by approximately $1.0 million in foreign currency translations primarily related to the weakening of the British pound against the United States dollar beginning in the latter half of 2016.

• Gross profit margin decreased to 36% from 40% primarily due to our recent Europe acquisitions. The acquired businesses in Europe had an average gross profit margin of 24% in the first nine months of 2017.

• Selling expense increased $4.9 million primarily due to an increase of $3.9 million in personnel costs mostly related to acquisitions and the addition of staff. The recent Europe acquisitions increased selling expense by $5.1 million.

• General and administrative expense increased $2.7 million primarily due to increases of $1.6 million in personnel costs, mostly related to the addition of staff and pay rate increases instituted on January 1, 2017, $0.8 million in cash profit sharing expense, $0.8 million in software licensing and data processing fees, $0.4 million in professional fees and $0.3 million in stock based compensation, partly offset by the benefit from $2.0 million in net foreign currency translation in the current period. Recent Europe acquisitions increased general and administrative expense by $3.7 million.

• Income from operations increased $3.3 million, mostly due to increased gross profits, which were partially offset by higher operating expenses.

Asia/Pacific

• For information about the Company's Asia/Pacific segment, please refer to the table above setting forth changes in our operating results for the nine months ended September 30, 2017 and 2016.

Administrative and All Other

• General and administrative expenses decreased, primarily due to a decrease of $2.4 million in cash profit sharing expense, partly offset by increases of $0.7 million in personnel costs and $0.3 million in stock based compensation.

Effect of New Accounting Standards

See "Note 1 Basis of Presentation - Recently Adopted Accounting Standards" and "Recently Issued Accounting Standards Not Yet Adopted" to the accompanying unaudited interim condensed consolidated financial statements.

Liquidity and Sources of Capital

Our primary sources of liquidity are cash and cash equivalents, our cash flow from operations and our $300.0 million credit facility that expires on July 23, 2021. As of September 30, 2017, there were no amounts outstanding under this facility. We also received proceeds through the exercise of stock options by our employees. Our outstanding stock options, all of which are currently in-the-money, will expire by February 2018 if not exercised by then. As a result, we anticipate that we will receive up to $3.9 million from stock option exercises through that time. Our principal uses of liquidity include the costs and expenses associated with our operations, continuing our capital

allocation strategy, which includes growing our business by internal improvements, repurchasing our common stock, paying cash dividends, and meeting other liquidity requirements for the next twelve months. As of September 30, 2017, our cash and cash equivalents consisted of deposits and money market funds held with established national financial institutions. Cash and cash equivalents of $86.3 million are held in the local currencies of our foreign operations and could be subject to additional taxation if it were repatriated to the United States. We have no current plans to repatriate cash and cash equivalents held outside the United States, as it is expected to be used to fund future international growth and acquisitions.

The following table presents selected financial information as of September 30, 2017 and 2016, and December 31, 2016, respectively:

34 --- At September 30, At December 31, At September 30, (in thousands) 2017 2016 2016 Cash and cash equivalents $ 204,171 $ 226,537 $ 218,720 Property, plant and equipment, net 265,178 232,810 229,670 Goodwill, intangible assets and equity investment 169,945 149,843 151,474 Working capital 478,961 476,451 475,582

The following table provides cash flow indicators for the nine-month periods ended September 30, 2017 and 2016, respectively:

Nine Months Ended September 30, (in thousands) 2017 2016

Net cash provided by (used in):

Operating activities $ 84,591$ 66,883 Investing activities (62,797) (34,017) Financing activities (49,342) (75,945) Cash flows from operating activities result primarily from our earnings, and are also affected by changes in operating assets and liabilities which consist primarily of working capital balances. As a building materials manufacturer, our operating cash flows are subject to seasonality and are cyclically associated with the volume and timing of construction project starts. For example, trade accounts receivable, net, is generally at its lowest at the end of the fourth quarter and increases during the first, second and third quarters. During the nine months ended September 30, 2017, operating activities provided $84.6 million in cash and cash equivalents, as a result of $79.5 million from net income and $34.5 million from non-cash adjustments to net income which includes depreciation and amortization expense, stock-based compensation expense, a nonrecurring gain on a bargain purchase of a business and changes in deferred income taxes, partly offset by a decrease of $29.4 million in the net change in operating assets and liabilities, including an increase of $40.6 million in trade accounts receivable, net. Cash used in investing activities of $62.8 million during the nine months ended September 30, 2017, consisted primarily of $45.1 million for property, plant and equipment expenditures related to real estate improvements, machinery and equipment purchases and software in development, and $27.9 million, net of acquired cash of $4.0 million, for the acquisitions of Gbo Fastening Systems and CG Visions, which was partly offset by $9.6 million, net of delivered cash of $0.6 million, for the sale of all of the equity in Gbo Poland. Cash used in financing activities of $49.3 million during the nine months ended September 30, 2017, consisted primarily of $20.0 million recorded for share repurchases and $27.0 million used to pay cash dividends. During the nine months ended September 30, 2016, operating activities provided $66.9 million in cash and cash equivalents, as a result of $72.3 million from net income and $31.8 million from non-cash adjustments to net income which included depreciation and amortization expense, stock-based compensation expense, software development write-offs and changes in deferred income taxes, partly offset by a decrease of $41.2 million in the net change in operating assets and liabilities, due to increases of $35.5 million in trade accounts receivable, net, and $23.0 million in inventory. Cash used in investing activities of $34.0 million during the nine months ended September 30, 2016, consisted primarily of $29.9 million for property, plant and equipment expenditures, related to real estate improvements, machinery and equipment purchases and software development, and $5.4 million, net of acquired cash of $1.5 million, for the acquisition of MS Decoupe, partly offset by $1.3 million in proceeds from sale of property, plant and equipment. Cash used in financing activities of $75.9 million during the nine months ended September 30, 2016, consisted primarily of $24.2 million used to pay cash dividends, $53.5 million for share repurchases, including a $50.0 million accelerated share repurchase program, partly offset by $6.7 million received from the issuance of common stock on the exercise of stock options.

Capital Allocation Strategy

We have a strong cash position and remain committed to seeking growth opportunities in the building products range where we can leverage our expertise in engineering, testing, manufacturing and distribution to invest in and grow our business. Those opportunities include internal improvements or acquisitions that fit within our strategic growth plan. Additionally, we have financial flexibility and are committed to providing returns to our stockholders. Below are highlights of our execution on our capital allocation strategy since the beginning of 2016. 35 ---

• In August 2016, we acquired all the stock of MS Decoupe (a former customer

of one of our subsidiaries) for a net cost of approximately $5.4 million.

Our preliminary measurement of MS Decoupe assets acquired included goodwill and intangible assets of $3.1 million. In January 2017, we acquired Gbo Fastening Systems for approximately $10.2 million and CG

Visions for approximately $20.8 million subject to specified holdback

provisions and post-closing adjustments. Our preliminary measurement of

Gbo Fastening Systems' assets acquired resulted in a $6.3 million gain on

a bargain purchase of a business. Our preliminary measurement of CG

Visions assets acquired included goodwill and intangible assets of $20.4

million. See "Note 1 Basis of Presentation -Acquisitions" to the accompanying unaudited interim condensed consolidated financial statements.

• In December 2016, we acquired a 25.0% equity interest in Ruby Sketch Pty

Ltd. ("Ruby Sketch") for $2.5 million, for which we account for our

ownership interest using the equity accounting method. See "Note 6 -

Investments" to the accompanying unaudited interim condensed consolidated

financial statements.

• Our capital spending in 2016 was $42.0 million and was primarily used for

the purchase and build-out of our West Chicago, Illinois, chemical

facility, manufacturing equipment and software development. Our capital

spending in the first nine months ended September 30, 2017 was $45.1

million primarily related to our Texas facility expansion (to increase

warehouse, office and training center capacity), West Chicago chemical

facility improvements, ERP project and Poland facility expansion (to

increase production and warehouse capacity). Based on current information

and subject to future events and circumstances, we estimate that our full-year 2017 capital spending will be approximately $55 million to $60 million, which includes expenditures finishing the work on our Texas facility, as well as for the purchase of manufacturing equipment and

development and licensing of software, assuming all such projects will be

completed by the end of 2017. Based on current information and subject to

future events and circumstances, we estimate that our full-year 2017

depreciation and amortization expense to be approximately $34 million to

$36 million, of which approximately $28 million to $29 million is related

to depreciation. • On September 28, 2017, the Board declared a cash dividend of $0.21 per

share, estimated to be $9.9 million in total. Such dividend is scheduled

to be paid on January 25, 2018, to stockholders of record on January 4, 2018. • In February 2016, the Board authorized the Company to repurchase up to $50.0 million of the Company's common stock in 2016. In August 2016, the

Board increased and extended the $50.0 million repurchase authorization

from February 2016 by authorizing the Company to repurchase up to $125.0

million of the Company's common stock through December 2017. In August

2017, the Board increased its previous $125.0 million share repurchase

authorization by $150.0 million to $275.0 million and extended the authorization from December 2017 to December 2018.

• In August 2016, the Company entered into a Supplemental Confirmation with

Wells Fargo Bank, National Association ("Wells Fargo") for a $50.0 million

accelerated share repurchase program (the "2016 August ASR Program"),

which has been completed. In June 2017, the Company entered into another

Supplemental Confirmation for a $20.0 million accelerated share repurchase

program with Wells Fargo (the "2017 June ASR Program"). During the third

quarter of 2017, the Company received 35,887 shares of the Company's

common stock pursuant to the 2017 June ASR Program, which constituted the

final delivery thereunder. In total, the Company received 460,887 shares

of the Company's common stock under the 2017 June ASR Program at an average price of $43.39 per share. The following table presents cash used to pay our dividends and to repurchase shares of our common stock for the nine-month period ended September 30, 2017 and the twelve-month periods ended December 31, 2016 and 2015, respectively, in aggregated amounts: Open Market Share Accelerated Share (in thousands) Dividends Paid Repurchases Repurchases Total January 1 - September 30, 2017 $ 27,044 $ - $ 20,000 $ 47,044 January 1 - December 31, 2016 32,711 3,502 50,000 86,213 January 1 - December 31, 2015 29,352 22,144 25,000 76,496 Total $ 89,107 $ 25,646 $ 95,000 $ 209,753

As of September 30, 2017, approximately $201.5 million remained available under the $275.0 million repurchase authorization from August 2017.

36 --

Off-Balance Sheet Arrangements

We did not have any off-balance sheet arrangements as of September 30, 2017.

Inflation

We believe that the effect of inflation has not been material in recent years, as general inflation rates have remained relatively low. Our main raw material is steel. As such, increases in steel prices may adversely affect our gross profit margin if we cannot recover the higher costs through price increases.

International Trade Commission Receives Complaint From Dr. Lakshmi Arunachalam

Targeted News Service
19 October, 2017
Targeted News Service

WASHINGTON, Oct. 3 -- The U.S. International Trade Commission received the following complaint:

Docket Number 3263

Received: Tuesday, October 3, 2017

Commodity: IoT Devices (The Internet of Things - Web Applications Displayed on a Web browser)

Investigation Number: Pending Institution

Filed By: Dr. Lakshmi Arunachalam

Firm/Organization: Per Se

Behalf Of: Dr. Lakshmi Arunachalam

Confidential: Yes

Related Companies:	
Usitc	[profile]
Fremont Bancorporation	[profile]
Fulton Financial Corporation	[profile]
Hertz Global Holdings, Inc.	[profile]
International Business Machines Corporation	[profile]
Payless Car Rental	[profile]
Enterprise Rent A Car Co.	[profile]
Alamo Rent A Car	[profile]

Country: None

Description: Letter to Lisa R. Barton, Secretary, USITC; requesting that the Commission conduct an investigation under section 337 of the Tariff Act of 1930, as amended, regarding Certain IoT Devices And Components Thereof (IoT, The Internet of Things - Web Applications Displayed on a Web browser). The proposed respondents are International Business Machines Corporation, Armonk, New York; IBM India Pvt Ltd., India; SAP America, Inc., Newtown Square, PA; SAP SE - Walldorf, Germany; Apple Inc., Cupertino, California; JPMorgan Chase and Company; New York, NY; The United States Office of the Attorney General, U.S. Department of Justice, Washington, DC; United States Patent and Trademark Office, Alexandria, VA; Patent Trial and Appeal Board, United States Patent and Trademark Office, Alexandria, VA; Facebook, Inc., Menlo Park, CA; Microsoft Corporation, Redmond, Washington; Samsung Electronics America, Inc., Ridgefield Park, NJ; Samsung Electronics Co., Ltd., Korea; Eclipse Foundation, Inc., and its Members, Canada; Fisery Inc., Brookfield, Wisconsin; Fiserv India Pvt. Ltd., India; Wells Fargo Bank, San Francisco, CA; Citigroup, Citibank, New York, NY; Citizen's Financial Group, Inc., Providence, RI; Fulton Financial Corporation, Lancaster, Pennsylvania; J.C. Penny Corporation, Inc., and J.C. Penny Company, Inc., Plano, TX; U-Haul International, Inc., Phoenix, AZ; Avis Rent A Car System, LLC, Avis Budget Group, and Payless Car Rental, Parsippany, NJ; Hertz Global Holdings, Inc., The Hertz Corporation, Dollar Rent A Car, and Thrifty Car Rental, Estero, Florida; Ace Rent A Car, Indianapolis, IN; Enterprise Holdings, Enterprise Rent-A-Car, National Car Rental, and Alamo Rent A Car, Clayton/St. Louis, Missouri; Presidio Bank, San Francisco, CA; Fremont Bancorporation and Fremont Bank, Fremont, CA; Heritage Bank of Commerce, and Focus Bank, San Jose, CA; and Bridge Bank, San Jose, CA.

Status Dropdown: Pending Institution.

Apple Inc.	[profile]
U-Haul International, Inc.	[profile]
Enterprise Holdings, Inc.	[profile]
Wells Fargo & Company	[profile]
Samsung Electronics America, Inc.	[profile]
Fremont Bank	[profile]
Sap America, Inc.	[profile]
Heritage Bank of Commerce	[profile]
Avis Rent A Car System, Inc.	[profile]
Focus Bank	[profile]
Sap Se	[profile]
Jpmorgan Chase & Co.	[profile]
The Hertz Corporation	[profile]
Samsung Electronics Co., Ltd.	[profile]
Facebook, Inc.	[profile]
United States Patent and Trademark Office	[profile]
United States Department of Justice	[profile]
Thrifty Car Rental	[profile]
Presidio Bank	[profile]
Dollar Rent A Car	[profile]

Related Geographies:

North America

Europe

Asia

Canada

Germany

India

United States

Arizona

California

Florida

Indiana

Missouri

Montana

New Jersey

New York

Pennsylvania

Rhode Island

Texas

Virginia

Washington

Wisconsin

District of Columbia

Related Topics:

International Finance

Patents

Global Business

Legal

Related Industries:	
Motor Vehicle Rental	[profile]
Administration of Public Programs	[profile]
Courts, Justice and Public Safety	[profile]

Ivyland Company Vies for HR Department of the Year Award

Warminster Patch
18 October, 2017

Innovative Human Resource leaders who have made an impact, effectively aligned their business strategies and delivered powerful results will be honored during the 20th annual Delaware Valley HR Department of the Year Award ceremony on Nov. 16. Long-time HR …

http://www.warminster.patch.com

Related Companies:	
Seer Interactive	[profile]
Glaxosmithkline PLC	[profile]
Solenis LLC	[profile]
Fox Run Brands	[profile]
The Investment Fund For Foundations	[profile]
Lassonde Pappas and Company, Inc.	[profile]
Sap America, Inc.	[profile]
Cabrini University	[profile]
Rosen Group	[profile]
Sap Se	[profile]
Lehigh Valley Restaurant Group, Inc.	[profile]
Related Geographies:	
United States	
Delaware	
New Jersey	
Pennsylvania	
Related Topics:	
Company Leadership	
Business Strategies	
Management Team	
Related Industries:	
Beverage Manufacturing	[profile]
Colleges and Universities	[profile]

Concept Software Hosts Its Graduation Ceremony for Workforce Atlanta Students

PR Newswire US
26 September, 2017

ALPHARETTA, Ga., Sept. 26, 2017 /PRNewswire/ -- Concept Software continues its strides in education by graduating its first batch of Workforce Atlanta (WIOA) students. Over 25 students who successfully completed their training in Bigdata development (SDLC), QA testing (STLC), Network A+/Net+ and Office Administration courses were presented graduation certificates. This

Related Companies:	
Sap Se	[profile]
Atlanta Regional Commission	[profile]

event was attended by over 60 people at Hyatt Place Northpoint parkway. The graduation event was graced by several industry leaders from Accenture, SAP America's, McKesson Change Health and Coca-Cola Corporation, who shared their wisdom on different topics including network security, opportunities in SAP, use of Agile methodologies in McKesson and BI tools used at Coca-Cola. The event was concluded by an inspiring speech from Concept's President and CEO Ravindra Bhave who talked about five things that made him successful in life and business.

"This event helped us to present our graduates to the industry leaders who could guide them in their future path for jobs," said Uday Gupte VP Concept Software.

"We at Concept Software are looking to provide training to more students and help them in their Path to Employment," stated Padma Putta – Manager Operations.

About the Company: Concept Software is a 19-year young company based out of Alpharetta, GA with several training locations in Norcross and Athens GA. Concept software provides several IT solutions, including niche IT Staffing, IT Training, Custom Software development and consultation in Robotic Process Automation, BI tools and setting up Delivery Centers. Concept Software values education and believes that tomorrow's better America can only be created by training young Americans and placing them in mainstream IT jobs. Concept is a MBE Company, and an approved training school by Atlanta Regional Commission and Georgia Vocational Rehab Association, and continues its approval for Georgia Veterans.

Emily Nicholson
Organization Concept Software & Services, Inc.
Phone Number 770 300 9486
Email: 177874@email4pr.com
http://www.concept-inc.com

View original content with multimedia:http://www.prnewswire.com/news-releases/concept-software-hosts-its-graduation-ceremony-for-workforce-atlanta-students-300525756.html

SOURCE Concept Software & Services, Inc.

Related Geographies:
Europe
Georgia
United States
Georgia
Related Topics:
Company Leadership
Management Team

August Jobs That Pay Update: Supporting Start-Ups, Celebrating Expansion, Revitalizing Neighborhoods

Targeted News Service
31 August, 2017
Targeted News Service

HARRISBURG, Pa., Aug. 30 -- Gov. Tom Wolf, D-Pa., issued the following news:

This August, the Keystone State continues to be an ideal place to kick start a new business, expand operations, and recruit the best talent.

Highlights include Governor Wolf's visit to the Almono-Hazelwood Mill 19 redevelopment site in Pittsburgh -- part of a massive revitalization of the largest remaining brownfield in the Steel City -- as well as meeting with companies supported by the University City Science Center's incubator program in Philadelphia. This month also included important infrastructure announcements -- including the introduction of Pennsylvania's first Diverging Diamond Interchange.

Governor Wolf also celebrated companies adding jobs and expanding operations in The City of Chester and Newtown Township in Delaware County, Elk County, Erie County, Fayette County, and Lackawanna County, as well as toured various neighborhood revitalization projects in Pittsburgh, Reading and Scranton.

Pennsylvania is open for business, and this administration is constantly seeking new ways to make it easier for start-ups, Fortune 500 companies, and family-owned businesses to have the support they need to succeed and grow in the commonwealth.

Highlights from August 2017

* Governor Wolf Touts SAP America Expansion Across Pennsylvania

* On 'Jobs That Pay' Tour, Governor Wolf Tours Power Home Remodeling Group in Chester

Related Companies:

Clarion Sintered   [profile]
Metals, Inc.
Logistics Plus, Inc.   [profile]
University City   [profile]
Science Center
Related Geographies:
United States
Delaware
Pennsylvania
Related Topics:
Company Rankings
Related Industries:
Colleges and   [profile]
Universities

* Governor Wolf Tours Revitalized West Reading Community Supported by State Investment

* Governor Wolf Announces Expansion of Clarion Sintered Metals in Elk County, Creation of 55 New Jobs

* Governor Wolf, PennDOT Announce Completion of State's First Diverging Diamond Interchange

* Governor Wolf Touts Work to Build Vibrant Agriculture Industry, Rural Communities in PA during Visit to Ag Progress Days

* Governor Wolf Announces COE Distributing to Expand, Moving Operations from Out of State to Fayette County

* On 'Jobs That Pay' Tour, Governor Wolf Visits Logistics Plus Inc.

* Governor Wolf Touts Economic Opportunities of Almono Site and Hazelwood Business District

* Governor Wolf Announces New Approvals for Low-interest Loans to Support Seven Small Business Projects

* Governor Wolf Tours Scranton Neighborhood Redevelopment Supported with State Investments

* Governor Wolf Announces Socafe To Relocate to Pennsylvania and Create 130 New Jobs in Lackawanna County

* Governor Wolf Hosts Roundtable Discussion on Jobs that Pay Tour at University City Science Center

Supporting Community Revitalization, Increasing Protections for Animals, Applauding Company Expansions in Pennsylvania

Targeted News Service
26 August, 2017
Targeted News Service

HARRISBURG, Pa., Aug. 25 -- Gov. Tom Wolf, D-Pa., issued the following news:

Governor Wolf kicked off this week by touring several community revitalization projects in West Reading. The projects received funding support through the Department of Community and Economic Development.

On Tuesday, Governor Wolf visited the Humane Society in Harrisburg to discuss Pennsylvania's new animal cruelty laws before they go into effect on August 28. Act 10 of 2017, which includes Libre's Law, was signed earlier this summer and includes improved tethering stipulations and conditions for dogs, additional protections for horses, and increased penalties for animal abuse.

Governor Wolf continued his week with stops in Chester and Newtown Square to see firsthand companies extolling innovation and expansion. In Chester, the governor toured the headquarters of Power Home Remodeling Group, the nation's second largest exterior home remodeler that has remained committed to Pennsylvania and the City of Chester since it was founded in 1992.

On Thursday, Governor Wolf toured SAP America and addressed SAP employees at their 'All Hands' staff meeting. The governor praised SAP's recent commitment to add nearly 400 jobs across the commonwealth.

Governor Wolf's Week, August 20, 2017 - August 26, 2017

Sunday, 8/20/17

* Governor Wolf Attends MLB Pirates-Cardinals Game at Historic Bowman Field

Monday, 8/21/17

* Governor Wolf Tours Revitalized West Reading Community Supported by State Investment

Tuesday, 8/22/17

* Governor Wolf Visits Humane Society of Harrisburg to Discuss New Animal Cruelty Laws Before

Related Geographies:

United States

Pennsylvania

Texas

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Effective Date

Wednesday, 8/23/17

* On 'Jobs That Pay' Tour, Governor Wolf Tours Power Home Remodeling Group in Chester

Thursday, 8/24/17

* Governor Wolf Touts SAP America Expansion Across Pennsylvania

* Governor Wolf Announces Aid for Survivors of Flash Flooding in Washington and Clearfield Counties

Friday, 8/25/17

* Governor Wolf Announces Two Pennsylvania Personnel Will Deploy to Texas in Support of Federal Response to Hurricane Harvey

Highlights from The Blog

* GUEST BLOG: Hear it From a Teacher: Reducing the PSSA Means Two More Days of Meaningful Education

* Follow me on Instagram

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Sap America, Inc.

Competitors Report

CompanyName	Location	Employees	Ownership
BMC Software, Inc.	Houston, Texas, United States	6,900	Private
Ca, Inc.	New York, New York, United States	11,800	Public
HP Inc.	Palo Alto, California, United States	49,000	Public
Infor (us), Inc.	Alpharetta, Georgia, United States	3,980	Private
International Business Machines Corporation	Armonk, New York, United States	380,300	Public
Microsoft Corporation	Redmond, Washington, United States	135,000	Public
Oracle Corporation	Redwood City, California, United States	138,000	Public
Progress Software Corporation	Bedford, Massachusetts, United States	1,462	Public
Salesforce.com, Inc.	San Francisco, California, United States	25,000	Public
Software Ag	Darmstadt, Hessen, Germany	4,381	Public
Tibco Software Inc.	Palo Alto, California, United States	4,000	Private
Vitria Technology, Inc.	Menlo Park, California, United States	1	Private
Workday, Inc.	Pleasanton, California, United States	6,600	Public

Published by Dun & Bradstreet, Inc.,Jan, 2018

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Sap America, Inc.

D&B Credit Score:

12

Credit Score Percentile

Credit Score Class: High Moderate Risk

Company Details

D-U-N-S® Number:	18-361-6317
Employees:	13,888
Company Type:	Private Subsidiary
Corporate Family:	476 Companies
Incorporation Date:	1988
US NAICS 2012:	541511 - Custom Computer Programming Services

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The "Class" score of 1 - 5 segments the scorable universe into five distinct risk groups where a (1) represents businesses that have the lowest probability of severe delinquency, and a five (5) represents businesses with the highest probability of severe delinquency. Note: Commercial Credit Scores are not calculated for those businesses designated as "Discontinued at this Location", "Open Bankruptcy", or "Higher Risk". These records are automatically assigned a score of zero (0). The Commercial Credit Risk Score Class indicates that this firm shares some of the same business and financial characteristics of other companies with this classification. It does not mean the firm will necessarily experience severe delinquency.

The "Percentile" score of 1 - 100, where 1 represents businesses that have the highest probability of severe delinquency, and 100 which represents businesses with the lowest probability of severe delinquency. The Commercial Credit Score percentile reflects the relative ranking of a firm among all scorable companies in D&B's database.

The Commercial Credit Score (CCS) predicts the likelihood of a business paying its bills in a severely delinquent manner (91 days or more past term) over the next 12 months, seek legal relief from creditors, or cease operations without paying all creditors in full over the next 12 months based on information in D&B's database. The scores and underlying models are based upon the observed characteristics of several million business in D&B's database and the relationship these characteristics have to the probability of a company experiencing severe delinquency over a period of 12 months. The delinquency scoring models were developed using statistical modeling techniques to select and weight the data elements that are most predictive of severe delinquency. A severely delinquent firm is defined as a business with at least 10% of its weighted dollars 91+ days slow.

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SAP Appendix 2 – Key Personnel Resumes

Profile

- Delivery Executive with broad SAP and business process experience, who manages and develops solutions to solve complex business challenges and minimize risk during SAP implementations and upgrades.
- Exceptional skill in delivering global SAP projects on the latest SAP solutions and developing templates that speed rollout with minimal disruption to business operations.
- Proven ability to understand business requirements and develop solutions that improves operational effectiveness and efficiency.
- Detail knowledge of notification to settlement, and order to cash processes that when implemented result in streamlined operations and reduced costs.
- Recognized for building strong C-level customer relationships based on trust, providing exceptional project team direction and leadership, and exhibiting superior interpersonal skills.
- Over 20 years of managing and delivering SAP implementations: 10 additional years working in Industry developing a strong business background across multiple industries.
- Broad knowledge of operations and business processes in the following industries, Petrochemical, Automotive, High Tech Manufacturing, Oil and Gas, Utilities, Public Sector, and Aerospace and Defense.

Technical

- Certified Project Management Professional - PMP
- Microsoft Certified Technology Specialist (MCTS) – MS Project Office 2007
- Experienced in Solution Manager and Activate methodology.
- Integration experience – within SAP, and between SAP and non-SAP solutions.
- Testing expertise.
  - Specialist in test planning and execution.
    - Integration testing.
    - Regression testing.
    - Stress testing.
  - Superior knowledge of automated testing principles.
- Strong knowledge PM functionality and configuration; expert in PM processes
- Well versed in logistics and materials business processes.

Experience/Project Work

Industry: Oil and Gas Exploration and Production, Houston, TX.
Project Description/Scope: Development of Standard Production Revenue Accounting (PRA) 2.0 Solution.
Solution: Developed an upgraded PRA solution to modernize the standard solution offering and align with current industry best practices.
Roles: Delivery Executive   **Duration:** 13 Months

Responsibilities/Deliverables:
Delivery Executive responsible for the management and delivery of upgraded software to replace the then current version of PRA. Responsibility for Phase 1 scope control, project budget, issue and risk management, integration test planning, and Phase 2 planning. Key deliverables:
- Software delivery project plan.
- Integration test plan and procedures.
- Phase 1 Scope Document.

Achievements:
- Delivered Phase One of Three PRA 2.0 Functionality. Major functionality included Rounding and Allocations, Payment Processing, AR Reporting, Check Input.

Industry: Aerospace and Defense, Tulsa, OK.
Project Description/Scope: ECC 6.0 EHP6 and SRM 7.0 Upgrade.
Solution: Perform technical and legacy system evaluation. Upgrade legacy SAP R/3 4.7 and SRM 4.1 to ECC 6.0 EHP 6 and SRM 7.02.
Roles: Project Manager   **Duration:** 9 Months
Responsibilities/Deliverables:
Delivery Executive responsible for the oversight and upgrade of legacy SAP R/3 and SRM systems. Overall responsibility for technical architecture and implementation of the technical solution. Key deliverables:
- Technical upgrade project plan.
- Upgraded SAP ECC 6.0 EHP6 system.
- Upgraded SRM 7.0 system.

Achievements:
- SAP's upgrade of the legacy SAP environment provided the customer with a system that can be leveraged to take advantage of functionality not previously available in their legacy SAP system.

Industry: Oil and Gas Exploration and Production, Houston, TX.
Project Description/Scope: ECC 6.0 EHP5 Upgrade and BW on HANA Implementation.
Solution: Implement and integrate New G/L, Joint Venture Accounting; implement Spend Performance Management, and new reporting in Business Objects. Also implement Business Planning and Consolidation (BPC NetWeaver 10.0 on HANA).
Roles: Delivery Executive   **Duration:** 12 Months
Responsibilities/Deliverables:
Project manager responsible for the implementation of the New G/L, BPC, and SPM functional solutions. Overall responsibility for technical architecture and implementation of the technical solution. Key deliverables:
- Technical architecture design.
- Technical upgrade cutover plan.
- Integration of BW on HANA into existing technical architecture.

Achievements:

- SAP's implementation of BW on HANA allowed for faster and more frequent data loading. Provided the customer a way to load information four times daily instead of by batch load nightly.
- Implementation of New GL integrated with JVA substantially improved detailed financial reporting below the segment level.

Industry: Natural Gas Exploration and Production, Reading, UK.
Project Description/Scope: Project Evaluation and Re-planning.
Solution: Business Objects Planning and Consolidation (BPC NetWeaver 7.5).
Roles: Project Manager   **Duration:** 2 Months
Responsibilities/Deliverables:
Delivery Executive responsible the evaluation and re-planning of an escalated BPC implementation project. Key deliverables:

- Detailed project plan.
- Resource plan.
- Governance model.

Achievements:

- Evaluated system configuration for design integrity
- Determined software solution was fit for purpose
- Developed new project governance model
- Re-planned project for successful re-start

Industry: Medical Equipment Manufacturing, Tucson, AZ.
Project Description/Scope: Management of SAP ECC 6.0 EHP4 Project Closure
Solution: FI, CO, SD, MM, PUR.
Roles: Program Manager   **Duration:** 2 Months
Responsibilities/Deliverables:
Overall project manager responsible for managing and resolving issues preventing operational stability, successful system implementation, and project closure. Key deliverables:

- Issues log and action plan.
- Prepare executive level briefings and communication.

Achievements:

- SAP system was stabilized.
- Corporate wide manufacturing operations were stabilized
- Implementation project milestones were achieved.
- Project was closed.

Industry: Public Sector Utility, Birmingham, AL.
Project Description/Scope: Implementation of ECC 6.0 EHP4 back office functionality. **Project budget 6MM.**
Solution: FI, CO, Budget, PS, AM, MM, PUR, PM, MAM, and Solution Manager.

Roles: Project Manager   **Duration:** 7 Months
Responsibilities/Deliverables:
Overall project manager responsible the successful delivery of the ECC system to the customer. Responsible for the overall planning, execution and rollout of the solution. Key deliverables:
- Detailed plan.
- Risk identification and mitigation strategy.
- Issues log and action plan.
- Cost control.
- Prepare executive level briefings and communication.
- Resource management.
- Participation in Project Governance Group.

Achievements:
- Solution developed and implemented.
- Complete end user buy-in and acceptance of the new systems and processes.
- On schedule and budget for successful go-live.

Industry: Public Sector Electric Utility, Lincoln, NE.
Project Description/Scope: Implement functional change management and trouble ticket system using SAP Solution Manager Version 7.0 ChaRM functionality.
Roles: Project Manager   **Duration:** 3 months
Responsibilities/Deliverables:
Project manager and solution development lead for ChaRM implementation. Responsible for managing scope, budget and deliverables. Key deliverables:
- Detailed project scope, and project plan.
- Blueprint documents and revised scope resulting from Blueprint phase.
- Configuration and development items.
- Integration test and cut-over plans.
- End user training.

Achievements:
- Successful implementation and Go-Live of ChaRM functionality.
- Delivered complete scope on time and on budget.
- Established baseline for enhanced Solution Manager functionality.

Industry: Public Sector Electric Utility, Columbus, NE.
Project Description/Scope: Develop and plan a solution to integrate SAP CRM and IS-U CRB into the customer's existing ECC 6.0 back office systems.
Roles: Project Manager   **Duration:** 3 months
Responsibilities/Deliverables:
Primary responsibility for planning and executing the assessment. Overall responsibility for planning and preparing deliverables. Staff the project and plan breakout sessions with functional users and key stakeholders in affected areas. Key deliverables:
- Fit/Gap analysis between proposed SAP solution and current legacy systems.
- Scope, time and budget estimates.
- Resource plan.
- Contingency plan.
- Cost justification and business case.

Achievements:
- Timely delivery and signoff of all deliverables.
- Secured budget line item for future implementation of proposed SAP upgrade and new functionality implementation.
- Achieved executive buy-in on proposed SAP solution.

Industry: Public Sector Water Utility, Dallas, TX.
Project Description/Scope: IS-U CCS, Billing, MM, SD, BW implementation in ECC 6.0 and BW 7.0. Credit card encryption, bill printing, and reconciliation with legacy financial systems were included in the project. *Project budget 30 MM*.
Role: Technical Project Manager/Regression Test Manager   **Duration:** 23 months
Responsibilities/Deliverables:
Primary responsibility was to oversee the implementation and installation of the technical infrastructure required to enable the functional solution. Provide leadership and guidance to the technical team, report status, and escalate issues to project management.   Additional responsibilities included procurement advice regarding automated test tools, development of an automated regression test methodology, development of a post go live support concept, and rollout of a Solution Manager proof of concept. Key Deliverables:

- Hardware installation and readiness assessment.
- Regression test tool analysis.
- Post go live support plan.
- Solution Manager proof of concept.

Achievements:
- Successful hardware installation and data center support implemented.
- Created issue resolution and escalation process. (post go live).
- Developed regression testing methodology and trained client staff.
- Defined deliverables for successful Solution Manager proof of concept.

Industry: Public Sector – Transportation Authority, Harrisburg, PA.
Project Description/Scope: Implement additional functionality for plant maintenance into existing SAP ECC 6.0 environment.
Role: Cutover Manager   **Duration:** 3 months
Responsibilities/Deliverables:
Primary responsibility was to provide direction for planning data migration, legacy cutover activities, and coordinating configuration activities to the production environment. Key Deliverables were:
- Cutover plan.
- Go/No-go decision matrix.
- Cutover risk and mitigation strategy.

Achievements:
- Developed a cutover plan that minimized impact on project and support staff.
- Developed and implemented a go/no-go decision matrix.
- Advised project management of potential risks to operations during cutover and closely monitored potential adverse outcomes.

Industry: Public Sector - Government, East Lansing, MI.

Project Description/Scope: Implement tax and revenue registration and collection system using SAP PSCD. Solution included PSC, FICA, FI, CO, Adobe Smart Form integration and reconciliation with legacy systems. *Project budget 12 MM.*

Role: Methodology and QA/Manager   **Duration:** 5 months

Responsibilities/Deliverables:

Primary responsibility was to provide direction to the client and external consulting team on the methodology and tools needed to enable the functional solution. Provide descriptions and examples of all deliverables required to complete the project. Assist in the development of the project plan. Ensure compliance with the SOW and other contractual documents. Key Deliverables

- Deliverable expectation documents.
- Quality plan.
- Compliance matrix.

Achievements:

- Produced deliverable expectation documents to facilitate client approval of all deliverables.
- Initiated quality processes to ensure client satisfaction with submitted deliverables.
- Maintain documentation to verify compliance with contractual obligations.

Industry: Public Sector - Government, Canada

Project Description/Scope: Develop new revenue collection procedures and implement those procedures within SAP PSCD and related telephony tools. *Project Budget 100+ MM.*

Role: Methodology and Quality Manager   **Duration:** 20 months

Responsibilities/Deliverables:

Primary responsibility was to define and develop overall implementation strategy and supporting methodology for the project. Responsible to define all deliverables, obtain agreement from the client on all deliverables, prepare the project plan, and initiate quality procedures. Also responsible for weekly status reporting to the client PMO and project executives. Key deliverables:

- Project plan.
- Status report templates.
- Deliverable descriptions.
- Quality plan.

Achievements:

- Defined the deliverables required for the project.
- Developed definitions of the deliverable to facilitate client approval.
- Developed a quality monitoring strategy and processes to ensure client satisfaction and produce quality deliverables.

Industry: Automotive Manufacturer, Breuberg, Germany.

Project Description/Scope: Replace the client's legacy SAP R/2 systems with an SAP 4.6C system and develop a template that could be rolled out to the client's European and US based facilities. The solution included MM, WM, PUR, FI, CO, PP, and SD. The solution was designed as a hosted solution with all hardware maintained in a secure location offsite. The focus of the project was to maintain tighter inventory and storage container controls and reduce the cost of delayed customer shipments. *Project Budget 10 MM.*

Role: Project Manager and Solution Architect   **Duration:** 12 Months

Responsibilities/Deliverables:

Develop the functional solution based on detailed studies of the client's requirements and operating procedures. Manage the delivery of the project and report findings weekly to the CIO and Executive Sponsor.

Achievements:
- Successfully delivered the project on time and on budget in 10 months.
- Reduced storage container cost in the first two months by 50%.
- Developed a global template for use in Europe and US rollout.
- Solution improved factory throughput and reduced inventory errors.

Industry: Automotive Manufacturing, Dearborn, MI, and Cologne, Germany
Project Description/Scope: Development and implementation of a financial trading company model to support trade with other global automotive manufacturers. The solution included R/3 4.6C, FI, CO, SD, and EDI. *Project Budget 50+ MM.*
Role: Project Manager   **Duration:** 30 months

Responsibilities/Deliverables:
Manage all aspects of the solution development, implementation, global rollout and support for an SAP based OEM trading company model. Responsible for an international team of 20 plus consultants and a monthly budget of 1.5 million USD. Responsible for project planning, risk mitigation, budget control, and resource planning. Responsible for bringing new customers onto the client's systems and managing the rollout to their entire customer base.

Achievements:
- All Projects delivered were on schedule and within budget
- Solution allowed the client to successfully pass internal and external audit and go public shortly after the release of the solution.
- Developed a rollout plan to bring new customers onto the client's systems with no disruption to manufacturing.

Industry: Oil & Gas, Caracas, Venezuela.
Project Description/Scope: To implement SAP PM Solution in the refining and pipeline divisions. *Overall project budget 100+ MM.*
Role: Project Manager   **Duration:** 15 months
Responsibilities/Deliverables:
Overall management of the plant maintenance functional team and integration with thirteen supporting teams. The PM team had 6 consultants and 25 team members. The project scope included the development of four major business processes and implementing the solution in six different locations with approximately 4000 users. Key responsibilities for the implementation consisted of developing a rollout strategy, central development of common business processes, resource management and coordination, custom solution development for detailed planning and

scheduling to support factory shutdowns and, development of common cost reporting procedures. Also responsible for training the company's internal IT staff for deployment to its external IT services consulting company. Responsible for implementing and using the ASAP methodology and tools to facilitate the implementation.

Achievements:
- Managed successful implementation of the plant maintenance solution.
- Developed a solution to integrate external project planning tools into SAP to facilitate plan shut down maintenance.
- Trained users on the ASAP methodology and supporting tools.

EDUCATION & Certification sections:

Bachelor of Engineering, Vanderbilt University, major area of study – mechanical engineering with a concentration in energetics.

Member: Project Management Institute.

Citizenship: US Citizen

Mobility: US Passport, expires 2020 – Willing to travel.

Languages: Fluent in written and spoken English, basic knowledge in spoken Spanish.

SAP Project Manager

- Certified Project Management Professional (PMP) with broad-based SAP experience, managing and delivering business solutions to meet and add value to challenging business needs.
- Special expertise delivering global SAP projects (ECC 6.0, ECC 5.0, R/3 4.0, 4.6, 4.7), carrying multiple implementations through successful go-live.
- Recognized for strong customer focus, leadership, team-building and problem-solving skills, adaptability, communication and interpersonal skills.
- Over 12 years of SAP implementations: 8 years in Industry managing complex SAP projects and programs. Over 4 years in consulting delivering value to demanding SAP customers.
- Broad functional and technical knowledge of SAP, including system landscape & architecture, SD, MM, and HCM functionality, business processes, and their integration points.
- Used to build consensus across multi-disciplinary teams, and across all organizational levels. M Sc: Systems Engineering (Software Engineering).

- Experienced in PMI standards and Activate methodology.
- Integration experience – within SAP, and between SAP and non-SAP solutions.
- Upgrades
  - Ramp-up coach Business Suite on HANA to S/4 HANA
  - ECC 6.0 to Business Suite on HANA
  - R/3 4.6 to ECC 6.0
- Strong knowledge of Netweaver, ESS/MSS and SAP's Enterprise Portal.
- SD configuration.
- Expert in employee lifecycle management, and workforce planning.
- Configuration of personnel administration, and organizational management.

Industry: Media and Advertising, Oklahoma City, OK.
Project Description/Scope: US Implementation of SAP IS –Media Solution: AMC, MAM, Circ., FI-CA, FI-CO, BW, CRM, SD, and Portal.
Roles: Project Manager   **Duration:** 6 weeks
Responsibilities/Deliverables:
Integration project manager to help the customer during the Final Preparation phase. Responsible to identify go-live obstacles and put plan in place to overcome them. Key deliverables:
- Detailed review of cut-over plan.
- Detailed issues log, and action plan.
- Daily issues review, and focused day plan review with consulting team.
- Assistance with escalation of customer messages.

- Coordination of activities of the different SAP organizations involved (SAP Hosting, SAP Delivery, SAP Active Global Support, SAP Industry Business Unit, SAP Global Development).
- Participation in Project Steering Committee.
- Issue resolution.

Achievements:
- Risk mitigation plan in place.
- Resolution of go-live showstopper issues.
- Successful go-live.

Industry: Oilfield Services, Houston, TX.
Project Description/Scope: Global Implementation of MySAP ERP 2005 HCM, including Global OM/PA, payroll in the US, Canada, UK, and Norway, ESS/MSS and Learning Solution.
Roles: Project Manager   **Duration:** 18 months
Responsibilities/Deliverables:
Project manager and lead for the SAP and 3rd party consulting team. Responsible to manage scope, budget and deliverables. Key deliverables:
- Detailed project scope, and project plan.
- Blueprint documents and revised scope resulting from Blueprint phase.
- Configuration and development items.
- Data conversion, Integration test and cut-over plans.
- Management and continued leadership of all the plans above, staffing and all project phases.
- Project reporting to Project Steering Committee.
- Issue resolution.

Achievements:
- Successful implementation and Go-Live of HCM functionality for Canada and the US.
- Successful implementation and Go-Live of HCM functionality for the Europe-Africa Region.
- Delivery of ESS/MSS solution. Completion of Q/A testing and roll-out plan.
- Delivery of Learning solution. Q/A and roll-out plan.

Industry: Chemical Manufacturer, The Woodlands, TX.
Project Description/Scope: Ramp-Up Upgrade from SAP 4.6c to MySAP ERP 2005; Implementation roll-out to Joint Venture in Saudi Arabia.
Roles: Ramp-Up Coach   **Duration:** 4 months
Responsibilities/Deliverables:
Primary responsibility in the upgrade project was to ensure a successful implementation of the new solution, to collect and consolidate feedback regarding all areas and to provide leadership guidance to the customer acting as single conduit to SAP. Key deliverables:
- Risk assessment and risk management plan.
- Facilitate customer nomination for combined upgrade and Unicode conversion pilot project.
- On-going support to customer project management.

Achievements:
- Timely resolution of problems and customer messages.

- Successful upgrade of development and Testing/QA systems.
- Knowledge transfer to customer's team from senior upgrade and Unicode conversion consultants..

Industry: Semi-Conductor Manufacturer, Chandler, AZ.
Project Description/Scope: Global MySAP ERP 2004 HCM implementation, using MSS, ESS, Performance Management, Learning Solution and Enterprise Portal 6.0.
Role: Technical Program Manager   **Duration:** 6 months
Responsibilities/Deliverables:
Primary responsibility was to reduce overall project risks and to provide leadership guidance to the project management team in the final part of realization, final preparation, and go live and support project phases.
Worked closely with customer project team, and coordinated SAP consulting resources on, and off-site. Acted as customer advocate within SAP.

- Risk assessment.
- Agreed criteria to identify when risks had been mitigated or eliminated.
- On-going support to customer project management.

Achievements:
- Successful "big-bang" global go-live.
- Created OSS issue resolution and escalation process.
- Facilitated resolution of all critical OSS messages.
- Created and managed risk management plan.

Industry: Public Sector – Utility Provider, West Palm Beach, FL.
Project Description/Scope: To conduct blueprinting sessions, and knowledge transfer for SAP E-Recruiting v 3.0.
Role: Senior Consultant   **Duration:** 3 weeks
Responsibilities/Deliverables:
Primary responsibility was to provide direction, and advice as to how SAP E-Recruiting would meet customer's need. Final deliverables were blueprint document, and implementation project plan with effort estimate.

- Conducted blueprinting session
- Produced Fit Gap analysis.
- Provided Best Practice guidance.

Achievements:
- Transferred product knowledge to implementation partner and end customer.
- Produced blueprint document.
- Produced implementation project plan, and effort estimate.

Industry: Oil and Gas, Houston, TX.
Project Description/Scope: To provide expert advice in a global SAP E-Recruiting fit-gap analysis. Customer is currently using 4.6c Recruiting module functionality.
Role: Senior Consultant   **Duration:** 4 weeks
Responsibilities/Deliverables:
Primary responsibility was to provide direction and advice as to how SAP E-Recruiting would meet customer's need. The final deliverable is in the form of a report with recommendations and effort estimate for implementation.

- Produced Fit Gap analysis.
- Provided Best Practice guidance.
- Produced implementation project plan, and effort estimate.

Achievements:
- Contributed to recommendation report to implement SAP E-Recruiting.
- Defined future architecture and contributed to recommended roadmap presenting business solution to workforce planning needs using MSS and ESS functionality.

Industry: Sports goods, Germany
Project Description/Scope: To continue roll-out of a global SAP program currently using version 4.7. Strong project governance using ASAP. Scope included 12 countries in Asia, Europe and Americas.
Role: Program Manager   **Duration:** 15 months
Responsibilities/Deliverables:
Primary responsibility was to define and implement Global HRIS strategy. Responsible to deliver HCM solutions using SAP, or integrating with SAP and to manage and execute portfolio of projects. Projects were delivered using a combination of internal and external resources.
Created and implemented a common model to accelerate global implementation of SAP. Responsible for creating detailed project plans, managing customer expectations, and delivering solutions.
Ensured implementation partners met agreed commitments.
Achievements:
- Upgrade of SAP from 4.6 to 4.7.
- Implementation of Employee Self-Service Performance Management solution for over 2000 employees in Germany.
- Implementation of SAP Personnel Administration (PA) and Organizational Management (OM) with interface to local payroll for 10 countries in Asia.
- Implementation of e-Recruiting solution for Germany

Industry: Sports Goods, Germany.
Project Description/Scope: A number of initiatives were in progress to complete implementation of SAP HCM (version 4.6) in Europe and one implementation of payroll using SAP in Hong-Kong. Most of the projects included personnel administration, organizational management, benefits, time management, and gross to net payroll.
Role: Project Manager and Program Coordinator **Duration:** 12 Months
Responsibilities/Deliverables:
Completing an analysis of on-going initiatives to stabilize their implementation and overtake project management. Implemented project controlling tool and process using ASAP.
Directly manage projects and act as technical lead as needed.
Achievements:
- Stabilization of Hong Kong payroll – September 2004 – 3 months
- Austria payroll – December 2004 – 6 months
- Switzerland PA/OM with interface to ADP payroll – December 2004 – 6 months
- UK Payroll – November 2004 – 7 months
- Time configuration and interface with time recording tool (MPDV) for France subsidiary – September 2004 – 3 months

Industry: Oil & Gas and IT consulting, Houston, TX, and Paris, France.
Project Description/Scope: 4.0 HR Global Implementation
Role: Program Manager   **Duration:** 34 months

Responsibilities/Deliverables:
Manage all aspects of the program with an operating budget of USD 14M and an international team of 50 people. Responsible for global HRIS (85000 employees), including its implementation, world-wide deployment (100 countries) and support, associated HR IT strategy definition, technology infrastructure, and delivery capability. Worked with, managed and coordinated multiple partners to deliver a successful SAP solution.

Directed team through the identification of functional fits and gaps proposed solutions for functional gaps. Investigated, researched and documented planned functional enhancements. Developed long-term and short-term resource and budget estimates. Developed implementation plans locally and global. Prepared and promoted business cases to secure projects sponsorship and funding. Participated in the development and assignment of project deliverables. Weekly activities include reviewing progress to-date, advising on future activities to share approaches that have been successful on other projects, and provide advice and guidance on issues the team is facing. Help design global template for several countries.

Achievements:
- Projects delivered were on schedule and within budget
- Reduced Employee Services administrative cost and enabled HR transformation
- Organizational Management, Personnel Administration and Payroll implementation in Canada – 8 months
- Upgrades: 4.6 -> 4.7 (HR) 3 months
-   3.1 -> 4.0 (HR) 4 months
- Implementation of employee portal for France, and UK – 6 months
- World-wide Employee and Manager's Self-Service Performance Evaluation (well over 30000 employees) – 8 months
- Learning Management Solution – 12 months
- Payroll implementation in France – 10 months
- World-wide eRecruiting solution – 6 months

Industry: Oil & Gas, Houston, TX.
Project Description/Scope: To implement SAP ERP solution in the US and Canada.
Role: Team Leader   **Duration:** 30 months
Responsibilities/Deliverables:
Primary responsibility was to lead implementation of SAP Finance and Sales and Logistics with an operating budget of over USD 3M and an international team of more than 20 people.
Built project teams and planned and maintained necessary staffing level.
Conducted interviews, analyzed, and participated in design and re-engineering of Supply-Chain business processes including hands-on SAP configuration.

Achievements:
- Managed successful implementation of Supply Chain solution using SAP Sales and Logistics and Finance modules.
- Implemented project methodology, and developed underlying systems architecture.
- Upgrade: 2.2 -> 3.1
- Conducted interviews, analyzed, and participated in design and re-engineering of Supply-Chain business processes with hands-on SAP configuration.
- SD and MM configuration, including order types, pricing procedures and conditions, as well as FI-CO integration and account determination.

M Sc: Systems Engineering - Emphasis in Software Engineering from Univ. Simon Bolivar
B Sc: Combined Major w/Distinction in Math and C Sc from Univ. of Victoria, Canada
Certified PMP
Member: PMI, ACM, IEEE

Citizenship: US Citizen

Mobility: European Union Passport, expires 2020, Also US Passport. Willing to travel

Languages: Fluent in written and spoken English, and Spanish. Semi fluent in spoken French.

Profile

- Principal Technology Consultant with over 17 years of SAP project experience, focused in the area of SAP Technology Lead - Basis, Technical Architecture, SAP Security and significant experience in full life cycle Projects - installations, upgrades, hardware migrations on the same platform and day-to-day support for SAP systems.
- Experienced in SAP S/4 HANA, BW, BW4/HANA installs and migrations to HANA
- Configure and integrate S/4 HANA 1503, 1511, 1610, SFIN, SLT, SLT, Fiori, HCM/Success Factors and DiH with HANA database.
- Proven ability to install SAP systems, upgrade SAP systems, set up all technical aspects of SAP systems, and support these systems through successful Go Lives. Support has including tuning the performance of systems, setting up and maintaining the transport system, and setting up and maintaining security.
- Strong IT background with significant experience in a variety of platforms including AIX, Solaris, HP/UX and Windows Server (with and without MSCS clustering) and databases (HDB, DB2, Oracle and SQL Server).
- Provided planning, sizing, cost estimations, recommendations, and advice to business owners for determining appropriate system hardware and landscape configuration.
- Project management, estimating, work plan and monitoring.
- Analysis and Design of the Technical Architecture and security.
- Design to-be architecture of all interfaces from the existing legacy systems
- SAP Virtualization Design - Host Design, Datacenter Design, Workload Design, Storage Design, Network Design, Best Practices – SAP/VMware, Security/Compliance & SRM Readiness, Backup/Recovery & SRM readiness and Database settings for VMware
- Certified in SAP NetWeaver Technology [Professional & Associate]
- Certified in SAP Enterprise Portal, Content Management & Collaboration
- Certified in SAP Exchange Infrastructure
- Certified SAP Application Management Engineer
- Certified SAP OS DB Migration Engineer
- Certified SAP Solution Manager Engineer
- Certified in SAP HANA
- Expert in global project delivery of SAP products in technical settings over 17 countries
- Expert in project lead with over a team of 23
- Experienced in assisting SAP Sales team and delivery
- Masters of Science in Engineering (Industrial & Systems), Ohio University, USA
- Bachelor of Science in Engineering (Industrial & Systems), Ohio University, USA

Products

§ **SAP Business Suites** – S/4 1503 & 1511, ERP 6.x, SCM 7.x, SRM 7.x, PLM 7.x, CRM 7.x, Business Suite powered by HANA, SFINACIALS 1.0/15xx, Central Finance, S/4 HANA, SLT, HCM, Success Factors

§ **SAP NetWeaver** – NW7.x, BW 7.x, EP 7.x, PI 7.x, MDM 5.x, IDM 7.x, DMO

§ **HANA** – Enterprise 1, Platform 1, LT Replication, HANA Live, HANA Live RDS, HANA 1 on Power, HANA DBO (Migration), Lumira 1x, ERP Suite on HANA, HANA Cloud Integration, Explorer for HANA, S/4 HANA OD (cloud), S/4 HANA 1x

§ **Business Objects/EPM** – XI 4.x, GRC 7x, BPC75/10x, Data Services 4x, Analysis for Office, EPM Add-on for Office, Simple Financial, Lumira 1x for BI, Crystal Reports, Dash Boards,

§ **SAP Other** –Solution Manager 7.x, TAO 2.x, Live Cache, AII, XRPM, Optimizers, IGS, ITS, HCM, SAP Console, SAPGui, SAP Web Dispatcher, Java Diagnostics with SMD, TREX, SLD, Content Servers, Cache Servers, BIA, Data Services, FIM, PCM, HANA Studio, Fiori, TDMS, TAO,

§ **SAP Related Third Party** – HP Quality Center 10x, HP Load Runner 11x, RWD Help LaunchPad & UPerform, KNOA, Right Fax/Commerce Path, Cideon AutoCAD, Java Diagnostics with Wily , Tivoli, Symantec

§ **RDBMS** – DB2, MaxDB, Oracle 11x, MS SQL Server 20xx

§ **OS/Platforms** – AIX, HP-UX, Sun Solaris, X-windows, OpenWin, Silicon Graphics Interface (SGI), IRIX, Windows Server & Workstation 200x Clusters, MS Windows 20xx, HP-UX Omni Back, Red Hat, SUSE

§ **Language/CASE** - ABAP/4, C, C++, Java, SQL, PL/SQL, PRO*C, Lisp, Perl, Java Script, Shell (C, K, Bourne) Scripting, HTML5

Experience/Project Work

Industry: Utilities, WA
Project Description/Scope: BW/BPC on HANA Implementation
Role: Technology Support   **Duration: 2 months**
Responsibilities/Deliverables: Configuration and system setup of BPC/BW on HANA database.

Achievements:
§   Configured – BPC and BW
§   Go-Live Support

Industry: Power & Turbine, GA
Project Description/Scope: Hadoop, SLT, BODS, and HANA implementation
Role: Technology Support   **Duration: 2 months**
Responsibilities/Deliverables: Usage of Hadoop by utilizing ECC, SLT, HANA, & BODS.

Achievements:
§   Configured – ECC, SLT, HANA, BODS, & Hadoop by using drivers.
§   Supported high volume load testing by using the above scenario.

Industry: Confectionery, PA
Project Description/Scope: S/4 HANA, Central Finance, SLT, DiH, HANA implementation
Role: Technology Lead   **Duration: 5 months**
Responsibilities/Deliverables: Usage of CFIN along with SLT on a Data in Hub environment.

Achievements:
§   Configured – S4HANA, CFIN, SLT, LT, and DiH implementation includes using SAP System Landscape Transformation (SLT) to replicate data objects into SAP HANA.
§   Lead partner in the latest technology for a successful customer greenfield project
§   Installation of 1511 and upgrade to 1610

Industry: Engines, WI
Project Description/Scope: S/4 HANA, Central Finance, SLT, BPC10.1, HANA implementation
Role: Technology Lead & Architect   **Duration: 3 months**
Responsibilities/Deliverables: Technology lead and architect to design, size, and deploy ERP 6, SCM 7, BW 74, BPC10.1, HANA Live, HDB database, SLT, SBOP BI, SBOP DS

Achievements:
§   Installed and configured – S4HANA, Simple Finance, SLT, LT, Fiori and DiH implementation includes using SAP System Landscape Transformation (SLT) to replicate data objects into SAP HANA.
§   Build Development, QA and Production Landscapes – S4HANA, SFin, SLT, LT, Gateway Server, Web Dispatcher using HANA Database and Oracle.

Industry: Food, IL
Project Description/Scope: New ERP 6.7, SCM7.3, BPC10.1, HANA implementation
Role: Technology Lead & Architect   **Duration: 15 months**

Responsibilities/Deliverables: Technology lead and architect to design, size, and deploy ERP 6, SCM 7, BW 74, BPC10.1, HANA Live, HDB database, SLT, SBOP BI, SBOP DS

Achievements:
§ Lead technical project manager & technical architect responsible for entire customer's production & project landscapes
§ Implementation of HANA database (Sizing, deployment, upgrade, installs, patches)
§ Complete end-to-end design and implementation of HANA Live reporting and SLT replication setup along with Data Services
§ Design, install, landscape design, delivery, co-ordination, and integration of activities for implementation all products and integration
§ Migration strategy for all the products using SAP-SLO
§ Coordination of project with implementation partner, SAP, and customer with support of hardware vendors

Industry: Insurance, IL
Project Description/Scope: New BPC 10 implementation
Role: Technology Lead & Architect   **Duration: 4 months**
Responsibilities/Deliverables: Technology lead and architect to design, size, and deploy BPC 10 on HANA database, SLT

Achievements:
§ Design, install, landscape design, delivery, co-ordination, and integration of activities for implementation of BPC 10
§ Upgrade strategy for BW Enterprise to migrate to HANA database and NW7.4
§ Coordination of project with implementation partner, SAP, and customer with support of hardware vendors

Industry: Consumer Goods, WI
Project Description/Scope: BPC upgrade and HANA
Role: Upgrade BPC & HANA   **Duration: 4 months**
Responsibilities/Deliverables: Upgrade BPC, NW, & HANA Database with newer builds. Implement all fixes and performance tuning, HANA Live reporting & SLT
Achievements:
§ Responsible for sizing, configuration, and performance tuning.
§ Complete end-to-end NW7.31 upgrade with support pack stacks
§ Complete end-to-end HANA upgrade and patching with tuning
§ Consolidation support for BPC10

Industry: Chemical, MI
Project Description/Scope: BPC 7.3 Upgrade
Role: Upgrade BPC 7.3 and BPC 10   **Duration: 4 months**
Responsibilities/Deliverables: Consulting advisor for upgrade BPC, NW with newer builds. Implement all fixes and performance tuning

Achievements:
§ Responsible for sizing, configuration, and performance tuning.
§ Support for Oracle, BPC 10, & NW7.3 and any open issues
§ Recommendations for support packs

Industry: Beverages, GA
Project Description/Scope: Global BPC implementation
Role: Lead for SAP EPM project   **Duration: 12 months**
Responsibilities/Deliverables: Technology Project Lead for a complete end to end design, sizing, project methodology, rollout, and support of SAP BPC product.
Achievements:
§ Responsible in multiple roles for direction, installations, landscape design, delivery, co-ordination, and integration of activities for implementation of SAP Project
§ Designed cross SAP products such as BW Enterprise, Business Objects Enterprise, Business Objects Data Services, Business Objects Financial Information Management (FIM).
§ Responsible for coordinating project activities between different divisions, support vendors

Industry: Consumer Goods, NJ
Project Description/Scope: Global EPM & BW rollout. World's largest
Role: Lead for SAP EPM project   **Duration: 5 months**
Responsibilities/Deliverables: Technology Project Lead for a complete end to end design, project methodology, rollout, and support of SAP BPC product.
Achievements:
· World's largest BPC Implementation in terms of size and volume (2011)
§ Responsible in multiple roles for direction, delivery, co-ordination, and integration of activities for implementation of SAP Project
§ Responsible for coordinating project activities between different divisions, support vendors (IBM, Accenture) in different time zones and countries

Industry: Banking, NC
Project Description/Scope: New product -- BPC 10 rollout globally
Role: Lead/Ramp-up Coach for the BPC10 Ramp-up/CUV project **Duration: 5 months**
Responsibilities/Deliverables: Technology Project Lead for a complete design, rollout, and support of SAP BPC 10 product. This role also covers interaction and support from RIG & SAP Development.
Achievements:
§ Project Support with all milestones delivered.
§ Conducted all Risk workshops, Governance meetings, PLT meetings, Go-no-Go calls. Produced project documentation (terms of reference, Environment Overview) in implementing migration projects.
§ Sizing of SAP NetWeaver BW system and configuration for SAP BPC 10
§ Training material and knowledge ramp-up creation.
§ Provided support as a Ramp-up Coach & Project deliverables to management
§ Installation, post configurations and performance tuning.

Industry: Oil & Gas, United Kingdom
Project Description/Scope: Europe's largest implementation of SAP BPC NW (2010)
Role: Technology Project Lead for the EPM project   **Duration: 10 months**
Responsibilities/Deliverables: Technology Lead for a complete end to end design, project methodology, rollout, and support of SAP BPC 7.5 product. This role also covers interface with other SAP products such as ERP, BI, and IBM Cognos.
Achievements:
§ Worked as Technical Lead / Testing Lead with technical issues, technical documentations, process documentation etc, in all aspects of SAP testing (Interface,

Regression, DR, Backup / recovery, User connectivity, etc) Technology & Development Lead.
§ Coordinated as single point of contact with project managers, security team, Project & Support teams on all issues and resolutions (server validations, user access, and issues management). As change coordinator, created tickets for change, and work with CAB for approvals.
§ Sizing of SAP NetWeaver BW system and configuration for SAP BPC 7.5 for all landscapes
§ Worked with Cutover lead in cases of large project in all aspects of gathering information, cutover plans, reviews, presentation & documentation for SAP mock and cutover activities.

§ Post Configurations and performance tuning.
§ Client Installation, testing, deployment and troubleshooting.

Industry: Consumer Goods, GA
Project Description/Scope: Technical Lead for BPC 7.5 project
Role: EPM Technology Principal Consultant   **Duration: 3 week**
Responsibilities/Deliverables: Technical lead for EPM project
Achievements:
§ Coordinated with various production support teams & project implementation teams on planning, execution, training, go live, and post go live support activities.
§ Sizing of SAP BPC MS 7.0 system on distributed systems.
§ Worked as Technical Lead / Testing Lead with Individual project teams on technical migration approaches, technical issues, technical documentations, process documentation etc, in all aspects of SAP testing (Interface, Regression, DR, Backup / recovery, User connectivity, etc).
§ Worked with Cutover lead in cases of large project in all aspects of gathering information, cutover plans, reviews, presentation & documentation for SAP mock and cutover activities.
§ Conducted PLT and governance board meetings for review of project plan and implementation.
§ Conducted SM workshops, Risk workshops, and Training sessions for project & production support teams. Created all project documentation (project plans, cutover plans, Environment overview, Training plans, implementation & testing plan, post go live support documents).

Industry: Financial, NC
Project Description/Scope: BPC 7.5 Install & Configuration, BPC Checks
Role: EPM Technology Principal Consultant   **Duration: 2 week**
Responsibilities/Deliverables: Enhancement pack installation and checks, complete end-to-end installation of SAP BPC 7.5 with post configurations on AIX/DB2 environment
Achievements:
§ Sizing of SAP NetWeaver BW system and configuration for SAP BPC 7.5.
§ Upgrade of BI 7.0 ENH1 with performance checks.
§ Complete installation of SAP BPC 7.5 NW add-ons and servers with latest support packs.
§ Post Configurations on SAP NetWeaver BI and SAP BPC servers.
§ Client Installation, testing and troubleshooting.

Industry: Financial, CA

Project Description/Scope: BPC 7.0 Project Role out
Role: EPM Technology Principal Consultant   **Duration: 8 week**
Responsibilities/Deliverables: Complete end-to-end Project delivery and Tech/Development lead
Achievements:

§ As Delivery manager & Technical Lead worked with Business and Project Manager to successfully implement a full life cycle project SAP NW BW & BPC SAP system.
§ Coordinated with Infrastructure team on Server build and validations as per SAP build requirements.
§ Managed, coordinated with support teams for Installation, configuration of SAP BPC & BW including Business systems in SLD.
§ Worked with functional leads in configuration with ERP and external interfaces, performance, data loading, security issues.
§ Created standard project documents (technical, support documentation, checklists etc) for smooth working of SAP systems.

Industry: **Automotive, IN**
Project Description/Scope: EPM 7.5 Team Lead
Role: EPM Technology Principal Consultant   **Duration: 2 week**
Responsibilities/Deliverables: Team Lead for BPC 7.5 & BW project
Achievements:

§ Managed and coordinated Technical & Security teams to successful SAP implementation of BW & BPC 7.5.
§ Worked with Project manager on implementation timeline, Integration tests, mock and go live cutovers.
§ Worked with technical teams on technical implementation approaches, coordinated with OS teams on server builds.
§ Worked with BW extraction and functional team on Info cube design, extraction strategies, configurations, initial and delta master and transaction data transfer, delta queue error analysis from R/3 to BW.
§ Worked on BW extraction batch schedule, performance of the batch & online run jobs and BW queries.
§ Worked with Security team for BW specific security needs.

Industry: Consumer Goods, IL
Project Description/Scope: BW & EPM Lead
Role: Technology Team Advisor   **Duration: 4 weeks**
Responsibilities/Deliverables: EPM Lead
Achievements:

§ As SAP Technical Lead provided direction, co-ordinated basis and security teams, and integration of activities for successful implementation of SAP BW & EPM project.
§ Worked with PM as single point of contact for all technical implementation including change, issue and problem management. Worked with BPC application team on Integration models, configurations, master and transaction data transfer, Worked on planning run jobs batch schedule, planning.
§ Worked with Demand and planners for monitoring & performance of batch jobs. Worked with DW functional team and BPC team to use the BW & BPC reporting.

Industry: Power & Energy – Juno, FL
Project Description/Scope: Enterprise portal design, MDM 7.1 upgrade
Role: Technology Team Advisor   **Duration: 3 weeks**

Responsibilities/Deliverables: Design Enterprise Portal with MDM 5.5 and upgrade of MDM 5.0 to MDM 7.0

Achievements:
§ Sizing, landscape design, installation, configuration of SAP NW EP 7.0 EHP1.
§ Sizing, installation, configuration of SAP NW MDM 7.1.

Industry: Consumer Goods – Duncan, SC
Project Description/Scope: CRM 7.1, E-Commerce, NWDI Implementation
Role: Technology & Development Team Lead   **Duration: 3 weeks**
Responsibilities/Deliverables: Complete end-to-end sizing, landscape design, installation of CRM 7.0 ENH1, SAP E-Commerce, NWDI 7.0, Web dispatcher

Achievements:
§ Sizing, landscape design, installation, configuration of SAP CRM 7.0 ENH1.
§ Sizing, landscape design, installation, configuration of SAP NWDI 7.0 ENH1.
§ Installation, configuration of SAP Web Dispatcher with SSL.
§ Installation of SAP E-Commerce with ERP backend.

Industry: High tech – Toledo, OH
Project Description/Scope: New Customer Project Implementation
Role: Technology Team Lead   **Duration: 8 months**
Responsibilities/Deliverables: Technology team lead for an implementation of 10 SAP products. Led a team of 6 and guide the project teams for infrastructure requirements

Achievements:
§ Complete end-to-end design and installation of SAP products (ERP6.0 ENH4, SCM7.1, SRM7.1, PLM7.1, Solution Manager 7.1, EP 7.1, GRC AC2.5, GRC PC3.5, DUET1.5, BOE3.1, BPC7.1, IDM7.1, & NWDI7.1) with HA & Microsoft Cluster Services.
§ Installation of Industry Best Practice, SAP BP for High Tech V6.0 & upgrade to ERP6.0 ENH4.
§ Complete end-to-end design and installation of non SAP products (HP QC10.0, HP LR10.0, RWD, KNOA, CIDEON CAD).
§ Complete sizing requirements based on the solution landscape.
§ Complete delivery of all phases based on SAP ASAP Roadmap.
§ Guide & Manage the technology team of six for proper installation and configurations.
§ Guide the project teams for global helpdesk support, security, testing, disaster recovery, system refresh, transport strategy, and development needs.
§ Complete architecture of Supplier Self-Service of SRM, Shopping Cart of EBP, & Portal needs.
§ Complete installation and design of Warehouse Management components based on SAP Console & wireless scanners.
§ Complete installation and design of PLM suite based on C-Project, Content Server, Cache Server, CAD Integration, and conversion servers.

Industry: Beverage – San Diego, CA
Project Description/Scope: HCM on ERP 6.0
Role: Principal Technology Consultant   **Duration: 4 weeks**
Responsibilities/Deliverables: Manage and guide HCM 6.0 with Enhancement Package 3 (EHP3)

Achievements:
§ Installation of Best Practice V2.6 for US HCM.
§ Installation of HCM 6.0 on an ERP 6.0 system with ENH 3.

§   Upgrade of HCM 6.0 on an ERP 6.0 ENH3 to ERP 6.0 ENH4.
§   Configuration of Tax, and other related components.
§   Installed/Configured BPC with BI backend.

Industry: Utilities – San Diego, CA
Project Description/Scope: BI 7.0 upgrade
Role: Principal Technology Consultant & Team Lead   **Duration: 4 weeks**
Responsibilities/Deliverables: Manage and guide BI 7.0 with Enhancement Package 1
(EHP1)
Achievements:
§   Successfully completed BI end-to-end upgrade with EHP1.
§   Provided guidance for enhancement packages for ERP Business suite.
§   Installed/Configured BPC with BI backend.
§   Delivered Webdispatcher and Java installations.

Industry: Chemical – Cleveland, OH
Project Description/Scope: BI 7.0 upgrade and Unicode conversion
Role: Principal Technology Consultant   **Duration: 4 weeks**
Responsibilities/Deliverables: Manage and guide BI-Unicode dual project
Achievements:
§   Successfully completed BI end-to-end upgrade coupled with a Unicode conversion in a
     high distribution server environment.

Industry: Publishing – Cleveland, OH
Project Description/Scope: Performance tuning project lead
Role: Principal Technology Consultant   **Duration: 3 weeks**
Responsibilities/Deliverables: Manage escalation project. Implement changes
Achievements:
§   Manage escalation project based on ERP 6.0 (EHP3) and CRM 2007.
§   Implement and guide customer with required performance related changes.

Industry: Oil & Gas – Houston, TX
Project Description/Scope: Upgrade of BW 3.1 to BI 7.0 in a HA environment
Role: Principal Technology Consultant   **Duration: 2 weeks**
Responsibilities/Deliverables: Upgrade of BW to BI 7.0 in a HA environment. Load
balancing based on Webdispatcher
Achievements:
§   BI 7.0 upgrade in HA environment for both ABAP & JAVA.
§   Performance tuning for BI ABAP & JAVA.
§   BI web, SLD, and broadcaster setup.
§   Load balancing setup using Webdispatcher.

Industry: Oil & Gas – Lexington, KY
Project Description/Scope: JWDI, System Refreshes, Performance
Role: Principal Technology Consultant   **Duration: 2 weeks**
Responsibilities/Deliverables: Upgrade, JWDI setup
Achievements:
§   Tuned performance of newly upgraded ECC 6.0 system.
§   Setup and Configured NWDI.
§   Performed System refreshes based on Dual stacks.

Industry: Specialty Chemicals – Des Plaines, IL
Project Description/Scope: Upgrade and Unicode Conversion
Role: Principal Technology Consultant   **Duration: 9 months**
Responsibilities/Deliverables: Upgrade and Unicode Conversion of R/3 MDMP to ECC 6.0.
Achievements:
§   Upgrade of R/3 system 4.7 to ECC 6.0 with Enhancement Package 3.
§   Unicode conversion with ABAP checks, Vocabulary of 30 MDMP languages.
§   Creation of conversion guides and related documentation.

Industry: Oil & Gas – Houston, TX
Project Description/Scope: Upgrade of BW 3.1 to BI 7.0 in a HA environment
Role: Senior Technology Consultant   **Duration: 2 weeks**
Responsibilities/Deliverables: Upgrade of BW to BI 7.0 in a HA environment. Java Engine troubleshooting and setup.
Achievements:
§   BI 7.0 upgrade in HA environment for both ABAP & JAVA.
§   Performance tuning for BI ABAP & JAVA.
§   BI web, SLD, and broadcaster setup.

Industry: Forest Products – Federal Way, NJ
Project Description/Scope: Landscape Architecture
Role: Senior Technology Consultant   **Duration: 3 weeks**
Responsibilities/Deliverables: Recommendation for the current BI landscape and BI Java server layout
Achievements:
§   Memory and server landscape for Java stack.
§   Performance recommendations for BI Web Queries.

Industry: Food – Elmhurst, IL
Project Description/Scope: BI 2004s SR2 upgrade
Role: Senior Technology Consultant   **Duration: 3 weeks**
Responsibilities/Deliverables: Perform and guide local basis team for BI 2004s SR2 upgrade
Achievements:
§   Procedure and document confirmation for the 7 TB system upgrade.
§   Performance tuning for the upgrade to minimize downtime.
§   Post upgrade configuration.

Industry: Specialty Chemicals – Whippany, NJ
Project Description/Scope: Upgrade and Unicode Conversion
Role: Senior Technology Consultant   **Duration: 2 months**
Responsibilities/Deliverables: Upgrade and Unicode Conversion of R/3 MDMP to ECC 6.0.
Achievements:
§   Upgrade of R/3 system 4.7 to ECC 6.0.
§   Unicode conversion with ABAP checks, Vocabulary of 30 MDMP languages.

Industry: Public Sector, Government, – Washington DC
Project Description/Scope: Detailed analysis of ALE architecture

Role: Senior Technology Consultant   **Duration: 2 weeks**
Responsibilities/Deliverables: Performed a detailed analysis of ALE architecture with
volume of over 700K IDocs a day.
Achievements:
§   Complete ALE analysis based on software with RFC performance tuning.
§   Hardware analysis with emphasis on load balancing among 6 applications and 1 Central
    Instance server.
§   Performance bottle neck analysis.

Industry: Postal Services – Minneapolis, MN
Project Description/Scope: Upgrade and Unicode conversion analysis
Role: Senior Technology Consultant   **Duration: 2 weeks**
Responsibilities/Deliverables: Upgrade analysis of R/3 to ECC 6.0 and Combined
Upgrade – Unicode Conversion (CU-UC)
Achievements:
§   Upgrade assessment of the largest SAP HR implementation of over 500,000 named
    users.
§   A complete end-to-end unicode analysis and project design.
§   Language analysis documentation.

Industry: Oil & Gas – Houston, TX
Project Description/Scope: MDM software and hardware analysis
Role: Senior Technology Consultant   **Duration: 3 weeks**
Responsibilities/Deliverables: Problem analysis for MDM design and repository
performance.
Achievements:
§   A complete architectural analysis of MDM repositories.
§   Troubleshooting of errors and escalations.

Industry: Oil & Gas – Houston, TX
Project Description/Scope: Custom design of a complete system copy procedure with
documentation of the largest IT funded project. Design and support of High Availability (HA)
landscape with webdispatcher. Support of XI systems.
Role: Senior Technology Consultant   **Duration: 3 Months**
Responsibilities/Deliverables: Responsible for installation of ECC systems with HA by
incorporating of Webdispatcher. Design, execution, and documentation of system copy of
HA systems. Support of XI.
Achievements:
§   A customized solution for the system copies of the largest funded IT project.
§   High availability installation of the systems with webdispatcher.
§   Support of XI systems with JAVA troubleshooting.

Industry: Oil & Gas – Warrenville, IL
Project Description/Scope: Design, architect, and support NW2004s – MDM landscape.
Role: Senior Technology Consultant   **Duration: 2 Months**
Responsibilities/Deliverables: Responsible for installation of NW 2004s MDM landscape
consisting of Sandbox, Development, and Production environments with EP 6.0 and ECC
backend.
Achievements:
§   Performance troubleshooting of MDM applications (Server, Console, Client, Syndicator,
    Importer, & JAVA API).

§ Performance tuning of repository and cleanup for better network utilization.
§ EP and XI integration and troubleshooting with MDM.

Industry: Consumer Goods Company – Racine, WI
Project Description/Scope: Design, architect, and support entire SAP landscape.
NW2004s implementation consisting of planning, upgrade and support of BI, EP, ECC, &
SCM.
Role: Sr. Technology Consultant   **Duration: 50 Months**
Responsibilities/Deliverables: Project Manager responsible for installation of NW 2004s
landscape consisting of sandbox, development, stage and production environments with EP
6.0 SP2. Architect and support various SAP products (see below).
Achievements:
§ Designed the infrastructure solution and assisted in hardware sizing and architecture
   planning for the production landscape and future BI, EP, ECC, & SCM rollouts.
§ Installed TREX Server to support Knowledge Management Search and Classification
   functionality within the EP. Implemented CM and configured CM/TREX for document
   search and taxonomy creation.
§ Implemented SSL, SSO, for ECC, BI, & EP on ABAP & J2EE stack supporting the Portal
   environments.
§ Integrated EP with multiple component systems including BI, xRPM, R/3 and third party
   applications.
§ Upgrade of BW 3.1 to NW 2004s BI 7.0, APO 3.0 to NW 2004s SCM 5.0, R/3 4.6C to
   ECC 5.0, SM 3.0 to SM 4.0.
§ Installation of ECC 5.0, EP 6.0, xRPM, CS, AII 4.0, XI 3.0, SLD, Solution Manager 4.0.
§ R/3 architect, support and rollout in over 17 countries with stress (volume) testing,
   performance configuration, volume printing, and configuration for local laws (multi-
   byte/Unicode).
§ General up-keeps, support packs, & other patching.
§ Trained Basis support staff in EP and R/3.
§ Setup of an EBP shopping cart on an IIS environment.
§ Provided homogeneous & heterogeneous system copies in ABAP, Java, & ABAP+Java
   systems.
§ Global Rollouts of SAPgui with Support Packs.

Industry: Chemical Manufacturing Company – Indianapolis, IN
Project Description/Scope: Support, Architect, Upgrade of SAP product landscape
including R/3 and HCM modules.
Role: Technology Consultant   **Duration: 40 Months**
Responsibilities/Deliverables: Subject matter expert for multiple projects, including
Employee Self Service (ESS), R/3 Upgrade, HR module rollout, and security.
Achievements:
§ Designed the infrastructure solution and assisted in hardware sizing and architecture
   planning for the production landscape in USA, China & Belgium.
§ Implementation of HR Planning Suite SAP. This covered payroll, time and event
   management/training, benefits, ESS, security, organization structure.
§ Implementation of Multinational Language Support (MDMP) & multi time zones.
§ HR support & rollout. This included tax configuration with BSI.
§ Upgrade of R/3 3.1I to 4.0B, 4.0B to 4.5B, & 4.5B to 4.6C.
§ Performed hardware sizing/installation/configuration, system landscape design, client
   copies/imports/exports, distributed system (ALE) configuration/monitoring, data archiving
   and retrieval, and backup/disaster recovery design and implementation.

§ Provide CTS problem resolution, configured OSS, Obtained SAP Object & Developer key, applied Hot Packages & SPAM.
§ Managed client activities (creation, copies, refreshes & deletes).
§ Created and maintained security (users, profiles, parameters, activity groups) using profile generator.
§ Computer Center Management System (CCMS) Implementation.
§ Setup the ALE Environment for Central User Administration (CUA), named logical systems, assigned logical systems to clients.
§ Managed SAP Instances including database copies (homogenous system copies).
§ Designed and implemented a backup & recovery methodology.
§ Export objects to UNIX systems, tp, R3Trans, backup failures handling & failure prevention, client copy/delete/export.
§ Managed volume groups, logical volumes, & file systems for EMC.
§ Set up and use SAP correction and transport/change management (CTS/CM) system. Monitor and tune R/3 systems and databases for optimal performance.
§ End user training and support, and supporting employees at multiple sites.
§ Web based software implementation written in Bourne shell, Java, & HTML.
§ Implemented and administered external mail communications with SAP systems.
§ Setup of an ESS in a MS IIS server environment.

Industry: Automotive Manufacturing – Dearborn, MI
Project Description/Scope: Support, Develop, Installation of SAP product landscape including R/3 and PDM by SDRC-Metaphase.
Role: Technology Analyst   **Duration: 15 Months**
Responsibilities/Deliverables: : Product Data Management Implementation for SAP, Implementation of SAP software company wide, Development of Siemens Product Data Bridge, Basis Support, Unix administration.
 Achievements:
§ Installed, configured and administered a second R/3 system landscape for FI/CO/MM/PP applications.
§ Upgraded existing R/3 landscape to release 4.0b.
§ Responsible for complete integration and implementation of SAP Cross Application Component – CAD Interface that uploaded and downloaded Master Production data from Metaphase 3.0. The Interface Bridge was Siemens Interface. Also responsible for Metaphase Customization and Creation of Communication Objects.
§ Developed an E-Commerce PDM solution that allowed users to navigate through web interface and performed complex PDM functions in Metaphase 3.0 and SAP 4.0b.
§ Participated in an integrated EC solution that handled marketing, order handling, pricing, material management, shipping, logistics, payments, accounting and taxes for Glass Division. This was a III tier architecture that used Auxilums' InfoEngine (BAPIs) and Netscape Corporation's ECommerceXpert (or ECXpert). ECXpert Provided an EDI interface which completed EC transactions over VANs, Internet and EDI Internet Integration (EDIINT).

EDUCATION & Certifications:

- SAP Certifications:
  - Technology consultant certification [01813268] – Technology Consultant Professional SAP NetWeaver 7.0 (ECC)
  - Technology consultant certification [0002778032] - Netweaver Enterprise Portals (EP)
  - Technology consultant certification [0002778032] - Netweaver Exchange Infrastructure (XI)
  - SAP Application Management Engineer [01813268]– End to End Root Cause Analysis
  - Technology consultant certification [01813268] - Technology Consultant SAP Associate NetWeaver 7.0 (ECC)
  - OS DB Migration Engineer Certification [01813268] – SAP OS/DB Migration certified Engineer
  - Solution Manager Engineer Certification [01813268] – SAP Solution Manager certified
  - SAP HANA [01813268] – SAP HANA Technical & Application certified
- Microsoft Certified MCSE
- Professional Trainings from HP, IBM, Oracle, SAP, & Sun

Citizenship: United States of America

Languages: English

Platinum Development Consultant   Charlotte, NC

Profile

- ABAP Expert
- ABAP for SAP HANA Development Specialist
- Central Finance Technical Expert
- SAP Landscape Transformation Replication Server (SLT) Expert
- Proven ability to lead team members in the development of RICEF objects
- Proven ability to lead / perform Data Migration for Central Finance
- ABAP development experience across multiple modules including HR, Payroll, FI, MM and SD (RICEF Objects)

Technical

- Expert ABAP Developer in all RICEF categories
- Expert loading/replicating data via SAP Landscape Transformation Replication Server (SLT)
- Expert in data migration (both master & transactional data) for Central Finance implementations; table-to-table and predefined migration objects
- Expert analyzing / accelerating ABAP reports via HANA DB
- Proficient in the design, development and maintenance of SAP Workflow
- Experience in FI/MM/SD modules
- Experience in HR modules; Personnel Administration and Organizational Management
- Experience implementing SAP Business Application Accelerator powered by HANA

Experience/Project Work

Industry: Aerospace & Defense – Lakeland, FL
Project Description/Scope: Central Finance
Role: Central Finance Data Migration / SLT Lead
Duration: 6 months
Responsibilities/Deliverables: Central Finance (cFIN) SLT Lead responsible for Load/Replication of Master and Transactional Data from 3 SAP ECC (Suite on HANA) Source Systems to Central Finance via both FINS Mass Data Framework (MDF) and SLT. Also, responsible for the design & development of all cFIN BAdIs, including Cost Object, Secondary CO & FI.
Achievements:
- Load/Replication of Master Data (Cost Objects) and Transactional Data (FI & Secondary CO) from 3 SAP Source System to Central Finance across multiple Integration Test Cycles

Industry: Consumer Products – Hershey, PA
Project Description/Scope: Central Finance
Role: Central Finance Data Migration Expert
Duration: 5 months
Responsibilities/Deliverables: Provide expert guidance in the development of a project plan, including steps, dependencies, estimates (processing time) for Central Finance Data Loads; Historical FI Load & subsequent SLT Load/Replication activities. Implement non-standard functionality to enable load/replication/conversion of Cost-Based (Source) to Account-Based (cFIN) COPA Characteristics for Secondary CO.
Achievements:

- Successful implementation of Cost-Based to Account-Based COPA Conversion of Secondary CO Documents (via Secondary CO cFIN BAdI).
- Successfully upskilled implementation team in the following cFIN Data Load activities;
  - Cost-Object (Order) Load & Replication via SLT
  - FI Initial Extract & Posting via FINS Mass Data Framework (MDF)
  - SLT Load/Replication of FI Data via SLT
  - Secondary CO Preparation Report
  - Load/Replication of Secondary CO via SLT

Industry: Aerospace and Defense – Wichita, KS
Project Description/Scope: Central Finance
Role: Technical Lead; ABAP / SLT / Data Migration
Duration: 12 months
Responsibilities/Deliverables: Data Migration / Harmonization from multiple SAP source systems to Central Finance via SLT, including master and transactional data. Support all steps for migrating data from source to target systems, including planning, mappings/transformations and optimization.
Achievements:

- Load/Replication of Master Data (including transformations via SLT & MDG); 3 Source Systems → Central Finance
- Load/Replication of Transactional Data (FI & Primary CO) from 3 SAP Source System to Central Finance

Industry: SAP Internal Project
Project Description/Scope: Central Finance – New Functionality Development/Testing
Role: Central Finance Technical Expert
Duration: 4 weeks
Responsibilities/Deliverables: Support development & testing of new Central Finance functionality: Open Item Management & Replication of Changes to Cost Objects. Load/Replicate Data (master & transactional data) to Central Finance Sandbox from Customer Source System. Error analysis via Application Interface Framework (AIF) & Central Finance Framework: BAdI's, standard Central Finance classes/framework, etc…
Achievements:

- Following functionality delivered to pilot customer;
  - Open Item Management
  - Replication of Changes to Cost Objects

Industry: Aerospace and Defense – Wichita, KS
Project Description/Scope: Central Finance Proof-of-Concept (POC)
Role: ABAP Expert
Duration: 4 weeks
Responsibilities/Deliverables: Load master data to support load of FI Postings. Develop BAdI's to support custom mapping/transformation framework; MDG key/value mappings were not leveraged during POC.
Achievements:
- Loaded Project Systems (PS) Data; Projects, WBS Elements & Hierarchy
- FI Load/Replication – mappings/data transformations (via BAdI)

Industry: Chemical – Wilmington, DE
Project Description/Scope: ABAP Code Remediation for ECC Migration to Suite on HANA
Role: ABAP for HANA Expert
Duration: 3 weeks
Responsibilities/Deliverables: Performed ABAP Code Remediation analysis for all custom objects in ECC. Identified and remediated all problematic code in preparation for migration to HANA DB.
Achievements:
- Identified & resolved all Database Migration Adaptations (required pre-Migration)
- Identified & resolved all Functional Adaptations (required pre-Migration)

Industry: Energy - Remote
Project Description/Scope: ABAP Code Remediation Analysis for ECC Migration to HANA Enterprise Cloud (HEC)
Role: ABAP for HANA Expert
Duration: 1 week
Responsibilities/Deliverables: Performed ABAP Code Remediation analysis for all custom development objects in ECC. Provided report outlining objects/code requiring remediation, identifying both problematic code and suggested solutions. Provided knowledge transfer to the customer development team focusing on 'ABAP for HANA Best Practice'.
Achievements:
- Code Remediation Analysis (Audience: Team Leads / Management), including assessment overview, approach, objects (per name/reason) requiring review/remediation and next steps
- Detailed ABAP Assessment (Audience: Development Team Members), including custom objects, problematic statement(s), location in code (per line number) and suggested solution.
- 'ABAP for HANA Best Practices' Document/Guide

Industry: Utilities - Remote
Project Description/Scope: ABAP Code Remediation Analysis for ECC Migration to HANA Enterprise Cloud (HEC)
Role: ABAP for HANA Expert
Duration: 1 week
Responsibilities/Deliverables: Performed ABAP Code Remediation analysis for all custom development objects in ECC. Provided report outlining objects/code requiring remediation, identifying both problematic code and suggested solutions. Provided knowledge transfer to the customer development team focusing on 'ABAP for HANA Best Practice'.
Achievements:
- Code Remediation Analysis (Audience: Team Leads / Management), including assessment overview, approach, objects (per name/reason) requiring review/remediation and next steps
- Detailed ABAP Assessment (Audience: Development Team Members), including custom objects, problematic statement(s), location in code (per line number) and suggested solution.
- 'ABAP for HANA Best Practices' Document/Guide

Industry: Banking - Remote
Project Description/Scope: ABAP Code Remediation Analysis for ECC Migration to HANA Enterprise Cloud (HEC)
Role: ABAP for HANA Expert
Duration: 1.5 weeks
Responsibilities/Deliverables: Performed ABAP Code Remediation analysis for all custom development objects in ECC. Provided report outlining objects/code requiring remediation, identifying both problematic code and suggested solutions. Provided knowledge transfer to the customer development team focusing on 'ABAP for HANA Best Practice'.
Achievements:
- Code Remediation Analysis, including assessment overview, approach, objects (per name/reason) requiring review/remediation and next steps
- Detailed ABAP Assessment (Audience: Development Team Members), including custom objects, problematic statement(s), location in code (per line number) and suggested solution.
- 'ABAP for HANA Best Practices' Document/Guide

Industry: Utilities – Remote
Project Description/Scope: ABAP Code Remediation Analysis for SRM Migration to HANA
Role: ABAP for HANA Expert
Duration: 2.5 days
Responsibilities/Deliverables: Performed ABAP Code Remediation analysis for all custom development objects in SRM. Provided report outlining objects/code requiring remediation (per object name & reason)
Achievements:
- Code Remediation Analysis (Audience: Team Leads / Management), including assessment overview, approach, objects (per name/reason) requiring review/remediation and next steps

Industry: Service Provider - Toronto, Ontario Canada
Project Description/Scope: ABAP Code Remediation Analysis for ECC Migration to HANA Enterprise Cloud (HEC)
Role: ABAP for HANA Expert
Duration: 2 weeks
Responsibilities/Deliverables: Performed ABAP Code Remediation analysis for all custom development objects in ECC. Provided report outlining objects/code requiring remediation, identifying both problematic code and suggested solutions. Provided knowledge transfer to the customer development team focused on 'ABAP for HANA Best Practice' and standard Code/Performance analysis tools.
Achievements:
- Code Remediation Analysis (Audience: Team Leads / Management)
- Detailed ABAP Assessment (Audience: Development Team Members), including custom objects, problematic statement(s), location in code (per line number) and suggested solution.
- 'ABAP for HANA Best Practices' Document/Guide
- ABAP Test Cockpit (ATC) Step-by-Step Guide
- ABAP Source Scan Report Step-by-Step Guide

Industry: Oil & Gas – Concord, California
Project Description/Scope: SAP ECC 6.0, Human Capital Management (HCM), HR Renewal 1.0 Feature Pack 4 (FP04)
Role: HR Framework Expert, HCM Processes & Forms (HCM P&F) Expert
Duration: 18 months
Responsibilities/Deliverables: Guided customer through Data Migration process required when implementing Employee Self-Service (ESS) / Manager Self-Service (MSS) / New (Decoupled) Infotype Framework. Led development of Conceptual and Technical Design documents for HCM Processes & Forms implementation. Responsible for the development of high complexity PA and OM Forms.
Achievements:
- Developed Data Migration strategy for HR data in preparation for Employee Self-Service (ESS) and Manager Self-Service (MSS) roll-out
- Developed and delivered Conceptual Design & Technical Design Documents for HCM Processes & Forms (PA & OM)
- End-to-End development of multiple PA and OM processes
- Process: Employee/Personnel Action Across Org. Units
  - Personnel Administration (PA) & Organizational Management (OM)
  - FPM Form
  - US & UK Employee processing
  - Custom WDA Search-Helps for Receiving Manager & Position that directly populate Form Fields (eliminate roundtrip required by Generic services)
  - Transfer Employee to 'existing position' or 'new position' (created via FPM Form)
  - Salary Change
- Process: Employee/Personnel Action
  - Personnel Administration (PA) & Organizational Management (OM)
  - FPM Form
  - US & UK Employee processing
  - Custom WDA Search-Helps for Position that directly populates Form Fields (eliminate roundtrip required by Generic services)
  - Transfer Employee to 'existing position' or 'new position' (created via FPM Form)
- Process: Leave of Absence (LOA)

- - Personnel Administration (PA)
  - FPM Form
  - US & UK Employee processing
- Process: Create Position(s)
  - Organizational Management (OM)
  - FPM Form (Composite Form)
  - US & UK Position creation
  - Create up to 5 new positions via single request
  - Create / Copy Position capability

Industry: SAP Internal Project
Project Description/Scope: ABAP for HANA
Role: ABAP Expert / HANA Modeler
Duration: 2 weeks
Responsibilities/Deliverables: Developed and delivered 'ABAP for HANA' training to SAP Consultants. Required data replication (from ECC to HANA) via SLT, acceleration of ABAP reports (ABAP 7.30 – ABAP 7.40) using HANA DB and development of HANA Models and Stored Procedures (SQL Scripting). Training provided current and future outlook for leveraging HANA to accelerate ECC applications and required working knowledge of ECC (DB tables, ABAP development) and HANA Studio/Modeling/SQL Scripting.
Achievements:
- Configured Cloud sandbox landscape, including Kernel Upgrade (7.21 EXT), establishing connection to HANA from ECC, and SLT Data replication
- Redirected customer reports to read HANA DB via Secondary DB connection and HANA Application Accelerator
- Pushed complex logic of sample customer reports to HANA through development of Attribute, Analytic, Calculation views and Stored Procedures(accessible via ABAP reports)

Industry: Energy – San Antonio, TX
Project Description/Scope: SAP ECC 6.0 / HANA
Role: ABAP Expert
Duration: 2 weeks
Responsibilities/Deliverables: Review custom reports accelerated via secondary DB connection to HANA and provide suggestions/feedback for further improvement. Provide document outlining several development strategies for accessing HANA DB from ABAP Reports.
Achievements:
- Reviewed customer reports and provided several SAP Notes to improve/increase performance. Provided HANA-specific SQL Hints to be included in Select Statements to improve performance when processing Select Statements that include For All Entries (FAE)
- Delivered detailed document covering several approaches for accessing HANA DB from ABAP Reports, including functionality to be delivered in AS ABAP 7.40. This document discusses and provides examples for the following topics:
  - Access replicated Tables in HANA via Open SQL (Pre-ABAP 7.40)
  - Access replicated Tables, HANA Views and Stored Procedures via ADBC Classes
  - Access HANA Views and Stored Procedures via Open SQL (ABAP 7.40)

Industry: Aerospace & Defense – Orlando, FL
Project Description/Scope: SAP ECC 6.0 / HANA
Role: ABAP Expert
Duration: 4 weeks
Responsibilities/Deliverables: Implement HANA Application Accelerator for existing ECC custom reports. Analyze custom reports, identify relevant tables and create scenario files to load into HANA Application Accelerator. Replicate ECC tables in HANA Database via System Landscape Transformation (SLT) system. Analyze performance improvement delivered via HANA Application Accelerator/HANA DB and present to client.
Achievements:

- Redirected existing custom reports from ECC to HANA DB via HANA Application Accelerator.
- Improved report performance and response time through leveraging HANA DB.

Industry: Medical Appliances & Equipment – Palo Alto, California
Project Description/Scope: SAP ECC 6.0, Human Capital Management (HCM)
Role: HCM Processes & Forms Expert
Duration: 2 weeks
Responsibilities/Deliverables: Improve user experience through redesigning an existing HCM Process & Form and provide demo to the client. This project required the following tasks; Copy and Modify existing Form Configuration, Copy and Modify existing Workflow, Create custom generic service, Create new decision-driven Adobe Interactive Form.
Achievements:

- Delivered decision-driven Transfer Form that displays/hides/populates data per Manager's response to questionnaire included within Form. Resolved Manager pain-point identified by End-Users who are required to initiate/submit processes via HCM P&F, but do not have knowledge required to enter new position, work schedule, etc…
- Delivered Process Workflow that includes additional 'Process Form' step for HR Business Partners, allowing HR BP to update form data not completed during Initiator Step.

Industry: Retail – Stellarton, Nova Scotia Canada
Project Description/Scope: SAP ECC 6.0, Human Capital Management (HCM)
Role: SAP Technical Consultant (ABAP Expert), HCM Processes & Forms Expert
Duration: 5 weeks
Responsibilities/Deliverables: Performed review of client's Decoupled Infotype Framework and HCM Processes & Forms solution. Redesigned clients existing termination form to align with Best Practice. Provided knowledge transfer to client resources regarding the Decoupled Infotype Framework, including migration of Infotypes and Enhancements to the new Infotype Framework (ITF), standard Infotype classes and configuration.
Achievements:

- Termination Form: Redesigned clients existing termination form replacing custom logic with functionality delivered via standard SAP_PA service. This redesign significantly reduced custom code (found within custom generic service) and the number of fields referenced within the form configuration, while improving performance. Through properly configuring the Termination process the client was able to undo changes made to Infotype configuration and standard Infotype Classes, avoiding potential impact to Infotype maintenance and retroactive accounting.

Industry: Retail – Toronto, Ontario Canada
Project Description/Scope: SAP ECC 6.0, Extended Warehouse Management (EWM)
Role: SAP Technical Consultant (ABAP Expert)
Duration: 4 weeks
Responsibilities/Deliverables: Assigned to SAP development team to resolve defects and complete change-requests. Responsibilities included modification/creation of Reports (ALV and List Output) within Extended Warehouse Management.
Achievements:

- Wave Clean-Up Report: Developed an automated daily report that evaluates wave status, processes (confirms) all open PTL tasks within a wave and closes the wave.

Industry: Medical Appliances & Equipment – Pittsburgh, Pennsylvania
Project Description/Scope: SAP ECC 6.0, RICEFW Objects
Role: SAP Technical Consultant (ABAP Expert) **Duration:** 2 weeks
Responsibilities/Deliverables: Assigned to SAP development team to resolve defects and complete development of critical project deliverables prior to Go-Live. Responsibilities included modification/creation of Reports (ALV and List Output), SmartForms, SAP scripts and Workflow across several modules, including Materials Management (MM), Sales and Distribution (SD) and HR.
Achievements:

- Daily Production Plan Report: Created report that derives Product Order data from custom table, and generates two ALV Grids within same display screen per selection-screen criteria. The client requested a printable version of the report that would include not only data displayed within the ALV grids, but also bar codes containing Product Order numbers. To meet this requirement, a SmartForm was created and is generated within the report, providing a printed version of the report output, including bar codes. Several (SmartForm) print options are available via the selection-screen, including 'Print Preview', 'Print Immediately' and 'Spool Request' (Background Processing).
- CATS Workflow Program: Developed program that triggers custom CATS Notification Workflow. This program includes a selection-screen parameter (Personnel Area) that when populated, limits the employees evaluated during Workflow processing. This allows the client to schedule the corresponding 'CATS Notification' job to run on different days, leveraging a program variant per execution. Different days leverage a program variant defined for that specific day of the week and determine the Personnel Area (employees) to be evaluated that day. Modifications to the existing Workflow container, Workflow Tasks and corresponding Business Object methods were also required.
- PNC Bank Interface: Resolved formatting issues identified within Outbound Interface file.

Industry: Pharmaceutical – Whitehouse Station, New Jersey
Project Description/Scope: SAP HCM Processes & Forms/SAP DUET/Microsoft SharePoint
Role: SAP Technical Consultant (ABAP), Adobe HCM Processes & Forms Expert
Duration: 8 months
Responsibilities/Deliverables: Assigned to SAP team to support development of an Adapter class for HCM Processes & Forms (HCMP&F). This deliverable allows customer to leverage existing HCMP&F functionality via a non-Adobe Interactive Form interface.
This role requires a working knowledge of the HCMP&F Framework from a back-end/ABAP perspective and experience using ABAP object-oriented development techniques.
Achievements:

- HCMP&F Adapter Class: Provide HCMP&F Functionality within SharePoint

- HR Administrator Advanced Search Function Module: Provide HCM Processes Search functionality to SharePoint Universal Worklist (UWL) via SAP ECC / Gateway / DUET
- Manager History Function Module: Provide SharePoint User's the ability to view all Process Requests initiated or acted upon (Submit/Approve/Reject/Withdraw) by User.
- Workflow Outbound Handler: Custom Outbound Handler (DUET) derives additional data to be sent to SharePoint Universal Worklist (UWL) during DUET Push Job (standard Job pushes Work Items from SAP to SharePoint). Additional data includes Form Data (HCMP&F) per work item and Process/Step-Specific identifiers leveraged by SharePoint when displaying request web parts accessed via UWL.

Industry: Chemical – Rockaway, New Jersey
Project Description/Scope: HCM Process and Forms (Personnel Administration)
Role: SAP Technical Consultant (ABAP)/Adobe HCM Processes & Forms **Duration:** 6.5 Weeks
Responsibilities/Deliverables: Assigned to HCM Process and Forms team to assist in the development and delivery of 6 Processes and Forms within a 6.5 week timeline. Responsibilities included process configuration, custom generic service development, Adobe form development and form scripting.
Achievements:

- Delivered Processes, including 'Promotion/Reposition' and 'Transfer Employee'
- Delivered Adobe Interactive Forms, including 'Promotion', 'Transfer Employee', 'Work Location Change' and 'Lateral Move' (Internal/External)
- Custom Generic Services, offering the following functionality; Default IT0008 Reason based on Action Reason and Populate Dynamic Tool Tip for form fields

Industry: Medical Device/Software Manufacturer – Palo Alto, California (Remote)
Project Description/Scope: HCM Process and Forms Defect Resolution
Role: Adobe HCM Processes & Forms Subject Matter Expert **Duration:** 2 Weeks
Responsibilities/Deliverables: Responsible for resolving Process/Form defect (Initialize Form Button clears all form fields), implementing Process/Form change-request (addition of infotype field) and providing client resources with detailed instructions for defect resolution/implementation of change-request. Responsible for supporting client during Unit Testing.
Achievements:

- Successful resolution of 'Work Schedule Change' defect and addition of Infotype field within allotted hours
- Successful knowledge transfer and development/delivery of client training materials, validated via client feedback

Industry: Public Sector - Columbia, South Carolina
Project Description/Scope: SAP ECC 6.0, HR/Payroll Implementation, full life cycle
Role: ABAP/HR Technical Interface Lead/HCM Processes & Forms Lead
Duration: 3 Years
Responsibilities/Deliverables: Led technical development of HCM Processes and Forms for Personnel Administration and Organizational Management. This role included the following responsibilities; Process Configuration, Adobe Form development/modification, Workflow development/maintenance and testing of processes/forms within Development and QA environments. Responsible for all HR/Payroll Interfaces during Unit Testing, which included resolution of all interface related defects and implementation of changes to functional requirement. Created standard templates for development of inbound and

outbound HR interfaces leveraged by client and consultant resources. Designed, developed and delivered an HR Interface workbench providing the following functionality; interface processing (production/test modes), error reprocessing (via editable ALV Grid), loading data to holding tables, interface history maintenance(view/delete TemSe Files), holding table maintenance (view table entries, reset errors, delete entries). Responsible for the development and support of RICEF objects within HR/Payroll/FI/MM Modules.

Achievements:

- HCM Processes & Forms
- 21 HR/Payroll Interfaces
- HR Interface workbench, central point of access for all HR Interface processing

Industry: Public Sector – San Francisco/Sacramento, California
Project Description/Scope: SAP Finance (FI)
Role: SAP Technical Consultant (ABAP) **Duration:** 5 Months
Responsibilities/Deliverables: Developed and delivered an Accounts Payable One-Time Vendor Interface for parking and/or posting financial documents leveraging object oriented programming. Worked with TIBCO (third-party file transfer software) resources to create an automated version of this interface that met security constraints set by the state. Co-developed an interface diagnostic report that offered the following functionality; display interface input data, messages generated during interface execution and success/error log containing document status of each record processed. Created technical documentation and conducted code reviews for development team members.

Achievements:

- Accounts Payable One-Time Vendor Interface
- Interface Diagnostic Report

Industry: Public Sector – Birmingham, Alabama
Project Description/Scope: SAP ECC 5.0, Finance (FI), Materials Management (MM)
Role: SAP Technical Consultant (ABAP) **Duration:** 18 Months
Responsibilities/Deliverables: Served project as remote developer from October 2006 thru February 2007 and as an onsite consultant from February 2007 thru March 2008. As a remote developer, supported onsite team through development of Materials Management Conversion program, General Ledger Upload Interface and multiple forms (Smartform / SAPscript). As an onsite consultant, responsible for maintaining 20 reports, 4 interfaces, 12 enhancements, and 7 forms during post Go-Live support. Responsible for reviewing specifications, designing, coding, and testing development objects within the SAP R/3 and SRM environments. Taught classes for client-side technical resources covering project documentation and ABAP development. Mentoring sessions were held 4 days a week over a two month period and required the development of How-To-Guides, PowerPoint presentations, class-related notes and sample projects.

Achievements:

- Materials Management Conversion
- General Ledger Upload Interface
- Multiple Smartforms/Sapscripts

Education & Certifications:
Bachelor of Science Computer Science – The University of Southern Mississippi

SAP Certified Application Associate – SAP HANA 1.0
SAP Certified Development Associate – ABAP with SAP NetWeaver 7.31
SAP Certified Development Specialist (Edition 2014) – ABAP for SAP HANA

Citizenship: U.S. Citizen
Mobility: U.S. Passport
Languages: English

SAP Appenidx 3 – Sample Go Live Plan

ID	ID	Task Name	Duration	Start	Finish	Predecessors
1	1	**Production Cutover**	**29.94 days**	**Mon 3/19/18**	**Mon 4/23/18**	
2	2	**General Cutover Preparation**	**17.38 days**	**Mon 3/19/18**	**Mon 4/9/18**	
3	3	**Cutover Planning**	**5 days**	**Mon 3/19/18**	**Fri 3/23/18**	
4	4	**Draft Cutover Plan**	**5 days**	**Mon 3/19/18**	**Fri 3/23/18**	
5	5	Draft Mock 1 Cutover Plan	5 days	Mon 3/19/18	Fri 3/23/18	
6	6	**Go-Live Acceptance Criteria**	**10 days**	**Mon 3/26/18**	**Fri 4/6/18**	
7	7	Define Go-Live Acceptance Criteria	10 days	Mon 3/26/18	Fri 4/6/18	5
8	8	Approve Go-Live Acceptance Criteria	0 days	Fri 4/6/18	Fri 4/6/18	7
9	9	**Cutover Communication**	**17.38 days**	**Mon 3/19/18**	**Mon 4/9/18**	
10	10	**Define Cutover Communication Strategy**	**12.38 days**	**Mon 3/26/18**	**Mon 4/9/18**	
11	11	Collect Contact Info	3 days	Mon 3/26/18	Wed 3/28/18	5
12	12	Establish Communication Methods	2 days	Thu 3/29/18	Fri 3/30/18	11
13	13	Approve Communication Strategy	0 days	Fri 3/30/18	Fri 3/30/18	12
14	14	Open Bridge Mock 1	9 days	Fri 4/6/18	Mon 4/9/18	13FS+20 days
15	15	**System Downtime Communication**	**10.01 days**	**Mon 3/19/18**	**Mon 4/2/18**	
16	16	Draft Outage Announcements	5 days	Mon 3/19/18	Fri 3/23/18	
17	17	Approve Outage Announcements	0 days	Fri 3/23/18	Fri 3/23/18	16
18	18	Send Mock 1 Outage Announcement	5 mins	Mon 4/2/18	Mon 4/2/18	17FS+5 days
19	19	**Vendor Communication (Interfaces)**	**0.5 days**	**Wed 4/4/18**	**Wed 4/4/18**	
20	20	Reschedule Jobs for PRD Downtimes	2 hrs	Wed 4/4/18	Wed 4/4/18	
21	21	PLACEHOLDER Vendor Communication Requirements	2 hrs	Wed 4/4/18	Wed 4/4/18	20
22	22	**VST Server Delivery**	**15 days**	**Mon 3/19/18**	**Fri 4/6/18**	
23	23	**BW**	**9 days**	**Mon 3/19/18**	**Thu 3/29/18**	
24	24	**BW Server Delivery**	**9 days**	**Mon 3/19/18**	**Thu 3/29/18**	
25	25	Windows App Servers (SAPYBPA, SAPYBPB, SAPYBPC)	6 days	Mon 3/19/18	Mon 3/26/18	
26	26	HANA DB Server (SAPYBPZ)	6 days	Mon 3/19/18	Mon 3/26/18	
27	27	Repurpose Linux App Server (SAPYBVL)	6 days	Mon 3/19/18	Mon 3/26/18	
28	28	ONE TIME Snapshot of Delivered Systems (Separate Storag	0.25 days	Thu 3/29/18	Thu 3/29/18	38,45SS
29	29	**BW Verify Delivered Servers at VST**	**0.38 days**	**Tue 3/27/18**	**Tue 3/27/18**	
30	30	Login with Domain User	15 mins	Tue 3/27/18	Tue 3/27/18	25,26,27
31	31	Verify Disk Space, Memory per Build Sheet & Handover Do	15 mins	Tue 3/27/18	Tue 3/27/18	30

ID	ID	Task Name	Duration	Start	Finish	Predecessors
32	32	Verify Local Users and Groups (Administrative Group Should have BCPS pre-defined Users)	15 mins	Tue 3/27/18	Tue 3/27/18	31
33	33	Verify IP Addresses	15 mins	Tue 3/27/18	Tue 3/27/18	32
34	34	Check Special Characters in Credentials	15 mins	Tue 3/27/18	Tue 3/27/18	33
35	35	Check Service User	15 mins	Tue 3/27/18	Tue 3/27/18	34
36	36	Check HANA Client Installation	15 mins	Tue 3/27/18	Tue 3/27/18	35
37	37	Check DB Host Environment Variable on Linux	15 mins	Tue 3/27/18	Tue 3/27/18	36
38	38	Verify that installed kernel is release 749 PL 301(for BW)	1 hr	Tue 3/27/18	Tue 3/27/18	37
39	39	**ECC**	**15 days**	**Mon 3/19/18**	**Fri 4/6/18**	
40	40	**ECC Server Delivery**	**15 days**	**Mon 3/19/18**	**Fri 4/6/18**	
41	41	Windows App Servers (SAPYEPA, SAPYEPB, SAPYEPC, SAPYEPD, SAPYEPE, SAPYEPF)	8 days	Mon 3/19/18	Wed 3/28/18	
42	42	HANA DB Server (SAPYEPZ)	8 days	Mon 3/19/18	Wed 3/28/18	
43	43	Repurpose Linux App Server (SAPYEVL)	8 days	Mon 3/19/18	Wed 3/28/18	
44	44	Pre-DMO BSI Client Install	0.5 days	Thu 3/29/18	Thu 3/29/18	41
45	45	ONE TIME Snapshot of Delivered Systems (Separate Storag	0.25 days	Thu 3/29/18	Thu 3/29/18	41,42,43,44,62
46	46	BSI Application & DB Install (Co-Location with ECC in VST)	5 days	Mon 4/2/18	Fri 4/6/18	44
47	47	**ECC Verify Delivered Servers at VST**	**0.75 days**	**Thu 3/29/18**	**Thu 3/29/18**	
48	48	Verify that the HANA passwords do not have special chara	0.5 hrs	Thu 3/29/18	Thu 3/29/18	41,42,43
49	49	Verify that the xepadm user has the same password in Linux and all Windows servers	0.5 hrs	Thu 3/29/18	Thu 3/29/18	48
50	50	Verify Login with Domain User to Windows servers	0.5 hrs	Thu 3/29/18	Thu 3/29/18	49
51	51	Verify that the all windows servers are start and stop prop	1 hr	Thu 3/29/18	Thu 3/29/18	50
52	52	Check SAPDBHOST environment variable on the Linux and the Windows servers	0.5 hrs	Thu 3/29/18	Thu 3/29/18	51
53	53	Veriry free space on the targer VST Linux host, must be at l	0.5 hrs	Thu 3/29/18	Thu 3/29/18	52
54	54	Login with Domain User to Windows servers	0.5 hrs	Thu 3/29/18	Thu 3/29/18	53
55	55	Verify Disk Space, Memory	0.25 hrs	Thu 3/29/18	Thu 3/29/18	54
56	56	Verify Local Users and Groups (Administrative Group Should have BCPS pre-defined Users)	0.25 hrs	Thu 3/29/18	Thu 3/29/18	55
57	57	Verify IP Addresses	0.25 hrs	Thu 3/29/18	Thu 3/29/18	56
58	58	Verify HANA version	0.25 hrs	Thu 3/29/18	Thu 3/29/18	57

ID	ID	Task Name	Duration	Start	Finish	Predecessors
59	59	Verify HANA Memory	0.25 hrs	Thu 3/29/18	Thu 3/29/18	58
60	60	Verify HANA Disk space	0.25 hrs	Thu 3/29/18	Thu 3/29/18	59
61	61	Verify HANA data Backups	0.25 hrs	Thu 3/29/18	Thu 3/29/18	60
62	62	Verify HANA Log backups	0.25 hrs	Thu 3/29/18	Thu 3/29/18	61
63	**63**	**EP**	**4.38 days**	**Mon 3/19/18**	**Fri 3/23/18**	
64	**64**	**EP Server Delivery**	**4 days**	**Mon 3/19/18**	**Thu 3/22/18**	
65	65	Windows App Servers (SAPYPPB, SAPYPPC, SAPYPPD)	4 days	Mon 3/19/18	Thu 3/22/18	
66	66	ASE DB Server (SAPYPPA)	4 days	Mon 3/19/18	Thu 3/22/18	
67	**67**	**EP Verify Delivered Servers at VST**	**0.38 days**	**Fri 3/23/18**	**Fri 3/23/18**	
68	68	Login with Domain User	15 mins	Fri 3/23/18	Fri 3/23/18	65,66
69	69	Verify Disk Space, Memory	15 mins	Fri 3/23/18	Fri 3/23/18	68
70	70	Verify Local Users and Groups (Administrative Group Should have BCPS pre-defined Users)	15 mins	Fri 3/23/18	Fri 3/23/18	69
71	71	Copy All Softwares to VST Servers including Export Directory (<SID>_Export)	15 mins	Fri 3/23/18	Fri 3/23/18	70
72	72	Verify Windows Firewall Rules especially Ports	15 mins	Fri 3/23/18	Fri 3/23/18	71
73	73	Verify Mapping Drive to each servers including servers @ E	15 mins	Fri 3/23/18	Fri 3/23/18	72
74	74	Verify IP Addresses	15 mins	Fri 3/23/18	Fri 3/23/18	73
75	75	NFS Service Note # 2073902 , KB 3012423	15 mins	Fri 3/23/18	Fri 3/23/18	74
76	76	Continuous Availability Note # 1823833	20 mins	Fri 3/23/18	Fri 3/23/18	75
77	77	Enable Telnet	20 mins	Fri 3/23/18	Fri 3/23/18	76
78	78	Check User access (UAL) is not elevated user	20 mins	Fri 3/23/18	Fri 3/23/18	77
79	**79**	**PI**	**4.69 days**	**Wed 3/28/18**	**Wed 4/4/18**	
80	**80**	**PI Server Delivery**	**3 days**	**Wed 3/28/18**	**Mon 4/2/18**	
81	81	ASE DB Server (SAPZXPA)(DEPENDENT ON EP INSTALL / AVAILABILITY OF CENTRAL SLD)	3 days	Wed 3/28/18	Mon 4/2/18	400
82	**82**	**PI Verify Delivered Servers at VST**	**1.69 days**	**Mon 4/2/18**	**Wed 4/4/18**	
83	83	Validation of Credentials (UME Roles, Assigned Groups, As	20 mins	Mon 4/2/18	Mon 4/2/18	81
84	84	Verify Disk Space, Memory per Build Sheet & Handover Do	15 mins	Mon 4/2/18	Mon 4/2/18	83
85	85	Verify IP Addresses	15 mins	Mon 4/2/18	Mon 4/2/18	84
86	86	Configuration and monitoring home checks(several PIMOI	30 mins	Tue 4/3/18	Tue 4/3/18	85

ID	ID	Task Name	Duration	Start	Finish	Predecessors
87	87	SAP MMC check(process list, heap memory, threads, process table, sessions, caches, enqueue & message	30 mins	Tue 4/3/18	Tue 4/3/18	86
88	88	Automated configuration tasks run.	30 mins	Tue 4/3/18	Tue 4/3/18	87
89	89	Job scheduler	10 mins	Tue 4/3/18	Tue 4/3/18	88
90	90	All Java components Check(ESR, IB, SLD, IS and etc.).	1 hr	Tue 4/3/18	Tue 4/3/18	89
91	91	Availability of PI Java Applications	1 hr	Tue 4/3/18	Tue 4/3/18	90
92	92	Validating java Caches	1 hr	Wed 4/4/18	Wed 4/4/18	91
93	93	Connectivity tests between development tools	30 mins	Wed 4/4/18	Wed 4/4/18	92
94	94	SLD Associations	1 hr	Wed 4/4/18	Wed 4/4/18	93
95	95	SLD Components check (Products, SWCV's Business systems, Technical systems, Transport Groups, clients	1 hr	Wed 4/4/18	Wed 4/4/18	94
96	**96**	**Security**	**10.94 days**	**Wed 3/21/18**	**Wed 4/4/18**	
97	97	Ensure SAP Basis Access to the PRD Systems & OS Level	1 day	Wed 3/21/18	Wed 3/21/18	
98	98	Ensure all Valid Passwords for Source & Target Systems are Properly Documented	1 day	Tue 4/3/18	Wed 4/4/18	97,62,38,78,95
99	**99**	**Perform Go Live Check Analysis**	**5.19 days**	**Mon 3/19/18**	**Mon 3/26/18**	
100	**100**	**Engage SAP Support**	**5.19 days**	**Mon 3/19/18**	**Mon 3/26/18**	
101	101	Open SAP Support Incident (133124 & 133154)	30 mins	Mon 3/19/18	Mon 3/19/18	
102	102	Schedule Go-Live Check	1 hr	Mon 3/26/18	Mon 3/26/18	101FS+5 days
103	103	Open Connections to Target System	30 mins	Mon 3/26/18	Mon 3/26/18	101FS+5 days
104	**104**	**System Preparation (On Premise)**	**10.07 days**	**Mon 3/19/18**	**Mon 4/2/18**	
105	**105**	**BW**	**10.07 days**	**Mon 3/19/18**	**Mon 4/2/18**	
106	**106**	**BI Portal to EP Migration**	**0.25 days**	**Tue 3/27/18**	**Tue 3/27/18**	
107	107	Install BI JAVA Components on EP (Incl. BEX)	2 hrs	Tue 3/27/18	Tue 3/27/18	
108	108	Import BI JAVA Content to On Premise EP	1 hr	Tue 3/27/18	Tue 3/27/18	107
109	109	Migrate Security Roles	0.5 hrs	Tue 3/27/18	Tue 3/27/18	108
110	110	Mass Change iViews	0.5 hrs	Tue 3/27/18	Tue 3/27/18	109
111	111	Pre-DSS EP Validation	3 hrs	Tue 3/27/18	Tue 3/27/18	110
112	**112**	**DSS via SWPM**	**0 days**	**Thu 3/29/18**	**Fri 3/30/18**	
113	113	Backup BI PRD (Dual Stack System)	4 hrs	Thu 3/29/18	Thu 3/29/18	111
114	114	Split Dual Stack	2 hrs	Thu 3/29/18	Thu 3/29/18	113
115	115	Disable JAVA Stack	1 hr	Thu 3/29/18	Fri 3/30/18	114

ID	ID	Task Name	Duration	Start	Finish	Predecessors
116	116	Bounce the System	1 hr	Fri 3/30/18	Fri 3/30/18	115
117	**117**	**Linux VM**	**9.75 days**	**Mon 3/19/18**	**Fri 3/30/18**	
118	118	Configure NFS Share on PRD LPAR (NEED SIGNIFICANT LEAD T	1 day	Mon 3/19/18	Mon 3/19/18	5SS
119	119	Re-Mount Linux OS to PRD Mainframe (NEED SIGNIFICANT LEAD TIME)(NEED GRANULAR LIST OF TASKS FOR basis)(CAN EXISTING VM BE UTILIZED?)	2 days	Tue 3/20/18	Wed 3/21/18	118
120	120	Adjust z/OS Security Settings & Profile Parameters (NEED SIGNIFICANT LEAD TIME - POTENTIALLY DISRUPTIVE TO PRD)(NEED SPECIFIC LIST OF TASKS FOR basis)(CAN EXISTING VM BE UTILIZED?)	2 days	Wed 3/21/18	Fri 3/23/18	119
121	121	Upgrade Kernels on ASCS, Windows App, & Linux App to v500 (DISRUPTIVE TO PRD, MUST BE DONE OVER	2 hrs	Fri 3/23/18	Sat 3/24/18	120
122	122	Dialogue Instance Installation on existing Linux VM	6 hrs	Fri 3/30/18	Fri 3/30/18	121,116
123	123	Validate Linux App Server	0 days	Fri 3/30/18	Fri 3/30/18	122
124	**124**	**BW Housekeeping**	**4.64 days**	**Mon 3/26/18**	**Fri 3/30/18**	
125	125	Check Parallel Processing Parameters	1 day	Mon 3/26/18	Mon 3/26/18	5
126	126	Check Required Notes	1 day	Tue 3/27/18	Tue 3/27/18	125
127	**127**	**BW Cleanup Jobs**	**2.64 days**	**Tue 3/27/18**	**Fri 3/30/18**	
128	128	PSA clean up (Job done a week earlier before Prod copy taken (includes requests in red/yellow)	48 hrs	Tue 3/27/18	Thu 3/29/18	126
129	129	Deleted obsolete process chains (RSMON/RSPC)	10 mins	Wed 3/28/18	Wed 3/28/18	126
130	130	Delete Cancelled jobs (SM37)	3 mins	Wed 3/28/18	Wed 3/28/18	129
131	131	Check Log files for short dumps (ST22)	2 mins	Wed 3/28/18	Wed 3/28/18	130
132	132	PSA tables not used (RSAR_PSA_CLEANUP_DEFINITION)	10 mins	Wed 3/28/18	Wed 3/28/18	131
133	133	Delete Partition errors (RSAR_PSA_CLEANUP_DIRECTORY)	10 mins	Wed 3/28/18	Wed 3/28/18	132
134	134	Basis Tables size check (basis task)	20 mins	Wed 3/28/18	Wed 3/28/18	133
135	135	DTP Cleanup jobs (HR, CO)	2 hrs	Wed 3/28/18	Wed 3/28/18	134
136	136	Data Loads cleanup (HR, CO)	3 hrs	Wed 3/28/18	Wed 3/28/18	135
137	137	RSZDELETE (bookmarks, Bex unused)	10 mins	Wed 3/28/18	Wed 3/28/18	136
138	138	RSBATCHDATA (Background information table cleanup)	10 mins	Wed 3/28/18	Wed 3/28/18	137
139	139	ZBW_ABAP_ANALYZER (ETL ABAP Code check)	10 mins	Wed 3/28/18	Wed 3/28/18	138
140	140	Housekeeping for BW (ZBW_HANA_CHECKLIST)	2 hrs	Wed 3/28/18	Thu 3/29/18	139

ID	ID	Task Name	Duration	Start	Finish	Predecessors
141	141	Housekeeping for BW (ZBW_HANA_MIGRATION_COCKPIT)	2 hrs	Thu 3/29/18	Thu 3/29/18	140
142	142	Housekeeping for BW (STC01 SAP_BW_HOUSEKEEPING)	18 hrs	Thu 3/29/18	Fri 3/30/18	141
143	143	Repair 0TCTIOBJVAL (SE38 RSD_PREXPRA_TO_740)	10 mins	Fri 3/30/18	Fri 3/30/18	142
144	144	Delete Infospokes (RSBOH2)	5 mins	Fri 3/30/18	Fri 3/30/18	143
145	145	repair of objects (RSRT)	1 hr	Fri 3/30/18	Fri 3/30/18	144
146	146	check inconsistencies, cache (RSRV)	1 hr	Fri 3/30/18	Fri 3/30/18	145
147	147	Clear delta queues (SMQ1 (ECC), RSA1 (BW))	2 hrs	Fri 3/30/18	Fri 3/30/18	146
148	148	RSAN_UT_RESULT_DROP_RESULTS (Basis /BW jobs)	10 mins	Fri 3/30/18	Fri 3/30/18	147
149	149	RSD_PREXPRA_TO_740 (Basis /BW jobs)	7 mins	Fri 3/30/18	Fri 3/30/18	148
150	150	SAP_QUERY_CHECKER_740 (Basis /BW jobs)	7 mins	Fri 3/30/18	Fri 3/30/18	149
151	151	/n/ASU/Start (ASU toolbox tasks)	30 mins	Fri 3/30/18	Fri 3/30/18	150
152	**152**	**Pre-SUM Basis Activities**	**0.33 days**	**Fri 3/30/18**	**Mon 4/2/18**	
153	153	Validate Space Availability	15 mins	Fri 3/30/18	Fri 3/30/18	123
154	154	Request an SAP License Key for the BW Target System	15 mins	Fri 3/30/18	Fri 3/30/18	153
155	155	Generate Migration Keys	15 mins	Fri 3/30/18	Fri 3/30/18	154
156	156	Check the Consistency of the Host Name	30 mins	Fri 3/30/18	Fri 3/30/18	155
157	157	Check All Needed Users / Passwords	15 mins	Fri 3/30/18	Fri 3/30/18	156
158	158	Check Hostnames, Filesystems, Media List	15 mins	Fri 3/30/18	Fri 3/30/18	157
159	159	Check XML Stack File	3 mins	Fri 3/30/18	Fri 3/30/18	158
160	160	Check SM12 & SM13	3 mins	Fri 3/30/18	Fri 3/30/18	159
161	161	Check VPN Connectivity for Offshore Resources	15 mins	Fri 3/30/18	Mon 4/2/18	160
162	162	Request BCPS Snapshot of Linux VM before Upgrade	30 mins	Mon 4/2/18	Mon 4/2/18	161
163	**163**	**ECC**	**7.05 days**	**Mon 3/19/18**	**Wed 3/28/18**	
164	**164**	**Linux VM**	**7.05 days**	**Mon 3/19/18**	**Wed 3/28/18**	
165	165	Configure NFS Share on PRD LPAR (NEED SIGNIFICANT LEAD T	1 day	Mon 3/19/18	Mon 3/19/18	
166	166	Re-Mount Linux OS to PRD Mainframe (NEED SIGNIFICANT LEAD TIME)(NEED GRANULAR LIST OF TASKS FOR basis)	1 day	Tue 3/20/18	Tue 3/20/18	165
167	167	Adjust z/OS Security Settings & Profile Parameters (NEED SIGNIFICANT LEAD TIME - POTENTIALLY DISRUPTIVE TO PRD)(NEED SPECIFIC LIST OF TASKS FOR basis)	1 day	Wed 3/21/18	Wed 3/21/18	166
168	168	Upgrade Kernels on ASCS, Windows App, & Linux App to v500 (DISRUPTIVE TO PRD, MUST BE DONE OVER WEEKEND)	2 hrs	Thu 3/22/18	Thu 3/22/18	167

ID	ID	Task Name	Duration	Start	Finish	Predecessors
169	169	Install XEP Application sever on the SAPSUSECC Linux server	1 day	Thu 3/22/18	Wed 3/28/18	168FS+3.75 days
170	**170**	**Maintenance Planner**	**1.5 days**	**Wed 3/21/18**	**Thu 3/22/18**	
171	171	Update the LMDB content for the ECC systems in the Solutio	1 hr	Wed 3/21/18	Wed 3/21/18	
172	172	Upload the LMDB content from from the Solution Manager to the Maintenance Planner	1 hr	Wed 3/21/18	Wed 3/21/18	171
173	173	Generate Stack XML for XEP	2 hrs	Wed 3/21/18	Wed 3/21/18	172
174	174	Download Upgrade Material and the Stack XML	1 day	Wed 3/21/18	Thu 3/22/18	173
175	**175**	**Pre-SUM Basis Activities**	**2 days**	**Wed 3/21/18**	**Fri 3/23/18**	
176	176	Housekeeping of Basis tables note 706478	8 hrs	Thu 3/22/18	Thu 3/22/18	97
177	177	Cluster Tables and Pool Tables as per SAP Note 1784377.	1 hr	Thu 3/22/18	Thu 3/22/18	97
178	178	SDBI_CLUSTER_CHECK	36 hrs	Wed 3/21/18	Fri 3/23/18	97
179	179	SDBI_POOL_CHECK	12 hrs	Thu 3/22/18	Fri 3/23/18	97
180	180	DBI_CLUSTER_CHECK_STATUS	1 hr	Thu 3/22/18	Thu 3/22/18	97
181	181	SDBI_CHECK_BCD_NUMBERS	12 hrs	Thu 3/22/18	Fri 3/23/18	97
182	182	Check SM13	1 hr	Thu 3/22/18	Thu 3/22/18	97
183	183	DB Consistency and look for Missing tables and Indexes	2 hrs	Thu 3/22/18	Thu 3/22/18	97
184	184	Clear QCM tables - SE14->Extras->Invalid Temp tables	1 hr	Thu 3/22/18	Thu 3/22/18	97
185	185	Check for Unfinished Table Conversion SE14	1 hr	Thu 3/22/18	Thu 3/22/18	97
186	186	Check for Erroneous Old tRFC Queues	1 hr	Thu 3/22/18	Thu 3/22/18	97
187	187	Prepare SAPhostagent for DMO	1 hr	Thu 3/22/18	Thu 3/22/18	97
188	188	Install DMO	1 hr	Thu 3/22/18	Thu 3/22/18	97
189	189	Configure hostagent for use with SUM	1 hr	Thu 3/22/18	Thu 3/22/18	97
190	190	Check the Consistency of the Host Name	1 hr	Thu 3/22/18	Thu 3/22/18	97
191	191	Add 200GB to the XEP database	1 day	Thu 3/22/18	Thu 3/22/18	97
192	192	Space Requirements (Provide 4x Temporary Storage for the D	2 days	Thu 3/22/18	Fri 3/23/18	97
193	193	Request an SAP License Key for the BW Target System	0.5 hrs	Thu 3/22/18	Thu 3/22/18	97
194	194	Generate Migration Keys	1 hr	Thu 3/22/18	Thu 3/22/18	97
195	195	Check VPN Connectivity for Offshore Resources	1 day	Thu 3/22/18	Thu 3/22/18	97
196	196	Request BCPS Snapshot of Linux VM before Upgrade	0.5 hrs	Thu 3/22/18	Thu 3/22/18	97
197	197	Clean up historic SPDD & SPAU Transports	2 days	Thu 3/22/18	Fri 3/23/18	97
198	**198**	**EP**	**1.25 days**	**Wed 3/21/18**	**Thu 3/22/18**	

ID	ID	Task Name	Duration	Start	Finish	Predecessors
199	**199**	**Verify Portal System**	**1.25 days**	**Wed 3/21/18**	**Thu 3/22/18**	
200	**200**	**ECC Connection**	**0.25 days**	**Wed 3/21/18**	**Wed 3/21/18**	
201	201	Check SSO Certs	25 mins	Wed 3/21/18	Wed 3/21/18	
202	202	Check JCO Connections for ECC	25 mins	Wed 3/21/18	Wed 3/21/18	201
203	203	Check Portal System Landscape for ECC	25 mins	Wed 3/21/18	Wed 3/21/18	202
204	204	Check ESS/MSS and HR Admin Roles	25 mins	Wed 3/21/18	Wed 3/21/18	203
205	205	Check SICF services for Custom developed Component	20 mins	Wed 3/21/18	Wed 3/21/18	204
206	**206**	**Portal**	**0.25 days**	**Wed 3/21/18**	**Wed 3/21/18**	
207	207	Custom Logon Component	20 mins	Wed 3/21/18	Wed 3/21/18	205
208	208	UME Configuration	20 mins	Wed 3/21/18	Wed 3/21/18	207
209	209	ADS Configuration	20 mins	Wed 3/21/18	Wed 3/21/18	208
210	210	SSO Certificates	15 mins	Wed 3/21/18	Wed 3/21/18	209
211	211	Destinations	15 mins	Wed 3/21/18	Wed 3/21/18	210
212	212	JCORFC Connections	15 mins	Wed 3/21/18	Wed 3/21/18	211
213	213	Check local telnet is enabled	15 mins	Wed 3/21/18	Wed 3/21/18	212
214	**214**	**NWDI**	**0.25 days**	**Wed 3/21/18**	**Wed 3/21/18**	
215	215	Check NWDI Tracks	30 mins	Wed 3/21/18	Wed 3/21/18	213
216	216	Make sure NWDI controlled components on Portal	30 mins	Wed 3/21/18	Wed 3/21/18	215
217	217	Check Custom Codes	0.13 days	Wed 3/21/18	Wed 3/21/18	
218	218	Bank Information	20 mins	Wed 3/21/18	Wed 3/21/18	216
219	219	Social Security	20 mins	Wed 3/21/18	Wed 3/21/18	218
220	220	Webdynpro Changes	20 mins	Wed 3/21/18	Wed 3/21/18	219
221	**221**	**SLD**	**0.25 days**	**Wed 3/21/18**	**Wed 3/21/18**	
222	222	Login to SLD	0.25 days	Wed 3/21/18	Wed 3/21/18	
223	223	Check CIM Content	40 mins	Wed 3/21/18	Wed 3/21/18	220
224	224	Check SLD is Active	40 mins	Wed 3/21/18	Wed 3/21/18	223
225	225	Check SLD Synchronization	40 mins	Wed 3/21/18	Wed 3/21/18	224
226	**226**	**BW Connection**	**0.25 days**	**Thu 3/22/18**	**Thu 3/22/18**	
227	227	Login	5 mins	Thu 3/22/18	Thu 3/22/18	225
228	228	Check BW Connection	5 mins	Thu 3/22/18	Thu 3/22/18	227
229	229	Check SSO Certs	10 mins	Thu 3/22/18	Thu 3/22/18	228

ID	ID	Task Name	Duration	Start	Finish	Predecessors
230	230	Check RFC Connection in BW SAPXPSA_PORTAL_XPS	10 mins	Thu 3/22/18	Thu 3/22/18	229
231	231	Check ADS Connection in BW	10 mins	Thu 3/22/18	Thu 3/22/18	230
232	232	Check RSPOR_T_PORTAL in SM30	10 mins	Thu 3/22/18	Thu 3/22/18	231
233	233	Check If Reports are running including ADS Print Version	10 mins	Thu 3/22/18	Thu 3/22/18	232
234	234	Check Portal System Landscape for BW	10 mins	Thu 3/22/18	Thu 3/22/18	233
235	235	Check Portal System Alias for BW	10 mins	Thu 3/22/18	Thu 3/22/18	234
236	236	Check JCO Connection for BW	10 mins	Thu 3/22/18	Thu 3/22/18	235
237	237	Check SLD Connection in Visual Admin	10 mins	Thu 3/22/18	Thu 3/22/18	236
238	238	Verify BW Roles are Exported	10 mins	Thu 3/22/18	Thu 3/22/18	237
239	239	Verify BW Roles are imported	9 mins	Thu 3/22/18	Thu 3/22/18	238
240	240	DO NOT DO MASS CHANGE YET	1 min	Thu 3/22/18	Thu 3/22/18	239
241	241	**System Uptime (On Premise)**	**11.13 days**	**Thu 3/22/18**	**Fri 4/6/18**	
242	242	**BW**	**4.3 days**	**Mon 4/2/18**	**Fri 4/6/18**	
243	243	**Execute SUM Uptime**	**4.3 days**	**Mon 4/2/18**	**Fri 4/6/18**	
244	244	Initialization	0.25 hrs	Mon 4/2/18	Mon 4/2/18	162
245	245	Extraction	2.62 hrs	Mon 4/2/18	Mon 4/2/18	244
246	246	Configuration	1.75 hrs	Mon 4/2/18	Mon 4/2/18	245
247	247	Checks	36.55 hrs	Mon 4/2/18	Wed 4/4/18	246
248	248	Notify users of transport lock	15 mins	Wed 4/4/18	Wed 4/4/18	247
249	249	Pre-Processing	19 hrs	Wed 4/4/18	Fri 4/6/18	247
250	250	**ECC**	**5.33 days**	**Wed 3/28/18**	**Wed 4/4/18**	
251	251	**Execute SUM Uptime**	**5.33 days**	**Wed 3/28/18**	**Wed 4/4/18**	
252	252	Initialization	0.25 hrs	Wed 3/28/18	Wed 3/28/18	175,169
253	253	Extraction	6 hrs	Wed 3/28/18	Wed 3/28/18	252
254	254	Configuration (Incl. Releasing Repairs / Modifying SAP Object	20 hrs	Wed 3/28/18	Thu 3/29/18	253
255	255	Checks (Incl. Clear Queues)	2 hrs	Thu 3/29/18	Thu 3/29/18	254
256	256	Manual Backup	4 hrs	Thu 3/29/18	Thu 3/29/18	255
257	257	Notify users of transport lock	15 mins	Thu 3/29/18	Thu 3/29/18	255
258	258	Pre-Processing (Incl. SPDD)	134 hrs	Thu 3/29/18	Wed 4/4/18	256
259	259	**EP**	**0.38 days**	**Thu 3/22/18**	**Thu 3/22/18**	
260	260	**Upgrade Readiness**	**0.38 days**	**Thu 3/22/18**	**Thu 3/22/18**	

ID	ID	Task Name	Duration	Start	Finish	Predecessors
261	261	Maintenance Planner	2 hrs	Thu 3/22/18	Thu 3/22/18	240
262	262	Download Stack.xml File	1 hr	Thu 3/22/18	Thu 3/22/18	261
263	263	Request Bill for Additional Drive 200GB	1 hr	Thu 3/22/18	Thu 3/22/18	261SS
264	264	Request Bill for Additional Memory	1 hr	Thu 3/22/18	Thu 3/22/18	263
265	265	Request Bill Snapshot before Upgrade	1 hr	Thu 3/22/18	Thu 3/22/18	264
266	**266**	**PI**	**1.13 days**	**Wed 4/4/18**	**Thu 4/5/18**	
267	267	Provide PI Communication channel connectivity sheet by System/Interface for each environment including all parameters including users, passwords, url's, hostnames,	8 hrs	Wed 4/4/18	Thu 4/5/18	95
268	268	Provide complete list of all users and passwords for all technical/system users in PI	1 hr	Thu 4/5/18	Thu 4/5/18	267
269	**269**	**System Downtime (On Premise)**	**12.23 days**	**Sun 3/25/18**	**Sun 4/8/18**	
270	**270**	**Project Management**	**0.03 days**	**Fri 4/6/18**	**Fri 4/6/18**	
271	271	Send Outage Communication Reminder	15 mins	Fri 4/6/18	Fri 4/6/18	249,258
272	**272**	**BW**	**2.06 days**	**Fri 4/6/18**	**Sun 4/8/18**	
273	**273**	**Transition to Downtime**	**0.38 days**	**Fri 4/6/18**	**Fri 4/6/18**	
274	274	Lock all Relevant Users	30 mins	Fri 4/6/18	Fri 4/6/18	249
275	275	Stop All Process Chains and RDA Daemons	0.5 hrs	Fri 4/6/18	Fri 4/6/18	303,300,274
276	276	Check the Operation Mode Timetable	0.5 hrs	Fri 4/6/18	Fri 4/6/18	275
277	277	Suspend All Scheduled Jobs	0.17 hrs	Fri 4/6/18	Fri 4/6/18	276
278	278	Delete All Entries from Statistic Tables for Aggregates	0.25 hrs	Fri 4/6/18	Fri 4/6/18	277
279	279	Update Table DBDIFF	0.25 hrs	Fri 4/6/18	Fri 4/6/18	278
280	280	Check/ Repair Missing Tables and Indexes	0.5 hrs	Fri 4/6/18	Fri 4/6/18	279
281	281	Initial Backup of PRD	4 hrs	Fri 4/6/18	Fri 4/6/18	280
282	**282**	**DMO Downtime Phase**	**1 day**	**Sat 4/7/18**	**Sat 4/7/18**	
283	**283**	Execution - Export	4 hrs	Sat 4/7/18	Sat 4/7/18	280
284	**284**	**MPLS Data Transfer**	**0.5 days**	**Sat 4/7/18**	**Sat 4/7/18**	
285	285	Copy SUM Directory from BCPS to VST via MPLS	4 hrs	Sat 4/7/18	Sat 4/7/18	283,38
286	**286**	**Reset the DMO Upgrade/Migration (Source)**	**0.69 days**	**Sat 4/7/18**	**Sun 4/8/18**	
287	287	Archive SUM Directory on Source	30 mins	Sat 4/7/18	Sat 4/7/18	285
288	288	Reset the DMO Upgrade/Migration on Source	1 hr	Sat 4/7/18	Sun 4/8/18	287
289	289	PLACEHOLDER 4 HOUR BUFFER BEFORE RELEASING ON PREM	4 hrs	Sun 4/8/18	Sun 4/8/18	288

ID	ID	Task Name	Duration	Start	Finish	Predecessors
290	**290**	**ECC**	**4.23 days**	**Thu 4/5/18**	**Sun 4/8/18**	
291	**291**	**Uptime Migration**	**0.38 days**	**Thu 4/5/18**	**Thu 4/5/18**	
292	292	Copy SUM Directory from BCPS to VST via MPLS	2 hrs	Thu 4/5/18	Thu 4/5/18	45,258
293	293	Start SUM on the Target VST System	1 hr	Thu 4/5/18	Thu 4/5/18	292
294	**294**	**Transition to Downtime**	**0.34 days**	**Fri 4/6/18**	**Fri 4/6/18**	
295	295	Lock all end users except the interface and cutover team (To	30 mins	Fri 4/6/18	Fri 4/6/18	293
296	296	Check SM13	15 mins	Fri 4/6/18	Fri 4/6/18	295
297	297	DB Consistency and look for Missing tables and Indexes	15 mins	Fri 4/6/18	Fri 4/6/18	296
298	298	Clear QCM tables - SE14->Extras->Invalid Temp tables	15 mins	Fri 4/6/18	Fri 4/6/18	297
299	299	Check for Unfinished Table Conversion SE14	15 mins	Fri 4/6/18	Fri 4/6/18	298
300	300	Check for Erroneous Old tRFC Queues	15 mins	Fri 4/6/18	Fri 4/6/18	299
301	301	Empty all Queues	15 mins	Fri 4/6/18	Fri 4/6/18	300
302	302	Check Interfaces	15 mins	Fri 4/6/18	Fri 4/6/18	301
303	303	Adapt the Operation Mode Timetable	15 mins	Fri 4/6/18	Fri 4/6/18	302
304	304	Send messae to all users to save the work and logoff	15 mins	Fri 4/6/18	Fri 4/6/18	303
305	**305**	**Start Business Downtime**	**0.06 days**	**Fri 4/6/18**	**Fri 4/6/18**	
306	306	Suspend All Scheduled Jobs	15 mins	Fri 4/6/18	Fri 4/6/18	304
307	307	Update Table DBDIFF	15 mins	Fri 4/6/18	Fri 4/6/18	306
308	**308**	**DMO Downtime Phase**	**5.08 days**	**Fri 4/6/18**	**Sun 4/8/18**	
309	**309**	**Execution**	**5.08 days**	**Fri 4/6/18**	**Sun 4/8/18**	
310	310	Stop and/or disconnect all in and outbound interfaces	0.25 hrs	Fri 4/6/18	Fri 4/6/18	307
311	311	Lock all interface users ids	0.1 hrs	Fri 4/6/18	Fri 4/6/18	310
312	312	Stop XEP SAP intance (Also PRD EP & PI)	0.25 hrs	Fri 4/6/18	Fri 4/6/18	311
313	313	Backup SAPSUSECC Linux server	0.25 hrs	Fri 4/6/18	Fri 4/6/18	312
314	314	Backup XEP DB2	3 hrs	Fri 4/6/18	Fri 4/6/18	312
315	315	Start Export from Source	0.25 hrs	Fri 4/6/18	Fri 4/6/18	314
316	316	Parallel Import/Export	16 hrs	Fri 4/6/18	Sat 4/7/18	315
317	317	Complete DMO Execution & Post Processing	20 hrs	Sat 4/7/18	Sun 4/8/18	316
318	318	Validate Target System Starts	0.25 hrs	Sun 4/8/18	Sun 4/8/18	317
319	319	Check and Adjust RFC Destinations	30 mins	Sun 4/8/18	Sun 4/8/18	318
320	**320**	**Reset the DMO Upgrade/Migration (Source)**	**0.88 days**	**Sun 4/8/18**	**Sun 4/8/18**	

ID	ID	Task Name	Duration	Start	Finish	Predecessors
321	321	Reset the DMO Upgrade/Migration on Source	3 hrs	Sun 4/8/18	Sun 4/8/18	319
322	322	PLACEHOLDER 4 HOUR BUFFER BEFORE RELEASING ON PREM	4 hrs	Sun 4/8/18	Sun 4/8/18	321
323	323	Archive SUM Directory on Source	30 mins	Sun 4/8/18	Sun 4/8/18	321
324	**324**	**EP**	**2 days**	**Sun 3/25/18**	**Wed 3/28/18**	
325	**325**	**System Copy Process**	**0.5 days**	**Tue 3/27/18**	**Tue 3/27/18**	
326	326	Export Production PCD Content	3 hrs	Tue 3/27/18	Tue 3/27/18	265,240
327	327	Export Logon Par File and Convert to EAR	3 hrs	Tue 3/27/18	Tue 3/27/18	326
328	328	Export KM Content Including BW Content	2 hrs	Tue 3/27/18	Tue 3/27/18	327
329	**329**	**Export Process**	**1.13 days**	**Tue 3/27/18**	**Wed 3/28/18**	
330	330	Execute SWPM on QA Portal @ VST	2 hrs	Tue 3/27/18	Tue 3/27/18	328
331	331	Pre-Requisite Checks for Export	1 hr	Tue 3/27/18	Wed 3/28/18	330
332	332	Export Process	1 hr	Wed 3/28/18	Wed 3/28/18	331
333	333	Make sure to save it under <SID>_Export Directory. (Newly created directory for Export)	1 hr	Wed 3/28/18	Wed 3/28/18	332
334	334	Make sure you run max 2 processes or it fails somehow	1 hr	Wed 3/28/18	Wed 3/28/18	333
335	335	Copy and Export Software to VST	3 hrs	Wed 3/28/18	Wed 3/28/18	78,334
336	**336**	**Go Back to Old Portal (BCPS)**	**0.38 days**	**Sun 3/25/18**	**Sun 3/25/18**	
337	337	Snap Back to EP 7.02	2 hrs	Sun 3/25/18	Sun 3/25/18	335
338	338	Restart Portal and Verify	1 hr	Sun 3/25/18	Sun 3/25/18	337
339	**339**	**Virtustream Upgrade/Migration Activities**	**20.19 days**	**Mon 3/26/18**	**Mon 4/16/18**	
340	**340**	**BW**	**3.16 days**	**Sat 4/7/18**	**Tue 4/10/18**	
341	**341**	**Resume DMO at Virtustream**	**1.17 days**	**Sat 4/7/18**	**Sun 4/8/18**	
342	342	Bring Down all SAP Instances in VST	15 mins	Sat 4/7/18	Sat 4/7/18	285,38
343	343	Resume DMO Execution Phase (Import to HANA DB)	7.5 hrs	Sat 4/7/18	Sun 4/8/18	342
344	344	SUM Tool Post Processing	0.59 hrs	Sun 4/8/18	Sun 4/8/18	343
345	345	Initial Backup of PRD	1 hr	Sun 4/8/18	Sun 4/8/18	344
346	**346**	**Manual Post Processing**	**1.99 days**	**Sun 4/8/18**	**Tue 4/10/18**	
347	347	Run Installation Check	0 hrs	Sun 4/8/18	Sun 4/8/18	345
348	348	Delete Old Table Entries	0.15 hrs	Sun 4/8/18	Sun 4/8/18	347
349	349	Adapt System Profiles and Load Them into the Database	0.15 hrs	Sun 4/8/18	Sun 4/8/18	348
350	350	Execute SAP Load Generator	2 hrs	Sun 4/8/18	Mon 4/9/18	349

ID	ID	Task Name	Duration	Start	Finish	Predecessors
351	351	BW Tables Consistency Check	0.3 hrs	Mon 4/9/18	Mon 4/9/18	350
352	352	Verify Operation Modes	0.1 hrs	Mon 4/9/18	Mon 4/9/18	351
353	353	Check the Logon Groups	0.1 hrs	Mon 4/9/18	Mon 4/9/18	352
354	354	Check the RFC Server Groups	0.1 hrs	Mon 4/9/18	Mon 4/9/18	353
355	355	Check the Secure Storage	0.1 hrs	Mon 4/9/18	Mon 4/9/18	354
356	356	Verify Connection to Spool Server	0.1 hrs	Mon 4/9/18	Mon 4/9/18	355
357	357	Verify ADS Connection	0.1 hrs	Mon 4/9/18	Mon 4/9/18	356
358	358	ASU Toolbox Post Upgrade Activities	2 hrs	Mon 4/9/18	Mon 4/9/18	357
359	359	Check and Adapt RFC Destinations	1 hr	Mon 4/9/18	Mon 4/9/18	358
360	360	Check and Repair BW Source Systems	0.5 hrs	Mon 4/9/18	Mon 4/9/18	359
361	361	Adapt and Reschedule Background Jobs	0.15 hrs	Mon 4/9/18	Mon 4/9/18	360
362	362	Check EP Connection to BW	0.5 hrs	Mon 4/9/18	Mon 4/9/18	361
363	363	Import Transports	3 hrs	Mon 4/9/18	Tue 4/10/18	362
364	364	Second Backup of PRD	1 hr	Tue 4/10/18	Tue 4/10/18	363
365	365	Unlock All Relevant Users	0.5 hrs	Tue 4/10/18	Tue 4/10/18	364
366	366	BW Validation	4 hrs	Tue 4/10/18	Tue 4/10/18	365
367	367	Restart All Process Chains and RDA Daemons	0.1 hrs	Tue 4/10/18	Tue 4/10/18	366
368	**368**	**ECC**	**2.21 days**	**Sun 4/8/18**	**Tue 4/10/18**	
369	369	Initial Backup of PRD	3 hrs	Sun 4/8/18	Sun 4/8/18	318
370	**370**	**Manual Post Processing**	**0.64 days**	**Sun 4/8/18**	**Mon 4/9/18**	
371	371	Run Installation Check	0.1 hrs	Sun 4/8/18	Sun 4/8/18	369
372	372	include XEP in the target STMS landscape	0.25 hrs	Sun 4/8/18	Sun 4/8/18	371
373	373	Import Transports (SPAU) and verify the SPAU	1 hr	Sun 4/8/18	Sun 4/8/18	372
374	374	ACA Notes	0.25 hrs	Sun 4/8/18	Sun 4/8/18	373
375	375	Adapt System Profiles and Load Them into the Database	0.5 hrs	Sun 4/8/18	Sun 4/8/18	374
376	376	Verify Operation Modes	0.1 hrs	Sun 4/8/18	Sun 4/8/18	375
377	377	Check the Logon Groups	0.1 hrs	Sun 4/8/18	Sun 4/8/18	376
378	378	Check the RFC Server Groups	0.1 hrs	Sun 4/8/18	Sun 4/8/18	377
379	379	Check the Secure Storage	0.1 hrs	Sun 4/8/18	Sun 4/8/18	378
380	380	Verify Connection to Spool Server	0.1 hrs	Sun 4/8/18	Sun 4/8/18	379
381	381	Verify ADS Connection	0.1 hrs	Sun 4/8/18	Sun 4/8/18	380

ID	ID	Task Name	Duration	Start	Finish	Predecessors
382	382	Restore T512W	0.1 hrs	Sun 4/8/18	Sun 4/8/18	381
383	383	Check and Adapt RFC Destinations	0.5 hrs	Sun 4/8/18	Sun 4/8/18	382
384	384	Adapt and Reschedule Background Jobs	0.15 hrs	Sun 4/8/18	Sun 4/8/18	383
385	385	SUSPEND AND DELETE ALL BCPS SCHEDULED JOBS	1 hr	Sun 4/8/18	Sun 4/8/18	384
386	386	Check Migrated System to SAP HANA	0.1 hrs	Sun 4/8/18	Sun 4/8/18	385
387	387	Intergration activities with BW, Portal, PI	0.1 hrs	Sun 4/8/18	Sun 4/8/18	386
388	388	Unlock All Relevant Users	0.5 hrs	Mon 4/9/18	Mon 4/9/18	387
389	389	**Additional Post processing**	**2.21 days**	Sun 4/8/18	Tue 4/10/18	
390	390	BSI TaxFactory Post-DMO Install & Integration Tasks	1 hr	Sun 4/8/18	Sun 4/8/18	318
391	391	Execute SAP Load Generator	2 hrs	Mon 4/9/18	Mon 4/9/18	388
392	392	Delete Old Table Entries	0.5 hrs	Mon 4/9/18	Mon 4/9/18	391
393	393	Final Backup of PRD DB	3 hrs	Mon 4/9/18	Mon 4/9/18	392,390
394	394	End User verification	4 hrs	Mon 4/9/18	Tue 4/10/18	393
395	**395**	**EP**	**15.13 days**	**Mon 3/26/18**	**Wed 4/11/18**	
396	**396**	**Import Process at VST (Dependent on ECC UME On Prem)**	**8.75 days**	**Mon 3/26/18**	**Thu 4/5/18**	
397	397	Installation Process	30 mins	Mon 3/26/18	Mon 3/26/18	338
398	398	Invoke SWPM	30 mins	Mon 3/26/18	Mon 3/26/18	397
399	399	Install SCS Instance on "B" Server	2 hrs	Mon 3/26/18	Mon 3/26/18	398
400	400	Verify SCS Instance on "B" Server	1 hr	Mon 3/26/18	Mon 3/26/18	399
401	401	Install DB Instance on "A" Server	4 hrs	Mon 3/26/18	Mon 3/26/18	400
402	402	Verify DB Instance on "A" Server	1 hr	Tue 3/27/18	Tue 3/27/18	401
403	403	Install PAS on "B" Server	4 hrs	Tue 3/27/18	Tue 3/27/18	402
404	404	Verify PAS on "B" Server	1 hr	Tue 3/27/18	Tue 3/27/18	403
405	405	Install all Additional App Server (4)	8 hrs	Wed 4/4/18	Thu 4/5/18	404FS+6 days
406	**406**	**Verify Production System**	**0.88 days**	**Sun 4/8/18**	**Mon 4/9/18**	
407	407	Logon to NWA	1 hr	Sun 4/8/18	Sun 4/8/18	338,318,404
408	408	Logon to Portal	1 hr	Sun 4/8/18	Sun 4/8/18	407
409	409	Check the Portal Logon Screen	0.38 days	Sun 4/8/18	Mon 4/9/18	
410	410	Reset Password	3 hrs	Sun 4/8/18	Mon 4/9/18	414
411	**411**	**Post Install Configuration**	**8.19 days**	**Tue 4/3/18**	**Wed 4/11/18**	
412	**412**	**SAP WebDispatcher**	**0.25 days**	**Sun 4/8/18**	**Sun 4/8/18**	

ID	ID	Task Name	Duration	Start	Finish	Predecessors
413	413	Internal and External Access availability	1 hr	Sun 4/8/18	Sun 4/8/18	408
414	414	F5 Configuration	1 hr	Sun 4/8/18	Sun 4/8/18	413
415	**415**	**Portal Content**	**0.38 days**	**Sun 4/8/18**	**Mon 4/9/18**	
416	416	Mass Change of Content	1 hr	Sun 4/8/18	Sun 4/8/18	414
417	417	HR Admin Roles	1 hr	Sun 4/8/18	Mon 4/9/18	416
418	418	Other Roles & Configuration	1 hr	Mon 4/9/18	Mon 4/9/18	417
419	**419**	**Configure Central SLD**	**15.23 days**	**Tue 4/3/18**	**Sun 4/8/18**	
420	420	Configure SLD on Production Portal	30 mins	Tue 4/3/18	Tue 4/3/18	81FS+1 day
421	421	Import Model Data	30 mins	Tue 4/3/18	Tue 4/3/18	420
422	422	Import CIM Content	30 mins	Tue 4/3/18	Tue 4/3/18	421
423	423	Check registered system on SLD	30 mins	Sun 4/8/18	Sun 4/8/18	422,345,369
424	**424**	**BW Steps**	**0.5 days**	**Mon 4/9/18**	**Mon 4/9/18**	
425	425	SM59 Connection	25 mins	Mon 4/9/18	Mon 4/9/18	418,345,369
426	426	System Landscape Definitions	25 mins	Mon 4/9/18	Mon 4/9/18	425
427	427	Configure SSO	25 mins	Mon 4/9/18	Mon 4/9/18	426
428	428	Work With BI Team for Post Install Steps for BW	25 mins	Mon 4/9/18	Mon 4/9/18	427
429	429	RSA (Activate 0ANALYSIS Templates)	25 mins	Mon 4/9/18	Mon 4/9/18	428
430	430	Request basis for DDIC password	25 mins	Mon 4/9/18	Mon 4/9/18	429
431	431	Request basis for icm/port and gw/acl_mode profile parameter	30 mins	Mon 4/9/18	Mon 4/9/18	430
432	432	Make Sure custom ABAP Code is Active	30 mins	Mon 4/9/18	Mon 4/9/18	431
433	433	Make Sure JCORFC is Configured and Running	30 mins	Mon 4/9/18	Mon 4/9/18	432
434	**434**	**ECC Steps**	**0.5 days**	**Mon 4/9/18**	**Tue 4/10/18**	
435	435	SM59 Connections	30 mins	Mon 4/9/18	Mon 4/9/18	433,369
436	436	System Landscape Definitions	30 mins	Mon 4/9/18	Mon 4/9/18	435
437	437	Configure SSO	30 mins	Mon 4/9/18	Mon 4/9/18	436
438	438	ICM Parameters	30 mins	Mon 4/9/18	Mon 4/9/18	437
439	439	Activate SICF Services	30 mins	Mon 4/9/18	Mon 4/9/18	438
440	440	Password Reset Services Configuraiton	30 mins	Mon 4/9/18	Tue 4/10/18	439
441	441	SPRO Configuraiton (open Client for Configuraiton)	30 mins	Tue 4/10/18	Tue 4/10/18	440
442	442	Request basis for DDIC Password on Clients 500 and 000	15 mins	Tue 4/10/18	Tue 4/10/18	441

ID	ID	Task Name	Duration	Start	Finish	Predecessors
443	443	Request basis for icm port and gw/acl_mode profile parameter	15 mins	Tue 4/10/18	Tue 4/10/18	442
444	**444**	**ADS Configuration**	**0.25 days**	**Tue 4/10/18**	**Tue 4/10/18**	
445	445	Configuration Wizard for ADS	30 mins	Tue 4/10/18	Tue 4/10/18	441
446	446	Configure ADS as HUB	30 mins	Tue 4/10/18	Tue 4/10/18	445
447	447	Configure ReaderRights with ADS License and Password	20 mins	Tue 4/10/18	Tue 4/10/18	446
448	448	Check the SM59 Connection in BW @ VST	20 mins	Tue 4/10/18	Tue 4/10/18	447
449	449	Check the SM59 Connection in ECC @ VST	20 mins	Tue 4/10/18	Tue 4/10/18	448
450	450	Configuration Wizards via NWA Configuration Wizard	0.75 days	Tue 4/10/18	Wed 4/11/18	
451	451	BI Initial Setup for ABAP	1 hr	Tue 4/10/18	Tue 4/10/18	449
452	452	BI Java	1 hr	Tue 4/10/18	Tue 4/10/18	451
453	453	Collaboration	1 hr	Tue 4/10/18	Tue 4/10/18	452
454	454	UWL	2 hrs	Tue 4/10/18	Tue 4/10/18	453
455	455	Knowledge Management	1 hr	Tue 4/10/18	Wed 4/11/18	454
456	456	System Landscape Directory (SLD)	0.5 days	Wed 4/11/18	Wed 4/11/18	
457	457	Configuration Wizard for SLD	1 hr	Wed 4/11/18	Wed 4/11/18	455
458	458	JCO Connections	1 hr	Wed 4/11/18	Wed 4/11/18	457
459	459	BW RZ70 and SM59 Connection for SLD	1 hr	Wed 4/11/18	Wed 4/11/18	458
460	460	ECC RZ70 and SM59 Connection for SLD	1 hr	Wed 4/11/18	Wed 4/11/18	459
461	**461**	**NWDI**	**0.13 days**	**Wed 4/11/18**	**Wed 4/11/18**	
462	462	Configure Runtime for Production	20 mins	Wed 4/11/18	Wed 4/11/18	460
463	463	Check the tracks in assembly	20 mins	Wed 4/11/18	Wed 4/11/18	462
464	464	Import to Production	20 mins	Wed 4/11/18	Wed 4/11/18	463
465	465	Post Installation Verification	1.5 hrs	Wed 4/11/18	Wed 4/11/18	464
466	**466**	**PI**	**11.63 days**	**Thu 4/5/18**	**Mon 4/16/18**	
467	**467**	**PRD Setup**	**33.38 days**	**Thu 4/5/18**	**Mon 4/16/18**	
468	468	Create all SFTP certificates, keys, views from NWA keystore	3 hrs	Thu 4/5/18	Thu 4/5/18	268
469	469	Create & verify Central SLD content	8 hrs	Thu 4/5/18	Fri 4/6/18	468
470	470	Update SLD CIM content	1 hr	Fri 4/6/18	Sat 4/7/18	469
471	471	Export/Import SLD content from source system to PO system (Products, SWC, Systems)	2 hrs	Sat 4/7/18	Sat 4/7/18	470

ID	ID	Task Name	Duration	Start	Finish	Predecessors
472	472	Provide SAP Ports	1 hr	Sat 4/7/18	Sat 4/7/18	471
473	473	Check and Verify porta are open and reachable	1 hr	Sat 4/7/18	Sat 4/7/18	472
474	474	Setup NFS file directories and shares	2 hrs	Sat 4/7/18	Sat 4/7/18	473
475	475	Create all technical & Business system users of ECC in PI with correct authorization and password	4 hrs	Sat 4/7/18	Sun 4/8/18	474
476	476	Create roles for developers	1 hr	Sun 4/8/18	Sun 4/8/18	475
477	477	Configure SLD technical/business systems and setup transpor	2 hrs	Sun 4/8/18	Sun 4/8/18	476
478	478	Verify unlimited strength JCE policy have been installed	8 hrs	Sun 4/8/18	Mon 4/9/18	477
479	479	Create Transport request for initial ESR content	1 hr	Mon 4/9/18	Mon 4/9/18	478
480	480	Transport ESR content to PO prod environment	1 hr	Mon 4/9/18	Mon 4/9/18	479
481	481	Verify ESR content	1 hr	Mon 4/9/18	Mon 4/9/18	480
482	482	Create Transport request for initial Integration Directory cont	1 hr	Mon 4/9/18	Mon 4/9/18	481
483	483	Transport Integration Directory content to PO prod environm	1 hr	Mon 4/9/18	Tue 4/10/18	482
484	484	Maintain all 24 communication channel details in PO PRD env	20 hrs	Tue 4/10/18	Thu 4/12/18	483
485	485	Maintain 14 communication channel details in PO TEST VEND	4 hrs	Thu 4/12/18	Fri 4/13/18	484
486	486	Activate channels and make sure channels are stopped.	1 hr	Fri 4/13/18	Fri 4/13/18	485
487	487	Verify transports and configuration in PI is complete	8 hrs	Fri 4/13/18	Sat 4/14/18	486
488	488	Initial setup for Idoc adapter Advanced Adapter engine for SAP ECC system, create resource adapter, destinations	8 hrs	Sat 4/14/18	Sun 4/15/18	487
489	489	Adjust Idoc/ALE configuration in SAP ECC system (RFC destinations, ports, partner Profiles and etc)	8 hrs	Sun 4/15/18	Mon 4/16/18	488
490	490	Configure sap properties file for inboundRA and JCO RFC to connect to SAP ECC systems	1 hr	Mon 4/16/18	Mon 4/16/18	489
491	491	Create/update HTTP destinations in SAP backend systems to point to PO AAE	2 hrs	Mon 4/16/18	Mon 4/16/18	490
492	492	Create/update HTTP destinations in PO AAE to point to SAP backend systems	2 hrs	Mon 4/16/18	Mon 4/16/18	491
493	493	Start communication channels	1 hr	Mon 4/16/18	Mon 4/16/18	492
494	**494**	**Production Validation**	**5.69 days**	**Mon 4/16/18**	**Mon 4/23/18**	
495	**495**	**Validation of Production Environment**	**2 days**	**Mon 4/16/18**	**Wed 4/18/18**	
496	496	Production Validation (Cycle 4 Only)	2 days	Mon 4/16/18	Wed 4/18/18	465,367,493,394,
497	497	Production Validation Complete	0 days	Wed 4/18/18	Wed 4/18/18	496,394

ID	ID	Task Name	Duration	Start	Finish	Predecessors
498	498	**DR/HA Testing**	**5.69 days**	**Mon 4/16/18**	**Mon 4/23/18**	
499	499	DR/HA Prep Tasks	2 days	Mon 4/16/18	Tue 4/17/18	465,367
500	500	DR/HA Testing in PRD Steps	2.75 days	Wed 4/18/18	Mon 4/23/18	499,394,497
501	501	Complete DR/HA Testing	0 days	Mon 4/23/18	Mon 4/23/18	500

SAP Appenidx 4 – Starting Project Plan

Name	Duration	Start	Finish	Predecessors	Resource Names
ECC BW HANA DMO Upgrade Migration Project	**126 days**	**Mon 6/18/18**	**Mon 12/10/18**		
pare	**10 days**	**Mon 6/18/18**	**Fri 6/29/18**		
Project Start Date	0 days	Mon 6/18/18	Mon 6/18/18		
Program Management	**10 days**	**Mon 6/18/18**	**Fri 6/29/18**		
Project Schedule	**10 days**	**Mon 6/18/18**	**Fri 6/29/18**		
Develop delivery schedule	7 days	Mon 6/18/18	Tue 6/26/18	3	SAP PM,DFA PM
Assign resources	2 days	Wed 6/27/18	Thu 6/28/18	6	SAP PM,DFA PM
Baseline project schedule	1 day	Fri 6/29/18	Fri 6/29/18	7	SAP PM,DFA PM
Baseline project schedule complete	0 days	Fri 6/29/18	Fri 6/29/18	8	SAP PM,DFA PM
Issue Log	**1 day**	**Mon 6/18/18**	**Mon 6/18/18**		
Verify issue management process	0.25 days	Mon 6/18/18	Mon 6/18/18	3	SAP PM,DFA PM
Agree issue capture tools	0.25 days	Mon 6/18/18	Mon 6/18/18	11	SAP PM,DFA PM
Issue management process definition complete	0.5 days	Mon 6/18/18	Mon 6/18/18	12	SAP PM,DFA PM
Risk Register	**1 day**	**Tue 6/19/18**	**Tue 6/19/18**		
Verify risk management process	0.25 days	Tue 6/19/18	Tue 6/19/18	13	SAP PM,DFA PM
Agree risk capture tools	0.25 days	Tue 6/19/18	Tue 6/19/18	15	SAP PM,DFA PM
Risk management process definition complete	0.5 days	Tue 6/19/18	Tue 6/19/18	16	SAP PM,DFA PM
Status Report	**1 day**	**Wed 6/20/18**	**Wed 6/20/18**		
Verify status reporting process	0.25 days	Wed 6/20/18	Wed 6/20/18	17	SAP PM,DFA PM
Agree status report template	0.25 days	Wed 6/20/18	Wed 6/20/18	19	SAP PM,DFA PM
Status reporting process definition complete	0.5 days	Wed 6/20/18	Wed 6/20/18	20	SAP PM,DFA PM
Key Decision Register	**1 day**	**Thu 6/21/18**	**Thu 6/21/18**		
Verify decision process	0.25 days	Thu 6/21/18	Thu 6/21/18	21	SAP PM,DFA PM
Agree decision documentation format	0.25 days	Thu 6/21/18	Thu 6/21/18	23	SAP PM,DFA PM
Key decision process complete	0.5 days	Thu 6/21/18	Thu 6/21/18	24	SAP PM,DFA PM
Change Control Log	**1 day**	**Fri 6/22/18**	**Fri 6/22/18**		

Name	Duration	Start	Finish	Predecessors	Resource Names
Verify change control process	0.25 days	Fri 6/22/18	Fri 6/22/18	25	SAP PM,DFA PM
Agree change log documentation format	0.25 days	Fri 6/22/18	Fri 6/22/18	27	SAP PM,DFA PM
Change control process definition compete	0.5 days	Fri 6/22/18	Fri 6/22/18	28	SAP PM,DFA PM
Project Organizational Chart	**1 day**	**Mon 6/25/18**	**Mon 6/25/18**		
Define Program Organization	0.25 days	Mon 6/25/18	Mon 6/25/18	29	SAP PM,DFA PM
Review Program Organizational Chart	0.25 days	Mon 6/25/18	Mon 6/25/18	31	SAP PM,DFA PM
Program Organizational Chart Approved	0.5 days	Mon 6/25/18	Mon 6/25/18	32	SAP PM,DFA PM
Project Resourcing	**10 days**	**Mon 6/18/18**	**Fri 6/29/18**		
90 day Resource Outlook compiled - business and IT	5 days	Mon 6/18/18	Fri 6/22/18	3	DFA PM
Review with resource managers	5 days	Mon 6/25/18	Fri 6/29/18	35	DFA PM
Project Resourcing Complete	0 days	Fri 6/29/18	Fri 6/29/18	36	DFA PM
Deliverable Templates	**7 days**	**Mon 6/18/18**	**Tue 6/26/18**		
Determine required templates	5 days	Mon 6/18/18	Fri 6/22/18	3	SAP PM,DFA PM
Build templates	1 day	Mon 6/25/18	Mon 6/25/18	39	SAP PM,DFA PM
Approve Templates	1 day	Tue 6/26/18	Tue 6/26/18	40	SAP PM,DFA PM
Deliverable Templates Complete	0 days	Tue 6/26/18	Tue 6/26/18	41	SAP PM,DFA PM
Team Onboarding & Logistics	**1 day**	**Mon 6/18/18**	**Mon 6/18/18**		
Verify team onboarding process with contractor	0.25 days	Mon 6/18/18	Mon 6/18/18	3	DFA Project Controller,SAP APM
Verify onboarding controls are in place	0.25 days	Mon 6/18/18	Mon 6/18/18	44	DFA Project Controlle
Team onboarding & logistics process complete	0.5 days	Mon 6/18/18	Mon 6/18/18	45	DFA Project Controller,SAP APM
Kick off Meeting	**9 days**	**Mon 6/18/18**	**Thu 6/28/18**		
Prepare for Kickoff Meeting	8 days	Mon 6/18/18	Wed 6/27/18	3	SAP PM,DFA PM
Perform Kickoff Meeting	1 day	Thu 6/28/18	Thu 6/28/18	48	SAP PM,DFA PM
Kick-Off Workshop Complete	0 days	Thu 6/28/18	Thu 6/28/18	49	SAP PM,DFA PM
Technical Solutions Management	**10 days**	**Mon 6/18/18**	**Fri 6/29/18**		

Name	Duration	Start	Finish	Predecessors	Resource Names
Technical Assessment for UCCHECK/HANA Code	10 days	Mon 6/18/18	Fri 6/29/18	3	SAP Basis
Assessment to validate scope					
System Preparation (cleaning, check prerequisites)	10 days	Mon 6/18/18	Fri 6/29/18	3	SAP Basis,DFA Basis
Setup target HANA hardware	10 days	Mon 6/18/18	Fri 6/29/18	3	DFA IT
Q-Gate	**9.5 days**	**Mon 6/18/18**	**Fri 6/29/18**		
Determine scope of Q-gate	0.25 days	Mon 6/18/18	Mon 6/18/18	3	SAP QA
Confirm Q-gate logistics	0.25 days	Mon 6/18/18	Mon 6/18/18	56	SAP QA
Perform Q-gate	6 days	Mon 6/18/18	Tue 6/26/18	57	SAP QA
Compile Q-gate results	2 days	Tue 6/26/18	Thu 6/28/18	58	SAP QA
Present Q-gate findings	1 day	Thu 6/28/18	Fri 6/29/18	59	SAP QA
Q-gate complete	0 days	Fri 6/29/18	Fri 6/29/18	60	SAP QA
plore	**50 days**	**Mon 6/18/18**	**Fri 8/24/18**		
Cycle 1 - Sandbox Migration	**50 days**	**Mon 6/18/18**	**Fri 8/24/18**		
Sandbox System Build - Copy of PROD and	10 days	Mon 6/18/18	Fri 6/29/18	3	DFA Basis,DFA IT
Pre-Requisites completion					
Unicode enablement of custom programs on Source	15 days	Mon 6/25/18	Fri 7/13/18	3SS+5 days	DFA Basis,DFA IT
SBX					
SAP ERP - Unicode Conversion and HANA Migration	15 days	Mon 7/9/18	Fri 7/27/18	65SS+10 days	SAP Basis
(DMO)					
SAP ERP - HANA Code Remediation for ABAP	20 days	Mon 7/30/18	Fri 8/24/18	66	DFA Development
SAP BW Migration (SBX)	15 days	Mon 7/30/18	Fri 8/17/18	66	SAP Basis
Functional test	10 days	Mon 8/13/18	Fri 8/24/18	67SS+10 days	DFA Functional Team
Cook Book, E2E Cutover plan creations (adjust in	20 days	Mon 7/16/18	Fri 8/10/18	66SS+5 days	SAP Basis
next cycle)					
Quality Gate	**10 days**	**Mon 8/13/18**	**Fri 8/24/18**		
Determine scope of Q-gate	0.5 days	Mon 8/13/18	Mon 8/13/18	68SS+10 days	SAP QA
Confirm Q-gate logistics	0.5 days	Mon 8/13/18	Mon 8/13/18	72	SAP QA
Perform Q-gate	6 days	Tue 8/14/18	Tue 8/21/18	73	SAP QA
Compile Q-gate results	2 days	Wed 8/22/18	Thu 8/23/18	74	SAP QA

Name	Duration	Start	Finish	Predecessors	Resource Names
Present Q-gate findings	1 day	Fri 8/24/18	Fri 8/24/18	75	SAP QA
Q-gate complete	0 days	Fri 8/24/18	Fri 8/24/18	76	SAP QA
alize	**50 days**	**Mon 8/20/18**	**Fri 10/26/18**		
Development Soft Freeze (Double Maintenance)	0 days	Fri 8/24/18	Fri 8/24/18	69,81	DFA Technical Lead
Cycle 2 - Development Migration	**50 days**	**Mon 8/20/18**	**Fri 10/26/18**		
Pre-Requisites completion	5 days	Mon 8/20/18	Fri 8/24/18	69SS+5 days	DFA Basis,DFA IT
SAP ERP - Unicode Conversion and HANA Migration (DMO)	10 days	Mon 8/27/18	Fri 9/7/18	81	SAP Basis
Delta HANA Code Remediation	5 days	Mon 9/3/18	Fri 9/7/18	82SS+5 days	DFA Development
SAP BW - Migration (DEV)	10 days	Mon 8/27/18	Fri 9/7/18	82SS	SAP Basis
Unit testing	5 days	Mon 9/10/18	Fri 9/14/18	84	DFA Functional Team
Quality Gate	**10 days**	**Mon 9/3/18**	**Fri 9/14/18**		
Determine scope of Q-gate	0.5 days	Mon 9/3/18	Mon 9/3/18	84SS+5 days	SAP QA
Confirm Q-gate logistics	0.5 days	Mon 9/3/18	Mon 9/3/18	87	SAP QA
Perform Q-gate	6 days	Tue 9/4/18	Tue 9/11/18	88	SAP QA
Compile Q-gate results	2 days	Wed 9/12/18	Thu 9/13/18	89	SAP QA
Present Q-gate findings	1 day	Fri 9/14/18	Fri 9/14/18	90	SAP QA
Q-gate complete	0 days	Fri 9/14/18	Fri 9/14/18	91	SAP QA
Cycle 3 - QA Migration	**35 days**	**Mon 9/10/18**	**Fri 10/26/18**		
Pre-Requisites completion	5 days	Mon 9/10/18	Fri 9/14/18	85SS	DFA Basis,DFA IT
SAP ERP - Unicode Conversion and HANA Migration (DMO)	10 days	Mon 9/17/18	Fri 9/28/18	94	SAP Basis
SAP BW Migration - QAS	10 days	Mon 9/17/18	Fri 9/28/18	94	SAP Basis
Integration Test / Regression Testing	20 days	Mon 10/1/18	Fri 10/26/18	96	DFA Functional Team
User Acceptance Testing	20 days	Mon 10/1/18	Fri 10/26/18	96	DFA Functional Team
Development Freeze (No productionsupport or project changes)	0 days	Fri 10/26/18	Fri 10/26/18	98	DFA Technical Lead
Quality Gate	**10 days**	**Mon 10/15/18**	**Fri 10/26/18**		
Determine scope of Q-gate	0.5 days	Mon 10/15/18	Mon 10/15/18	98SS+10 days	SAP QA

Name	Duration	Start	Finish	Predecessors	Resource Names
Confirm Q-gate logistics	0.5 days	Mon 10/15/18	Mon 10/15/18	101	SAP QA
Perform Q-gate	6 days	Tue 10/16/18	Tue 10/23/18	102	SAP QA
Compile Q-gate results	2 days	Wed 10/24/18	Thu 10/25/18	103	SAP QA
Present Q-gate findings	1 day	Fri 10/26/18	Fri 10/26/18	104	SAP QA
Q-gate complete	0 days	Fri 10/26/18	Fri 10/26/18	105	SAP QA
Cycle 4 - Dry Run & Cutover Planning	**20 days**	**Mon 10/1/18**	**Fri 10/26/18**		
Build Dry Run system as latest copy of PRD and Pre-Requisites completion	10 days	Mon 10/1/18	Fri 10/12/18	98SS	DFA Basis,DFA IT
SAP ERP - Unicode Conversion and HANA Migration (DMO)	5 days	Mon 10/15/18	Fri 10/19/18	108	SAP Basis
SAP BW, EP Migration	5 days	Mon 10/15/18	Fri 10/19/18	108	SAP Basis
Infrastructure Testing (Backup /Restore, HA/DR tests)	5 days	Mon 10/22/18	Fri 10/26/18	110	DFA IT
Migration Cutover Planning - Final verification	5 days	Mon 10/22/18	Fri 10/26/18	110	DFA Basis,DFA IT,SAP Basis
Cutover plan and cookbook update					
Quality Gate	**10 days**	**Mon 10/15/18**	**Fri 10/26/18**		
Determine scope of Q-gate	0.5 days	Mon 10/15/18	Mon 10/15/18	109SS	SAP QA
Confirm Q-gate logistics	0.5 days	Mon 10/15/18	Mon 10/15/18	114	SAP QA
Perform Q-gate	6 days	Tue 10/16/18	Tue 10/23/18	115	SAP QA
Compile Q-gate results	2 days	Wed 10/24/18	Thu 10/25/18	116	SAP QA
Present Q-gate findings	1 day	Fri 10/26/18	Fri 10/26/18	117	SAP QA
Q-gate complete	0 days	Fri 10/26/18	Fri 10/26/18	118	SAP QA
ploy					
Cycle 5 - Production Cutover and Go-Live	**16 days**	**Mon 10/22/18**	**Mon 11/12/18**		
Pre-Requisites completion	11 days	Mon 10/22/18	Mon 11/5/18	110	DFA Basis,DFA IT
Cutover Weekend	**2 days**	**Fri 11/9/18**	**Mon 11/12/18**		
SAP BW (PRD), SOLMAN CONFIGURATION OF PRD	2 days	Fri 11/9/18	Mon 11/12/18	122FS+3 days	SAP Basis

ect Plan T-5 Exhibit

Name	Duration	Start	Finish	Predecessors	Resource Names
SAP ERP - Unicode Conversion and HANA Migration (DMO)	2 days	Fri 11/9/18	Mon 11/12/18	122FS+3 days	SAP Basis
n	**20 days**	**Tue 11/13/18**	**Mon 12/10/18**		
Post Go-live Support	20 days	Tue 11/13/18	Mon 12/10/18	125	SAP Basis
Quality Gate	**10 days**	**Tue 11/27/18**	**Mon 12/10/18**		
Determine scope of Q-gate	0.5 days	Tue 11/27/18	Tue 11/27/18	127SS+10 days	SAP QA
Confirm Q-gate logistics	0.5 days	Tue 11/27/18	Tue 11/27/18	129	SAP QA
Perform Q-gate	6 days	Wed 11/28/18	Wed 12/5/18	130	SAP QA
Compile Q-gate results	2 days	Thu 12/6/18	Fri 12/7/18	131	SAP QA
Present Q-gate findings	1 day	Mon 12/10/18	Mon 12/10/18	132	SAP QA
Q-gate complete	0 days	Mon 12/10/18	Mon 12/10/18	133	SAP QA

SAP Appendix 5 – Sample Test Plan and Test Strategy

ECC & BW MIGRATION TO HANA
Month XX, 2018
Test Plan

Version: 0.0

Document Control Information

Revision History

Date	Version	Description	Author
XX/XX/2018	0.0	Initial Draft	Author name
XX/XX/2018	1.0	Approved Test Plan	

Review & Approval

Name	Role	Reviewer/Approver	Approved/ Reviewed	Date
Person Name	IT Director ECC Migration Project	Approver		
Person Name	IT Director CIS Applications	Approver		
Person Name	IT QA & Release Manager	Approver		
Person Name	Project Manager	Approver		
Person Name	Manager	Approver		
Person Name	Technical Lead	Reviewer		
Person Name	Business Lead	Reviewer		
Person Name	Business Lead	Reviewer		
Person Name	BW Reporting & Analysis	Reviewer		

Reference Documents

Document Name	Document Version	Document Location

Table of Contents

Introduction

1. Purpose & Objectives

This document is the detailed test scope and plan for the ECC & BW migration to SAP HANA project ("Project").
Because the database migration from DB2 to SAP HANA is purely technical no new functionality or modifications will be introduced as part of this effort. The overall testing objective for this project is to verify that SAP ECC & BW functionality still transacts post migration.

The following table outlines the CLIENT   applications that related to, or impact, the Project.

Applications	Test Type	Accountable
SAP ECC & BW		
	Regression Test	SAP
	Interface Test	SAP
	Performance Test	SAP
	3rd Party Applications	CLIENT
	User Acceptance Test	CLIENT
SAP Code Enhancement		
	Regression Test	SAP
	Interface Test	SAP
	Performance Test	SAP
	3rd Party Applications	CLIENT
	User Acceptance Test	CLIENT
SAP Solution Manager (SolMan)		
	SAP SolMan is a separate project and will have its own Test Plan	CLIENT
SAP Process Integration (PI)		
	SAP PI is a separate project and will have its own Test Plan	CLIENT

1.1 Risked Based Testing

Because no new or modified functionality will be introduced as part of this project, and given the aggressive timeline, CLIENT and SAP leadership have agreed to a Risked Based testing approach.
The Risk Based approach will leverage:
- SAP's domain experience
- CLIENT 's recent HR Service Pack project artifacts (if any)
- CLIENT 's existing test cases
- ST03N usage/utilization information provided for the prior two months (XX/'18 & XX/'18)

Once the data has been compiled in the Test Script Priority Matrix (TSPM) the following prioritizations will be applied to drive the overall scope and test cycle execution plans.

Applications	Accountable
Priority 1	High Business Criticality / High Usage • Critical & High Priority Test Scripts as evaluated by CLIENT & SAP • Top 25% usage/utilization per ST03n
Priority 2	High Business Criticality / Low Usage • Critical & High Priority Test Scripts as evaluated by CLIENT & SAP • Top 26% - 50% usage/utilization per ST03n
Priority 3	Low Business Criticality / High Usage • Medium & Low Priority Test Scripts as evaluated by CLIENT & SAP • Top 51% - 75% usage/utilization per ST03n • KPIT remediated code not covered by P1/P2
Priority 4	Low Business Criticality / Low Usage

	• Medium & Low Priority Test Scripts as evaluated by CLIENT & SAP • Bottom 25% usage/utilization per ST03n

To validate that the appropriate Risk has been associated with each test, SAP will work with CLIENT subject matter experts to review the risk ratings for each functional area to verify coverage, risk profile, and address any outstanding issues or concerns.

2. Test Scope

The following table outlines testing scope by module based upon the analysis done within the Test Script Priority Matrix.

Regression Testing Non-Prioritized Scope	Total Test Count	Planning	Assessment				Risk Based			
			P1	P2	P3	P4	P1	P2	P3	P4
FICO										
→ FI	433	216	363	67	1	2	356	3	1	
→ GL	32	16	8	21	1	2	9		1	
→ CO/PS	118	59	10	71	12	25	43	1	9	
Total FICO	583	291	381	159	14	29				
Total HR	197	98	34	46	117	--	20	1	29	3
MM										
→ IM	33	16	7	23	3	--	12		1	
→ MM	43	21	15	29	--	--	15			
→ Procurement	89	44	49	38	2	--	44		1	
Total MM	165	81	71	90	5	--				
Total SD	89	44	5	70	12	2	49		7	
Total WM	222	111	70	59	86	7	91	8	38	1
Total BW	382	191	--	--	382	--				
Total Regional Structure	13	6	1	12	--	--	6			
Counts/ECC & BW	1651	822	562	436	616	38				

2.1 Level Timeline

The following table outlines the high-level timeline for testing on the Project.

Test Milestones	Test Cycle Duration	
	Test Dates	Test Duration (in Weeks)
Test Prep	xx/xx/18 - xx/xx/18	x
Test Plan Signoff	xx/xx/2018	
Regression Test Cycle 1	xx/xx/18 - xx/xx/18	x

Regression Test Cycle 2	**xx/xx/18 - xx/xx/18**	**x**
User Acceptance Test Cycle 1	**xx/xx/18 - xx/xx/18**	**X**
Integration Testing	**xx/xx/18 - xx/xx/18**	**X**
User Acceptance Test Cycle 2	**xx/xx/18 - xx/xx/18**	**X**
Performance Testing	**xx/xx/18 - xx/xx/18**	**X**
HA/DR	**xx/xx/18 - xx/xx/18**	**x**

2.2 Proposed High Level Test Execution Schedule

Listed below is the proposed high level test schedule for the ECC & BW migration to HANA. Detailed schedule will be provided after the TSPM is complete.

Proposed Test Execution Schedule

	R1	UAT 1 - No Integration	R2	SIT/(E2E)	UAT 2 (Integration)	Resource Requirements
Of the Regression Test Prioritized Scope (P1-P4), existing scripts with little or no remediation	50% of the prioritized list		50% of the remaining scope can be tested			1 hr of business's time for prioritization for ECC/CRM & 3P; 2 hours of time per module per week from Functional Leads to validate a sample of tests (sample should include P1-P4) 1 hr. for master data identification
Regression Test scope that needs remediation - ie, add steps, net new tests that need to be written, sprinter test conversion	10%		90%			Offshore - FICO-Monica Pandey;SD-Raghav Polepalli;MM-Ameen Azizi;CIS-Piyush Parihar;WM-Parag Mahajan;HR-Prasun Das 2 hours of time per module of Functional Leads time for validation
New Test cases that need to be written for Delta - Easy Soft, tests run outside of HPQC			100%			Easy soft team
UAT 1		All R1 tests that have passed & any 3P interfaces that do not have dependencies				1 hour of the business's time for identifying which scenarios /processes need to be tested; Test team validates
SIT /(E2E)				UAT1 plus R2		1 hr by module of functional leads time for identifying E2E scenarios. Leverage HSRP/FTIP projects. 1 hr. by module for master data identification
UAT2					Subset of SIT w/3P	1 hr of the business's time per module for identifying the critical business processes
Remediated Objects - Scripts that need no remediation	75%		25%			2 hrs of a technical resource
Remediated Objects - New scripts that need to be written	Run the objects that have tcodes and test cases identified		Run the remainder of the tests			Need to map the remediated objects to Regression Superset & test case identified before offshore can test
FTIP in flight processes retrofit into HANA project for retesting	50%		50%			FTIP test lead to test a subset of the BCE test cases; Need 1 hr to reconcile with the superset
3P Interfaces - Test Interfaces w/o Dependencies			60%	Subset of R1 & R2		

2.3 Testing Approach by Phase

2.3.1 Regression Testing

The ECC & BW HANA Migration Timeline currently calls for two (2) Regression Test Cycles. Based upon the scoping done in the TSPM we are targeting all P1 and P2 test cases to be executed within each Regression Test Cycle. At a minimum all P1 test cases will be executed within each cycle. Additional execution of P2, P3, & P4 test cases will be scheduled based upon testing progress with the expectation that all P2, P3, & P4 test cases will be executed a minimum of one time before the completion of the Interface test cycle. To verify compliance with CLIENT SOX control any test script that touches a remediated object will be scheduled for execution during regression testing.

The Acceptance Criteria for Regression Test Cycle 1 is that all P1 and P2 Regression Test scripts (that do not go beyond the SAP system) have been executed as well as all other scripts that have been identified as targets for Cycle 1 according to the TSPM.

The Acceptance Criteria for Regression Test Cycle 2 is that all P1 and P2 Regression Test scripts (that do not go beyond the SAP system) have been re-executed. Additionally, any scripts not previously executed in Cycle 1 according to the TSPM has been executed except for these P3/P4 scripts that were identified as to be tested during Interface testing or those scripts that were identified as not to be tested.

2.3.1.1 Regression Testing Assumptions

- Test scripts will be written in parallel to execution of tests.
- Based upon the TSPM Regression Testing Cycle 1 and Cycle 2 will be executed within TE1/TC1
- Regression test is complete when all identified (critical and high) defects are resolved or mitigated and with medium and low having approved workarounds.
- Test execution will be performed by nearshore testers via CLIENT 's Application Lifecycle Management tool
- Regression Test Cycle 1 & 2 will be limited to within the four-walls of the SAP applications
- Interface Testing will be pulled forward if possible for processes where the TE1/TB1 environment has available interfaces to complete the business process. Pull forward depends upon test progress/risk

2.3.1.2 DE1/DB1 Contingency Plan

If the TE1/TB1 Environment is not ready for Regression Test Cycle 1, and to prevent slippage in the overall project plan the test team will identify a subset of regression test scripts (P1 & P2 scripts that do not extend beyond the four-walls of SAP DE1/DB1) to pull forward to kick-off testing. The test team will coordinate with CLIENT Architecture to verify there are no impacts to other programs currently using the DE1/DB1 environments. It is important to note that stakeholders are aware that the DE1/DB1 instances do not have a full data set, so testing will be limited to the data that is currently available within that environment.

2.3.2 System Interface Testing

The ECC/BW to HANA Migration Test Plan currently calls for one (1) Interface Test Cycles. Based upon the actual output of the TSPM the current expectation is that all P1 and Interface test cases will be executed within the Interface Test Cycle. Additional execution of P2, P3, & P4 test cases will be scheduled based upon the testing window with the expectation that any P2, P3, & P4 test cases not executed previously would be executed a minimum of one time before the completion of Interface testing phase.

The Acceptance Criteria for Interface (integration) Test is that all P1 Regression Test scripts have been re-executed as well as any scripts not previously executed in Cycle 1 or Cycle 2 according to the TSPM. At a minimum all P2 tests that do not extend beyond the SAP system will have been executed twice and any P3/P4 script will have been executed a minimum of once except for tests that were identified as not to be tested.

2.3.2.1 System Interface Testing Assumptions

- Test scripts will be written in parallel to execution of tests.
- Based upon the TSPM Interface (integration) Testing will be executed within QE1/QB1
- Regression test is complete when all identified (critical and high) defects are resolved or mitigated and with medium and low having approved workarounds.
- Test execution will be performed by nearshore testers via CLIENT 's Application Lifecycle Management tool
- Regression Test Cycle 1 & 2 will be limited to within the four-walls of the SAP applications
- Interface Testing will be pulled forward if possible for processes where the TE1/TB1 environment has available interfaces to complete the business process. Pull forward depends upon test progress/risk
- Interface (integration) test is complete when all identified (critical and high) defects are resolved or mitigated and medium and low having approved workarounds.

2.3.3 Performance Test Approach

The Performance Test is defined based upon exiting agreed performance baseline for a sub-set of high volume transactions critical to the ECC and BW business processes. The performance plan will identify a subset of regression/interface test scripts to be executed during the Performance Test period. CLIENT will provide performance baselines from production if necessary. Clarify the expected performance levels to be achieved for ECC/BW on HANA Migration. Conduct the performance test to verify the technical architecture meets all performance-related metrics, such as response time, and load/throughput.

2.3.3.1 Performance Test Assumptions

- Performance Test will be executed using CLIENT 's LoadRunner or Performance Center tool set
- SAP and CLIENT   will work in concert to optimize ECC/BW HANA performance issues on Linux SAP Application Servers- Configure ECC/BW HANA DB corruption check per Best Practices- Set-up and configure ECC/BW HANA health checks in Solution Manager
- Performance test results are documented as pass or failed. Failed scripts are reviewed and issues logged for resolution by SAP.
- Documentation, disposition of configuration and code/optimization issues will be identified as a result of Performance testing according to CLIENT   Documentation Standards.
- CLIENT 's expectation is that any object impacted by HANA code remediation will execute at a minimum as fast as they have within the Oracle instance. Every effort will be made during the performance test planning phase to include these objects as part of the overall business transactions identified for performance test.
- Performance test is complete when all identified (critical and high) defects are resolved or mitigated and medium and low having approved workarounds.

2.3.4 3rd Party Applications Test Approach

(Need input from the CLIENT 3rd Party Test Lead)

Module	3rd Party Application's – Non CIS
FICO	
	Infor
	Bank of America
	Z Programs
AA	
	Power Plant
MM	
	CSY
	Nexant
	Z Programs
WM	

HR	
	Broadspire
	IAM
	Long Term Care Solution(LTC)
	Milliman & Roberts
	Safety Group
	Glassdoor
	Metlife
	T. Rowe Price (Retirment)
	Z Programs
	T. Rowe Price (Payroll)
	ADP

2.3.4.1 3rd Party Application Test Assumptions

- (need input from the CLIENT   3rd Party Test Lead)

2.3.5 User Acceptance Testing

The approach for User Acceptance Test (UAT) is that during Regression Cycle 2 CLIENT   will begin to introduce End Users/SMEs into the UAT process by executing their key/critical business processes. The UAT team will leverage existing Test Scripts wherever possible. The expectation is that End Users should not see any functional difference within their existing business process.

Once the Project officially moves into the UAT phase the CLIENT   team will reengage with End Users/SMEs to formally execute key and critical business processes (leveraging existing test scripts) this time focusing on transactions that originate within SAP and interface with other solutions or transactions that originate in other solutions and enter SAP.

2.3.5.1 User Acceptance Testing Assumptions

- UAT will be performed by business users, facilitated by CLIENT   Test Lead
- Existing Test scripts will be leveraged where ever possible
- Based upon the TSPM User Acceptance Testing (UAT) will be executed within QE1/QB1
- User Acceptance Test is complete when all identified (critical and high) defects are resolved or mitigated and with medium and low having approved workarounds.

2.3.6 Non-Named Testing Areas Approach

2.3.6.1 Security Testing

For the identified test environments SAP will assign reasonable security access and will leverage CLIENT   knowledge for any questions… if there are failures or defects related to the ECC / BW HANA Migration will be remediated by SAP. SAP's GRC solution is not within the scope of this testing effort.

2.3.6.2 SOX

CLIENT IT is responsible for ECC/BW to HANA Migration Project adherence to CLIENT 's SOX control policies. SAP will provide best practice on how to apply CLIENT   SOX standards to ECC/BW 2 HANA Migration Project.

CLIENT   SOX controls are reviewed at the end of development phase and reviewed for final compliance during Interface (integration testing)

For SOX related Privileges needing HANA security development CLIENT   will provide requirements in a timely fashion. SAP will be accountable for Unit testing of these requirements.

2.3.6.3 SAP Solution Manager (SolMan)

The SAP Solution Manager upgrade is a separate project with a separate testing approach.

2.3.6.4 SAP Portal

The SAP Portal upgrade is a separate project with a separate testing approach; however, we have become aware that there is potential impacts to the Project's environments so the testing team will discuss their expectations to verify impacts are documented.

2.3.6.5 SAP Process Integration (PI)

The SAP Process Integration upgrade is a separate project with a separate testing approach; however, we have become aware that there is potential impacts to the Projects environments so the testing team will discuss their expectations to verify impacts are documented.

3. Test Preparation

Analysis of CLIENT 's Test Inventory revealed that the test scripts are in various state of completeness, hence, tests scripts will have to be remediated, i.e. Transfer the "Sprinter" attachments to test steps in Excel and then upload to HP ALM, or develop them from scratch where tests cases do not exist. For custom transactions, we will need CLIENT input to understand the business process.

3.1.1 Test Case Development Approach

Once the scope is established the team will begin the process of mapping existing test assets (Test Cases) currently residing within the HP ALM solution to the TSPM. The test cases will fall within one of the following four (4) buckets:

- B1: Script exists and is detailed to where a tester (knowledgeable with basic SAP) can execute
- B2: Script exists but some minor (less than 50%) needs to be updated or clarified
- B3: Script exists but major changes are needed (more than 50%) needs to be updated or redone
- B4: No script exists

After the initial mapping of test scripts has been completed and all testing assets have been categorized into one of the above four buckets the testing team will begin setting up test cases within HP ALM for test scripts within the B1 bucket, and set up a remediation schedule for all test scripts within the B2 - B4 buckets. An initial assessment will be done between the SAP and CLIENT   testing teams to understand if the functionality can be updated within the testing team or if additional support is needed from CLIENT   Business SMEs. In the event the testing team can remediate the scripts, the scripts will be updated based upon standard SAP functionality and any modifications to CLIENT   business process will be addressed by CLIENT   Test Manager/Business SMEs. In the event that additional support is required the Test Team will leverage the HP Sprinter tool to capture the business process (as the CLIENT Business SME) steps through the scenario. The combined SAP/CLIENT   testing team will then leverage the output of the Sprinter to update/develop the test script.

Regression Testing Non-Prioritized Scope	Total Test Count	Assessment				Test Case Readiness			
		P1	P2	P3	P4	B1	B2	B3	B4
FICO									
→ FI	433	363	67	1	2			1	430
220 Test Cases are variants on Create New Employee and the remaining test we are still evaluating test scripts									
→ GL	32	8	21	1	2			26	6
→ CO/PS	118	10	71	12	25		23	74	
Total FICO	583	381	159	14	29				
Total HR	197	34	46	117	--		197		
CIS									
→ Billing	130	39	54	9	28		49		81

→ DM	5	5	--	--	--	--	5	--	--
→ FICA	123	14	71	34	4				124
We are still investigating the test cases for the FICA functionality									
→ FO	8	--	8	--	--		8		
→ ISU	42	19	13	10	--		42		
Total CIS **	**308**	**77**	**146**	**53**	**32**				
MM									
→ IM	33	7	23	3	--			33	
→ MM	43	15	29	--	--			43	
→ Procurement	89	49	38	2	--		2	66	21
Total MM	**165**	**71**	**90**	**5**	**--**				
Total SD	**89**	**5**	**70**	**12**	**2**		**26**		**64**
Total WM	**222**	**70**	**59**	**86**	**7**		**130**		**88**
Total BW	**382**	**--**	**--**	**382**	**--**				
Working with PROJECT Team to leverage PROJECT BW regression scripts									
Total Regional Structure	**13**	**1**	**12**	**--**	**--**		**13**		
Counts/ECC & BW	**1960**	**639**	**582**	**669**	**70**				

The test case build/remediation plan will be to focus on moving those test cases currently in B2 status up to B1 by finalizing any questions and/or adding the data to verify they are ready to go. Many of these are PROJECT scripts that will just require data prep and these will be the focus of wave 1 script remediation. We plan to execute the scripts in B1 and B2 status in parallel as we continue to develop any B3/B4 test scripts.

3.2 Test Data Requirements

The Testing Team will be leveraging existing assets to acquire test data. Ideally the test scripts would contain data requirements or links to existing data tables. In instances where this does not exist SAP will leverage our domain knowledge to gather standard (according to SAP standard business process) data sets, or reach out to CLIENT subject matter experts when possible for help in identifying data when we cannot locate the correct data or for custom transactions. Additionally, data lineage will be maintained as often as possible to verify accurate flow through the business process.

3.2.1 Test Data Assumptions

> Test Data – within the four walls of SAP 4 walls SAP SMEs are expected to help provide Test Data
> Test Data - CLIENT SMEs will help provide data for any external transactions or z-transactions (as part of their Test Case development efforts)

4. Detailed Schedules and Milestones including RACI matrix

The list below includes the standard milestone dates, task description, and person/ team responsible. The project team may have additional milestones that are specific to their project so these should be added here as well.

Task	SAP Project Manager	PSE Project Manager	SAP Test Manager	3P	Testing Team		Functional/Dev Team (SAP+ 3P)	BASIS/infraTeam	PSE Business	Status	Start Date	End Date
	John	Kiran	Jay	Harpreet	Offshore	Support						
Review Test Plan: Development of an integrated testing plan for Regression, Integration, UAT, 3P	A, I	A, I	R	C						In Process	12/12/2016	1/6/2017
Final Test Plan	A, I	A, I	R	C							1/17/2017	1/17/2017
Regression Testing Plan (2 Cycles)												
Test Scope Identification												
Identify Regression Test Scope Scenarios from HPQC	I	I	R,A	C						Complete	12/22/2017	2/21/2017
Identify Superusers	I	A,C				R				Complete	12/16/2016	12/19/2016
Test Case Remediation - Offshore	I	I	A	A	R		C			Not Started	1/10/2017	2/24/2017
Create Test Scripts for New Functionality - DQM & Easy Soft	I	I	A	A	R		C			Not Started	1/13/2017	1/18/2017
Approve & Review Tests Scripts with Functional Leads	I	I	A	R	R		A			Not Started	1/16/2017	
Prioritize Test Scripts using TSPM	I	I	R,A	R,A			C		C	In Process	1/9/2017	1/12/2017
Identify/Create Test Data (master & transactional)	I	I	A	A			R			Not Started		
Confirm System Availability	A, I	A, I						R		In Process	Ongoing	1/19/2017
3P Regression Test Scope - HARPREET TO UPDATE											TBD	TBD
Identify interfaces				R, A							TBD	TBD
				A			R				TBD	TBD
											TBD	TBD
											TBD	TBD
											TBD	TBD
											TBD	TBD
Entry & Exit Criteria												
Identify Entry Criteria	I	I	R,A	R,A,C							1/4/2017	1/4/2017
Identify Exit Criteria	I	I	R,A	R,A,C							1/4/2017	1/4/2017

Task	SAP Project Manager	PSE Project Manager	SAP Test Manager	3P	Testing Team		Functional/Dev Team (SAP+3P)	BASIS/infraTeam	PSE Business	Status	Start Date	End Date
	John	Kiran	Jay	Harpreet	Offshore	Support						
Test Tool - HPQC Setup												
Set up Project Folder for CRM & HANA Migration	I	I	A	R,A						Complete	12/15/2016	12/19/2016
Move Tests From Other Folders to CRM/HANA Migration Project	I	I	R,A	R,A								
Upload New Tests as Needed	I	I	A	A	R							
Add Testers	I	I	A	A	R							
Test scripts uploaded into HP QC	I	I	R	R	R							
Set up Traceability to Requirements	I	I	A	A			R					
Status Reports & Metrics	I, C	I, C	A	A	R							
Integration Testing Scope												
Identify Critical Scenarios (use Regression Testing Scope to String)	I	I	A	A			R			Not Started		
Approve & Review Tests Scripts with Functional Leads	I	I	R, A	R, A			C			Not Started		
Entry & Exit criteria for Integration Testing	I	I	R,A	R,A			C			In Process		
Identify/Create Test Data (master & transactional)	I	I	A	A			R			Not Started		
Confirm System Availability	A	A	I	I				R		Not Started		
Regression Test Execution (2 Cycles)												
SAP & required code in moved to Q for Integration Testing	I,C	I,C	R,A	R,A			C					
Ensure testers have VDI access to systems and tools	I	A, I	R	R								
Defect triage meetings	A	A	R	R	I							
Publish Test Execution report	I	I	R	R	I							
Test Team to update Test Execution section, with status and defect ID (in case it fails the test)	I	I	A	A	R							
R1 & R2 Test Result review and Signoff	A, I	A, I	R	R								
UAT Test Scope Identification												
Identify UAT Scope (Use the Critical Scenarios from Integration Testing)	I	I	A	A					R	Not Started		
Scripting detailed level scenario and uploading to HPQC	I	I	A	A	R					Not Started		
Entry & Exit criteria for UAT	C, I	C, I	R	R						In Process		
Define Q gates	A,C, I	A,C, I	R	R						Not Started		
Test Plan Review w/PSE	A	A	R	R						In Process		
Test Strategy Signoff	R	R	A	A						Not Started		

Task	SAP Project Manager	PSE Project Manager	SAP Test Manager	3P	Testing Team		Functional/Dev Team (SAP+ 3P)	BASIS/infraTeam	PSE Business	Status	Start Date	End Date
	John	Kiran	Jay	Harpreet	Offshore	Support						
UAT Test Execution												
System Availability												
Smoke testing for UAT readiness	I	I	I	I			R	C		Not Started		
Execution of UAT test scenarios	I	I	A	A			C		R	Not Started		
Publish UAT progress status reports	I	I	R	R						Not Started		
Defect Triage	I	I	R	R			C			Not Started		
Defect Retest	I	I	A	A			C			Not Started		
Data Prep										Not Started		
UAT Sign-Off										Not Started		
UAT												
Identify UAT resources	I	R,A	I	I						Not Started		
Performance Test												
System Availability	A, I	A, I	I					R		Not Started		
Identify scope for Performance testing	I	I	A	A	C		R			Not Started		
Confirm KPI's with business	I	R, A	I	I						Not Started		
runner during execution and script building phase	I	R, I	A		A, I			R		In Process	1/5/2017	
Identify resources	R	A	I	I								
Script Creation through HP Load runner	I	I	A	A	R		C			Not Started		
Performance test data generation	I	I			A		R			Not Started		
Performance test script execution	I	I	A	A	R					Not Started		
Defect triage meetings	I	I	R, A	R, A						Not Started		
Publish performance Reports/Metric	A, I	A, I	A		R					Not Started		
Performance test results sign off	A	R	I		A					Not Started		

4.1 Testing Roles, Responsibilities and Resources

Role	Primary Responsibilities	# of Resources Required & Duration
Project Managers	1. Leads overall control and direction of the PROJECT test cycles 2. Tracks and measures the success of the PROJECT implementation 3. Collects performance metrics to support result oriented decision making 4. Attends daily status meetings	
Test Leads	1. Coordinates overall testing effort 2. Builds and manages test schedule; assigns test scripts to Testers 3. Responsible for properly organizing testing activities and documentation 4. Verifies that Configured Test script requirements' Execution States are kept up-to-date by the Team 5. Builds daily/weekly reports on testing progress and communicates to project leadership	

Role	Primary Responsibilities	# of Resources Required & Duration
	6. Trains and assists Testers on use of testing tools and procedures 7. Leads the daily status meeting	
Testers - Nearshore	1. Executes the test script procedures as documented 2. Documents actual results with appropriate verbiage in the field provided for each step 3. Creates new defect records in HPQC, retests test scripts, and closes defects 4. Reviews the test after the run has been completed to make sure that guidelines have been adhered to and results are documented thoroughly and accurately 5. Updates the Execution status in Test Plan to reflect test progress and completion 6. Verifies BPD's and log defects 7. Attends daily status meetings	
Defect Specialists (Functional Team, Application Development Team, Security Team, TI Team)	1. Resolves defects as they are identified by Testers during Integration Testing, participates in daily defect status resolution and related meetings. 2. Maintains the status of defect records in HPQC and fully documents resolutions, informs Tester when test script is ready to be retested. 3. Corrects Test scripts as needed. 4. Corrects BPDs and logs defects. 5. Attends daily status meetings.	
Functional Team Leads Application Development Team Leads	1. Reviews and approves scripts 2. Reviews and approves RTM 3. Evaluates and assigns the defects to a Defect Specialist 4. Reviews the resolution and documentation related to defects 5. Approves the fix to be migrated to QA system 6. Attend daily status meetings	
Technical Infrastructure Team (Basis)	1. Builds QA environments. 2. Validates that they are operational prior to Integration Testing and User Acceptance Testing providing enough time for the set up activities to take place by the Functional and Application Development Teams 3. Validates the technical solution architecture for Integration Testing and System Acceptance Testing 4. Provides PROJECT specific information, such as any changes in QA log on properties or workstation image requirement 5. Attends and reports on technical metrics at daily status meeting	
UAT Testers	1. Execute UAT Test Cases	CLIENT Business
UAT Test Leads	1. Provide UAT leadership 2. Represent team cross-functionally 3. Author UA Test Plan 4. Coordinate UAT Test Cases	

Role	Primary Responsibilities	# of Resources Required & Duration
	5. Report and Manage UAT Defects 6. Facilitate Daily UAT Test Status Call 7. Provide Daily UAT Test Status Reporting	

5. Test Execution

5.1 Logistics

At the beginning of each day during the Regression Testing effort the Testers report to the Test Manager on testing progress and defect identification, assignment and remediation.

Test scripts are assigned according to the Regression Testing schedule that is managed by the Testing Manager. Each Tester begins test script execution according to the plan for each day.

At the end of each testing day, the Test Managers assess the level of progress achieved by the Testers based on the status indicated for each of the Configured Test script record stored in HPALM. All open defects will be assessed for status, severity and progress of remediation. The detailed schedule is adjusted according to the outcome of this status assessment in order to determine work assignments for the following testing day.

When Regression Testing begins, the tester logs into HPALM and runs his/her assigned tests from the Test Lab module in HPALM. The tester will record the results of each test step and indicate a pass or fail status. Failed steps will then require a defect record to be opened and assigned to the appropriate team for review and remediation.

Defects are created using HPALM and linked to the test script. For more details on the Test Execution Procedures, please reference section 6.3 "Defect Management Process" of this document.

5.2 Test Execution

Test execution is the execution of all test scripts, and the validation of expected results. During test execution, the Test Team will monitor and report progress against the schedule using the test catalog and reports from HPALM.

6. Test Management

The Project will use standard CLIENT processes for the overall test execution, reporting, and defect resolution processes. The following sections are standard CLIENT Process.

6.1 Team Meetings and Communication Plan

Communication and Training Plan

6.2 Testing Process

The following high-level process is and will be followed for the ECC & BW Migration to HANA project:
1) Remediated Objects traceability to Test Cases
2) The test cases will be developed on an Excel spreadsheet and then loaded into HP ALM (Test Plan module) once approved.
3) Master test data will be identified prior to the start of test execution.
4) Prior to test execution kick-off, the test cases will be pulled into the Test Lab module of HP ALM to facilitate test execution.
5) The order of execution for test cases will follow the Test Script Priority Matrix. (TSPM). In situations where there are multiple iterations of the same test due to different data sets, an "Exec. Priority" field in test lab can be leveraged to determine whether the iteration will fall in the High, Medium or Low category for execution.

6) The target for SIT will be to attempt execution of all the planned priority 1 test cases including 3P interfaces, while UAT will focus on a sub-set of the more critical scenarios. In the current schedule, Integration Testing and UAT Cycle 1 overlap.
7) There will not be any pre-planned assignment of test cases to testers unless there is a specific ask to do so.
8) Planned execution dates for individual tests in SIT will be randomly assigned based on a daily execution target.
9) Testers will enter a pass or fail status to each test step and attach supporting documentation of the actual result as it compares to the expected result. A linked defect will be logged at the point of the failed step.

6.3 Defect Management Process

6.3.1 Defect Identification

Defects need to be created for the following scenarios:
- Environmental issues
- Failed test scripts/steps
- Functionality gap – as evidenced by a mismatch between the expected results in the test script and the actual results, or otherwise.
- Requirements gap – When a particular functionality that is being observed is not clearly called out as being the expected result in the requirements.
- Issue tracking.
- This will be tracked via the "Issue Type" field on the defect.

Documentation, disposition of configuration and code issues identified as a result of regression testing.

Testing is complete when all identified severity 1 defects are resolved

6.3.2 Defect Definition

In the defect details or description section provide all relevant details, as applicable. Details could include:
- QAT Test Environment name
- URL and login ID, password details
- Step by step instructions to help reproduce the defect
- Information regarding any specific test data used during the test run.

Note: Always include any attachments or screenshots that will help clarify the defect better. (Use HP ALM defect module attachment features)

6.3.3 Defect Severity

Defect Severity is defined as the impact of a reported problem on the operation of the system or the user's ability to successfully use the system. The Severity may also be affected by the impact on project operations which include failures that stop or impede project activities like testing or UAT. The Severity has no default value and is a required entry when the defect is created. The Severity of a defect does not generally change over time. At the time that each defect is identified, the defect author assigns one of the four severity levels based on the criteria defined below.

Severity Code	Definition
1 - Critical	**Testing – a blocking defect:** ✓ A defect blocking execution of manual or automated test cases, OR ✓ AUT is unavailable/unusable OR ✓ Testing cannot continue OR ✓ Keeps scheduled Release from occurring **Business:** ✓ Defect causes item or condition that causes the system or business operation to be unavailable.
2 - High	**Testing:** ✓ A defect blocking execution of more than 50% total test cases. ✓ Test scenario step has stopped and additional steps cannot be completed ✓ A dependent test scenario cannot be executed until defect is resolved ✓ A workaround which is acceptable to CLIENT is not available. **Business:** ✓ Defect causes item or condition where major functionality of the system is impaired but CLIENT can conduct normal business operations.
3 – Medium	**Testing:** ✓ Impacted tests are not critical to business process and operations. ✓ Test execution can continue without significant impact to meet current test cycle objectives. ✓ A workaround which is acceptable to CLIENT is in place. **Business:** ✓ Item or condition where minor functionality is impaired.
4 – Low	**Testing:** ✓ Little or no business impact ✓ A "cosmetic" issue ✓ Test scenario can be continued to completion, with minor inconvenience. ✓ Does not stop implementation or execution of other planned tests **Business:** ✓ Item or condition that impacts the system in a minimal way with no impact to business operations

6.3.4 Defect Priority

Defect Priority is defined as the level of urgency to get a reported problem resolved. Priority is set during Triage or when a defect is assigned to be worked on. Priority may change at any time during the project based on changes in the availability of resources and the concerns related to the nature of the reported problem. Considerations affecting the Priority may include the impact on project operations which include failures that stop or impede project activities like testing, UAT activities or Release schedules. The Priority should have no default value and be an optional entry when the defect is created or modified.

Priority Code	Meaning	Resolution
1 - Urgent	The reported issue must be resolved as soon as possible. Other work activities should be interrupted as necessary to complete the resolution of an Urgent Defect. No code promotions should occur when they include Urgent Defects and all Urgent Defects must be resolved before the Sprint in which they were detected can be closed.	Change status to fixed, promote resolved code, retest

Priority Code	Meaning	Resolution
2 - High	The reported issue should be resolved within the current flow of normal work activities. High Priority Defects should be corrected with each promotion build and must be corrected before the code base containing the defect can be promoted to the UAT environment.	Change status to fixed, promote resolved code, retest
3 – Medium	The reported issue should be resolved when possible within the flow of normal work activities. A code base with Medium Defects can be promoted to UAT.	Change status to fixed, promote resolved code, retest
4 – Low	The reported issues needs to be corrected when there is extra time in the flow of normal work activities, or when the code involved is being worked on for other reasons. Low Priority defects do no impede any builds or promotions, including Release.	Change status to fixed, promote resolved code, retest

6.3.5 Defect Status and workflow

Defects are tracked through Quality Center Defect Module.
All proposed changes to baseline configuration due to defects detected during testing will follow the approved PROJECT Change Control Process.
The HPALM Defect module is configured to have the following defect statuses:

Status Value	Description of State	Valid Next States
New	Default value set when a new defect is created in ALM. Means the defect has not been processed or needs to be processed through Triage again.	• Open • Deferred • Duplicate
Open	The defect has been triaged and is now assigned to a resource to process for a resolution. Resolved defects that are failing retest or closed defects that have re-appeared can also be set to this status if the 'Assigned To' resource is known.	• In Progress • Open • Rejected • Duplicate
In Progress	A resolution to the defect is being worked on. This work may include analysis, research, seeking guidance, or applying adjustments to deliverable code.	• Open • Fixed
Fixed	The reported problem has been resolved and needs to be verified.	• Open • Closed
Deferred	The defect has been removed from consideration and should not be worked on. May result from reports of issues that are determined to be out of scope or not valid.	• New • Closed
Duplicate	Duplicate of another existing defect.	• Closed • New • Open
Rejected	The defect has been rejected for causes like: invalid test, user error, Accepted as implemented, etc.	• Closed • New • Open
Closed	The reported issue has been corrected and verified to be corrected so no other work should be done.	• New • Open

Workflow:

HP ALM will be used for logging, tracking and reporting out on defects. Listed below are the steps of defect life-cycle:

1) A defect will be logged in HP ALM if the actual result of a step differs from the expected result or if behavior that is contrary to business requirements is encountered as part of testing. A unique defect should be opened for every issue encountered. Newly logged defects are by default assigned a status of 'New'.

2) Defects will be assigned to a member of the technical team (functional or technical) following a daily defect triage. The defect status is now changed to 'Open' and the Assigned To field is updated to reflect the name of the technical resource that is assigned to review and fix the issue.

3) The functional resources will work the defect based on the severity and priority level. Defects that are being actively worked as marked as 'In Progress'. If additional details or clarification is needed, the technical resource may add comments and assign the defect to another team member to address.

4) Once a defect is resolved and the fix migrated to the test environment, the technical team member will mark the defect as 'Fixed' and change the 'Assigned To' to the tester who originally logged the defect.

5) If the test case expected result is achieved after the defect resolution is retested, the tester will attach the appropriate testing evidence to the defect and then change the status to 'Closed'. If the resolution did not achieve the expected result, the defect will be reopened for additional research. The failed defect retest documentation will be attached to the reopened defect.

1   Defect Management Process

Defects are to be tracked and reported on in the HPALM Defect Module. The Defect Management Guidelines describe the process for managing defects associated with PROJECT applications during the formal testing phases of deployment, including Regression Testing, User Acceptance Testing, and System/Performance Testing. It includes definition of responsibilities and toolset, as well as detailed information about defect tracking in HPALM.

HPALM provides workflow management that assists the project team in managing defects during the formal testing phases of a deployment. HPALM is used to record and to keep track of testing related defects as they are identified, fixed, and promoted through the system landscape.

Figure 2 depicts the typical progression of a defect through the various states in HPALM, identifying the individual(s) responsible for graduating a defect to the next stage in the process and the action that needs to be taken. The scope of re-testing required (related scenarios) will be mutually agreed by the CLIENT   and SI Team Leads.
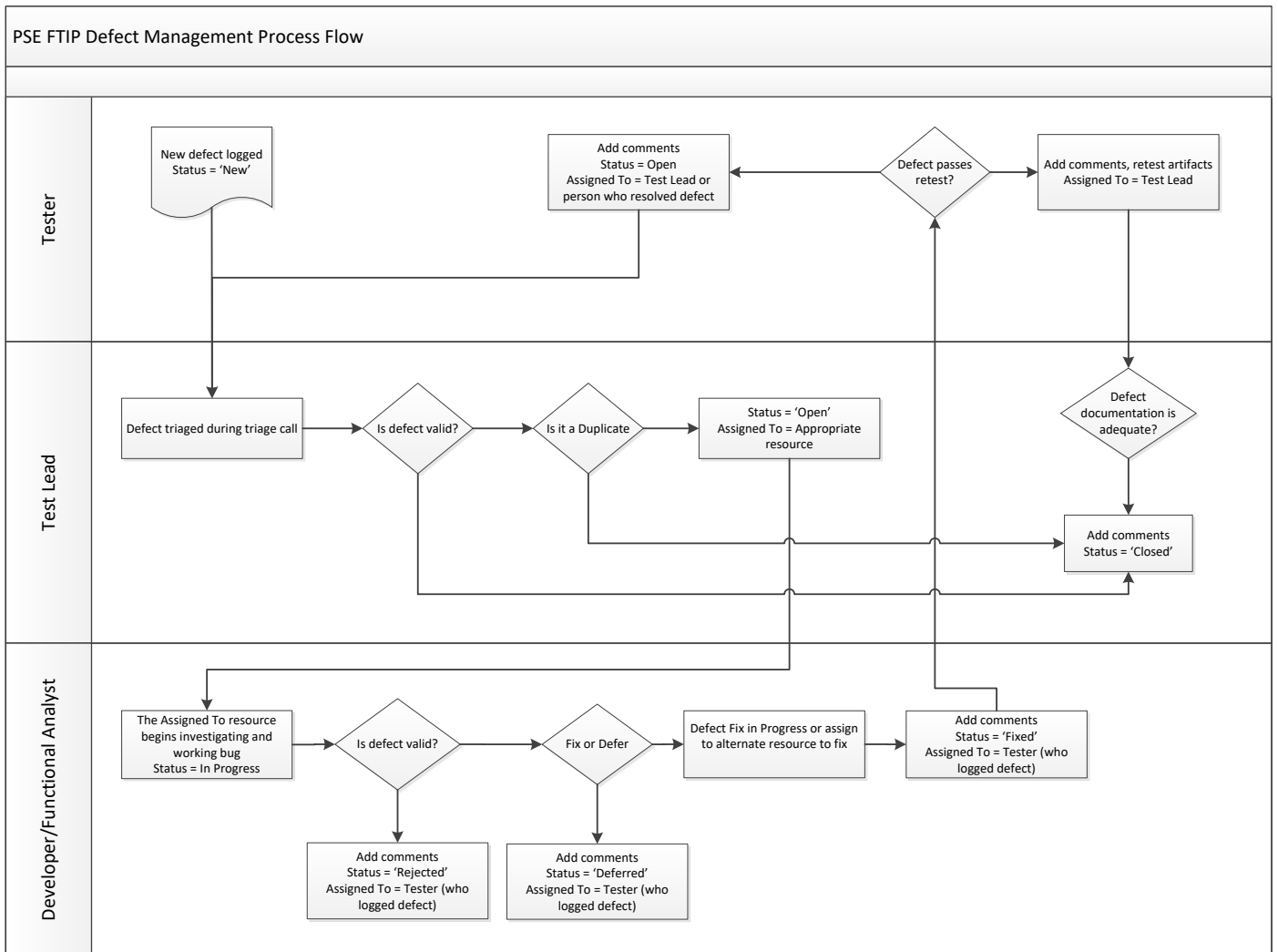
Figure 3: Defect Management Workflow

A defect record is created in HPALM and linked to the Test script record. A defect record clearly states the problem found during testing. The Defect Coordinator and Team Leads review the problem stated in the defect during defect evaluation. The defect is assigned to a Defect Specialist who determines and develops a solution and makes all updates to required documentation. The Defect Coordinator reviews the defect records to verify that the resolution is clearly stated and related documents are uploaded. The Team Lead reviews the resolutions that have been developed. If the Team Lead agrees with the resolution, the fields of the defect record are completed and defect's state is changed to Resolved, indicating that the fix is now ready to be moved / transported into the QA environment.

If it is determined that the defect requires a CR, then the tester updates the defect record in HPALM accordingly and assigns it to the Project Leadership for disposition. If a change request is selected, the information for the defect must be entered into HPALM along with the Change Request Form and Project Change Control Procedures are followed.

Once a defect is corrected by the Defect Team and incorporated into the appropriate environment, the change is placed under strict configuration management control. Not only must this software unit be retested to determine that it has been corrected, but reasonable and appropriate level of testing needs to be performed to ascertain whether any previously working software units have been adversely impacted by this latest change.

6.4 HPALM folder structure & naming convention -

A separate HP ALM project – ECC & BW migration to HANA – has been created under the DEFAULT domain for tracking the test-related artifacts for this initiative.

6.5 Test Deliverables -

- ➢ Test Plan document
- ➢ Test Scripts (in HPALM)
- ➢ DSR (Daily Status report) includes Defect summary
- ➢ Test Exit Report
- ➢ Lessons Learnt (to be incorporated in the overall project lessons learnt document)

- ➢ Testing Phase Acceptance Report

Completion of QE1/QB1 and TE1/TB1 environment regression testing, defects and risks documented per program governance standards.

Performance Testing Phase Approval Report
Facilitated review of consolidated phase / work stream documentation. Summary acceptance and sign-off to proceed to next work stream phase.
Resolution of all Critical defects completion of technical development, associated documentation and unit test execution with all issues, defects and risks documented per program governance standards.

7. Assumptions, Dependencies & Risks

7.1 Assumptions

Availability of business users for UAT
Availability of resources for regression testing & integration testing
It is our expectation that SAP will be Accountable for any functionality/transaction originating within SAP
It is our expectation that CLIENT   will be Accountable for any functionality/transaction originating outside of SAP
It is our expectation that both SAP/CLIENT   collaborate to validate these transactions within and outside of SAP
It is our expectation that HA/DR testing process/test scripts will leverage as much content as possible from BW efforts
CLIENT   will be responsible for testing anything pertaining to the Bill Code Enhancement Project
Test Execution is assumed to be done in HP ALM
Test Execution Processes – assumed to be existing processes built within HP ALM
Test Data – within the four walls of SAP 4 walls SAP SMEs are expected to help provide Test Data
Test Data - CLIENT   SMEs will help provide data for any external transactions or z-transactions (as part of their Test Case development efforts)

8. Entrance/Exit Criteria

8.1 Regression & Interface Testing Entrance Criteria

Entrance Criteria Description
Test Environment is available, all transports are complete, and a Smoke Test has been done by the Test Team
The Regression Resource Plan and Test Schedule are approved
Testers have been identified, scheduled and assigned
Test data identification and creation (where applicable)
The user accounts required for testing are set up and appropriate security profiles assigned
Test scripts prioritized & reviewed and approved by functional leads
HP ALM testing tool set up complete: users have access; test cases have been uploaded, and moved to the lab for execution.
All logistics including relevant software/hardware/access is in place for the testers.

8.2 Regression & Interface Testing Exit Criteria

100% of Severity 1 (Critical) and Severity 2 (High) defects are resolved or have an agreed upon plan for a resolution.
100% of Severity 3 (Medium) defects are resolved or have an agreed upon resolution plan post deployment
All unique test phase assumptions have been met as defined in the sections above
80% of the in-scope test cases are complete with a 'Pass' status and results documented.
Test scenarios/ scripts identified and reviewed and approved by functional leads and business users.

Test Strategy
CUSTOMER

<Name>

19.01.2017

Test Strategy Document Details	
DOCUMENT NAME & LOCATION:	Test Strategy – CUSTOMER <add file location> SubType: Approach & Strategy
DOCUMENT VERSION:	0.1 DRAFT
DATE:	24.01.2017
READERSHIP:	• CUSTOMER and SAP Programme Managers • CUSTOMER and SAP Team Leads • CUSTOMER and project team members • All interested parties who are involved with planning and execution of tests and testing activities. It remains as a document for reference.

Amendment History

Version	Date	Comment	By
V0.1	27.01.2017	Initial Draft	
V0.2		Updated after all comments received	
V0.3		Updated after all comments received	

Approval

Approver	Name	Date	Email confirmation
CUSTOMER Programme Manager			
CUSTOMER Design Authority			
SAP Programme Delivery	<<<NAME>>>		
SAP Programme Manager	<<<NAME>>>		
SAP Design Authority	<<<NAME>>>		

Associated Reference Documents:

Title of Document	Version No / File Name / Location
String Test Approach	To be delivered during kick off session, prior to entry into String Test Phase
System Integration Test Approach	To be delivered during kick off session, prior to entry into SIT Test Phase
Performance Test Approach	To be delivered as part of Performance Test Strategy, prior to entry into Performance Test Phase
User Acceptance Test Approach	To be delivered during kick off session, prior to entry into UAT Test Phase
User Stories	To be delivered prior to entry into the Realisation Phase
Epics	To be delivered prior to entry into the Realisation Phase
Functional Specifications	To be delivered prior to entry into the Realisation Phase

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4 DOCUMENT OVERVIEW

4.1 Purpose

This document outlines the way in which the testing will be performed for the CUSTOMER. This includes which testing phases to include, scope definition, time frame of testing, physical location of tests, organisation of testing phases and issue resolution. This document aims to describe the following elements of testing:

- Definition of test phases – see section 6 Test Phases below

- Entry and exit criteria for each test phase – see section 6 Test Phases below

- Testing responsibilities and resource requirements – see section 12.2 below

- Approach to build cycle unit testing of SAP configuration and developments – see section 6.2 Unit Testing below

- Approach to integration testing of SAP modules and developments – see section 6.4 System Integration Testing (SIT) below

- Approach to performance testing of SAP modules and developments – see section 6.7 Performance Testing (PSV) below

- Approach to support of user acceptance testing – see section 6.6 User Acceptance Testing (UAT) below

- Approach to continuous involvement of Customer resources throughout testing – see section 12.2.2 CUSTOMER test team roles & responsibilities below

- Approach to the testing of Project defined SAP authorization roles – see section 16 Security Testing (Roles and Authorisations) below

- Scope of testing – the high level process scenarios – see Figure 2 – ZIM High Level Process Scope

- Approach to Positive and Negative Testing – see section 10 Positive and Negative Testing below

- Risks and their mitigation strategy & assumptions – see section 19 Risks, Issues, Assumptions, Dependencies & Decisions (RAIDD) below

- Acceptance criteria for build cycle unit testing, integration testing, performance testing, and user acceptance testing are detailed in section 6 Test Phases below.

Following approval of the Testing Strategy document, and completion of the solution workshops, detailed test plans will be produced for each phase of testing.

4.2   Context and Intended Audience

The context of this strategy specifically applies to the CUSTOMER Project.

The intended audience for this document includes, but is not limited to:

•   Project management from CUSTOMER Project Teams and SAP as approvers

•   Functional and Technical solution architects

•   Appropriate SAP Subject Matter Experts

•   Implementation Partners <if any> apart from SAP

4.3   Test Objective

The objective of testing for all parties engaged is to:

   I.   Find important problems early

  II.   Find as many problems as possible, as early as possible - If functionality is available to test meaningfully, then tests will be done.

 III.   Provide advice on the perceived delivery and business risks throughout the project - Keep the relevant project and business stakeholders informed of the quality risks, both potential and actual.

The key methods applied for testing are:

  A.   Test approach is risk based - Tests will be designed to cover business processes and will be prioritized on the basis of business risk, technical complexity and impact of failure.

  B.   Usability and Re-usability - Tests will be written to one standard regardless of target test phase so that anyone with a working knowledge of the solution can execute them

  C.   Componentization - Tests will be constructed from components that can be re-used within the Project and beyond the Project.

  D.   Use of appropriate data - Migrated, generated and test generated data will be used as is appropriate to the test in hand

  E.   Test management approach is compliant with SAP Activate procedures

  F.   Regular Review and Adjustment - Throughout the build phase the approach will be reviewed and adjusted to meet the needs of the project delivery.

5   TEST SCOPE

5.1   In Scope

The scope will clarify what is or is not to be tested to avoid confusion. As part of the testing, SAP will perform testing of the following scope:

A.   High Level Functional Requirements

The high level function requirements are listed in <<Exhibit X of the Statement of Work>>. This will be the functional testing scope across all the test phases.

B. High Level Non-Functional requirements

The high level nonfunctional requirements that are in scope will be defined in the performance test approach and design documentation.

C. Test Phases

The test phases in scope of this test strategy are:

- Unit Testing

- String Testing

- System Integration Testing (SIT) - Core scripts and process variants will be the responsibility of SAP to plan, prepare and execute, whilst the data variants will be the responsibility of CUSTOMER

- Performance testing of certain bespoke non-functional requirements

- CUSTOMER user acceptance testing (UAT) - SAP in a support function only

D. Physical Boundary of the System Under Test

The physical boundaries of the system under test will be determined by the solution design documentation. SAP will be responsible for testing all interfaces from SAP to middleware. CUSTOMER will be responsible for testing all other middleware. This co-ordination will be managed jointly by CUSTOMER and SAP – see Figure 1 - Diagram to show physical boundaries of system under test and responsibility below:
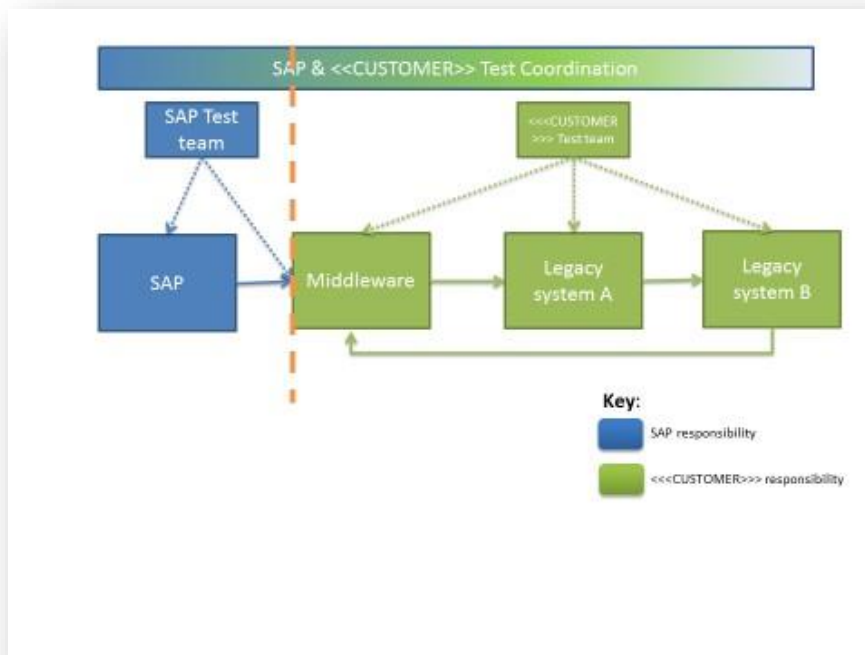
Figure 1 - Diagram to show physical boundaries of system under test and responsibility

E. User Roles

User roles will be tested as per the roles and authorization requirements. Please see section 16 Security Testing (Roles and Authorisations) below for more details. Only roles and authorizations that are

applicable to the test scenarios in scope will be tested. This will be dependent on roles and authorizations being set up in the test environment.

F. Data Flows

During integration testing, data flows will be tested to see if they will successfully flow in an end to end scenario. A data flow is an abstract representation of the sequence and possible changes of the state of data objects, where the state of an object is any of creation, usage, or destruction[1]. Whilst there may be a number data flow variants that are applicable to a test case, only one data flow per test case will be tested.

G. WRICEFs

All WRICEF items that are listed in Exhibit B will be tested as part of the scope. They will be tested explicitly as part of unit testing and build cycle testing, and implicitly during SIT and UAT.

H. Logical components of the system under test

The logical SAP components of the system under test are described in Figure 2 – ZIM High Level Process Scope below. Whilst this is a snap shot at the time of writing, please refer to the process scope document for the latest version.
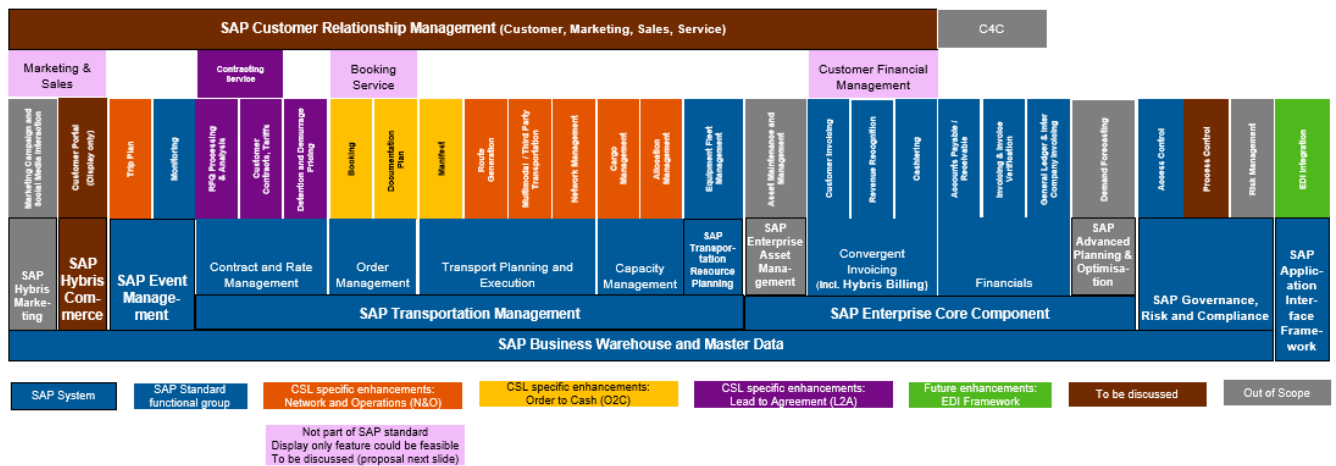
Figure 2 – ZIM High Level Process Scope

5.2   Out of scope

Anything that is not mentioned in this test strategy, and not is in scope of testing will be considered as out of scope for testing. This will include:

- SAP Solution Manager Blueprint module propagation and filling.

---

[1] Reference: ISTQB Glossary

- Any test phases not listed above such as:
  - Security Penetration testing
  - Infrastructure testing
  - Backup and recovery testing
  - Operational readiness and acceptance testing execution
  - Cutover testing
  - Disaster recovery testing / OAT
  - Testing of legacy / third party systems
- Test Support Packages
- Detailed Data Migration Testing (considered part of the Data Migration work stream activities)
- Change Management during this programme
- Non SAP systems (will be conducted by CUSTOMER)
- Test Data Creation other than those created by the business processes being executed during the course of testing.
- Any other test activities that are not explicitly referred in the Test Phases section
- User acceptance test script build and execution (SAP is in a supporting role only)
- Testing of subsequent rollouts post go-live
- Testing interfaces other than what is described above
- Downstream systems full integration of non-SAP systems to be the responsibility of CUSTOMER

6   TEST PHASES

The following sections provide details on how each level of testing will be conducted, the teams involved and the outcomes being sought. Please see 20.3 Appendix: Test Levels below for further explanation on the various test levels, their purpose and scope. Testing will be driven by the testing team throughout all levels of testing, except unit testing, and will be supported by the functional and leadership team.

The testing phases are aligned to the development life cycle phases to ensure early development of test requirements and early detection of errors. Each major cycle in the development process is assessed, verified, validated and tested.

Test Phase	SAP Test Team	SAP Build Team	SAP Design Team	CUSTOMER Test Team	CUSTOMER Legacy Teams	Programme Mgmt.
Unit	I	R	C	C / I		I
String Test	I	R	C	C / I		I
Integration (Core Scripts and Process Variants)	R / A	C	C	R	R	I
Integration (Data Variants)	C	C	C	R / A	R	I
Regression	R / A			R / A	R	I
UAT	C			R / A	R	I

6.1   High Level Timeline of test phases

A high level timeline showing the test phases steps is shown in Figure 3 - Test Phase Schedule below:

<<< TO ADD AN APPROPRIATE PLAN >>>

Figure 3 - Test Phase Schedule

6.2   Unit Testing

Unit Testing	
Definition	Smallest testable part of the system is tested such as WRICEF, config item, interfaces etc. to determine if they behave as expected, as per the requirements and design.
Approach	Unit testing is part of the development delivery, and as such, the design will be tested as part of the development sign off, by unit testing the components / work item. The testing approach can either be a unit test or a string test, whatever is most relevant to the component under test. These tests will be conducted by the build team.
Objectives	To confirm that individual transactions and WRICEF developments have been correctly configured.
Scope	The scope of unit testing is defined by the functional scope contained within the specification documents of which 100% will be unit tested. Each and every WRICEF must be unit tested.

---

[2] The Table 1 - RACI matrix for test phases table details the involvement of teams and individual in each of the test phases using the RACI definition:

- **R**esponsible (Those who do the work to achieve the task, there can be multiple resources responsible).
- **A**ccountable (The resource ultimately accountable for the completion of the task)
- **C**onsulted (Those whose opinions are sought. 2 way communication)
- **I**nformed (Those that are kept up-to-date on progress. 1 way communication)

Location		Onshore, Nearshore, Offshore SAP teams
Team-Level Roles & Responsibilities	Business	• Not applicable
	Technical	• Review the content / quality of unit testing. • Provide advice with regards to unit test data • Develop and execute unit tests (includes required test data) • Provide documented defect resolution • Provide documentary evidence to support testing
	SAP Test	• Support the teams as required and review the content / quality of unit testing. • Monitor progress of unit testing in accordance with schedules
	CUSTO MER Test	• Not applicable
Data		Manufactured to meet the needs of the test.
Environment		• TBD
Security		Other than any role based testing, all unit tests will be run with only generic SAP ALL user ids used.
Deliverables		• Documented evidence that all tests have been completed • Documented evidence to be stored in Solution Manager
Entry Criteria		• Project charter complete with scope approved. • Developments completed. • Testing strategy (this document) has been approved by all parties.
Exit Criteria		• Approved documents – Technical specification • Unit tests added to Solution Manager and attached to it any variations of the transaction are listed. • All critical defects have been resolved.
Signoff		• Technical and Test signoff the unit test handover document.
Tools		• Development tools used for development • The development teams are responsible for monitoring the progress of unit testing

6.3   String Testing

String Testing		
Definition		String testing is part of the development build cycles. The string tests are different to the unit tests in that they will be conducted by the test team, where epics will be used to derive the string tests The string testing will test the SAP elements of the core processes and process variants to test its functionality.
Approach		The approach to string testing is to define the testable parts of the core processes and process variants. In Solution Manager 7.2, reusable components will be built in the business components module. These modules can be strung together to create build cycle tests and system integration tests as appropriate.
Objectives		• Validate and verify the system components against use case documentation (SAP components only) • Identify and resolve defects
Scope		The scope of string testing is defined by the functional scope contained within the specification documents. All functionality and WRICEF included in scope of a build cycle will be tested.
Location		Onshore, Nearshore, Offshore SAP teams
Team-Level Roles & Responsibilities	Business	• Not applicable
	Technical	• Support in defect resolution • Provision of QA environment • Provision of relevant test data in SAP • Provide documentary evidence to support defect fixes

	SAP Test	• Define the scope of build cycle testing for each cycle • Review the content and quality of build cycle testing. • Develop and execute build cycle tests (includes required test data) • Provide documented defect evidence and retest evidence • Monitor progress of build cycle testing in accordance with test schedule
	CUSTOMER Test	• Not applicable
Data		Manufactured to meet the needs of the test.
Environment		• TBD
Security		Other than any role based testing, all build cycle tests will be run with only generic SAP ALL user ids used.
Deliverables		• Documented evidence that all tests have been completed • Documented evidence to be stored in Solution Manager 7.2
Entry Criteria		• Unit testing has been completed • There are no critical defects identified in unit testing • Documentation has been updated to reflect the current state of the system if there are any changes from unit testing • Tests have been prepared ready for test execution • Tests are scheduled in a test plan and allocated to testers • Test environment is successfully installed, configured, functioning properly and accessible • Testing tools have been successfully installed and are functioning properly and appropriate access has been given. • Test support is engaged and ready to assist (such as the build team to help fix defects) • Kick off for build cycle testing has been conducted whereby all testers and support resources understand the approach, scope, objectives of the test phase
Exit Criteria		• Test cases scheduled for build cycle testing have all been executed • There number of critical, high, medium and low defects are within the numbers agreed in the SOW • String Test Completion report has been completed
Signoff		• String Test Completion report signoff by SAP and CUSTOMER project management.
Tools		• Development tools used for development • The development teams are responsible for monitoring the progress of unit testing

6.4   System Integration Testing (SIT)

System Integration Testing	
Definition	Testing single features in an integrated process. This could include testing interactions between different systems to verify the execution of components and interfaces between modules within the solution. Testing dependencies is a primary function of this test phase, therefore regression testing will also be included.
Approach	Testing of the core process, process variants and data variants, as identified and agreed during the solution workshops. Testing to include third party and legacy systems as defined in the scope below. Core processes and process variants to be planned, prepared and managed SAP. Data variants to be planned, prepared and managed by CUSTOMER, to allow for early user enablement, prior to UAT. When requesting CUSTOMER to execute test steps in a legacy or third party system, a "defect" will be created in Solution Manager 7.2 which will be assigned to the appropriate contact person for that system. The test step can be progressed by the team and sent back to the requestor. By using the defect module of Solution Manager 7.2, the functionality of the defect management can be used to exchange comments and queries and attachments. The requests will be clearly marked to separate them from actual defects.

		There will be 2 cycles of SIT: • Cycle 1: Core process scripts – XYZ number of tests • Cycle 2: Process variant scripts – XYZ number of tests • Cycle 3: Core process and process variant scripts using migrated test data, authorisations and batches – XYZ number of tests
Objectives		To validate that all software module dependencies are functionally correct and that data integrity is maintained between separate modules for the entire solution
Scope		The scope of system integration testing is defined by the core processes, process variants and data variants derived from the solution workshop. The systems tested include legacy and third party systems, where inputs and outputs to and from systems will be tested. SAP will execute the tests within SAP and to the message hub. All other tests (e.g. from message hub to third party and system and back into SAP) will be tested by CUSTOMER
Location		Onshore, Nearshore, Offshore SAP teams Onshore, Nearshore, Offshore CUSTOMER teams (for third party and legacy systems testing, and for data variant testing)
Team-Level Roles & Responsibilities	Business	• Not applicable
	Technical	• Provision of QA environments • Provision of relevant test data in SAP and third party / legacy systems • Connection of third party / legacy systems • Support in defect resolution
	SAP Test	• Define the scope of system integration testing for each phase • Review the content and quality of system integration testing for core processes and process variants. • Develop and execute system integration tests (includes required test data and authorisations where applicable) • Provide documented defect evidence and retest evidence • Monitor progress of system integration testing in accordance with test schedule
	CUSTO MER Test	• Plan, prepare and support execution of data variant tests • Progress test steps in legacy and third party systems • Defect resolution of legacy and third party systems defects
Data		• Cycle 1 and Cycle 2 - Manufactured to meet the needs of the test (unless migrated test data is available) • Cycle 3– Migrated test data
Environment		• CUSTOMER QA
Security		• Cycle 1 and Cycle 2 - run with only generic SAP ALL user ids • Cycle 3 – Role based testing, assuming authorisations is available for test.
Deliverables		• Documented evidence that all tests have been completed in the Test Your Processes app • Documented evidence of defects to be stored in Solution Manager 7.2
Entry Criteria		• The system is testable and there are no missing functionality, gaps or WRICEFs for that wave or phase • The environment sanity tests have been conducted and have all passed successfully • The required legacy systems are available and are successfully connected to the environment • Test data is defined and prepared, and available in the test environment, ready for testing • There are no critical defects outstanding • All the necessary documentation, design, and requirements information should be available that will allow testers to operate the system and judge the correct behaviour

	• Documentation has been updated to reflect the current state of the system if there are any changes from system testing • Test automation scripts have been prepared ready for test execution • Tests are scheduled in a test plan in the Test Your Processes app • Test environment is successfully installed, configured, functioning properly and accessible • Testing tools have been successfully installed and are functioning properly and appropriate access has been given. • Test support is engaged and ready to assist (such as the build team to help fix defects) • Kick off for system integration testing has been conducted whereby all testers and support resources understand the approach, scope, objectives of the test phase. (Individual kick offs may be held for each phase during system integration testing).
Exit Criteria	• There number of critical, high, medium and low defects are within the numbers agreed in the SOW • The system has been tested with migrated data • The system has been tested with all integration systems in scope as specified in the functional specification. • Test cases scheduled for system integration testing have all been executed • There number of critical, high, medium and low defects are within the numbers agreed in the SOW • System Integration Test Completion report has been completed
Signoff	• System Integration Test Completion report signoff by SAP and CUSTOMER project management.

Tools	• The two apps that will be used (featuring test automation tool) for S/4HANA Cloud edition under Manage Your Solution:
	   o Manage Your Test Processes: to create test case
	   o Test Your Processes: to create test plan (using test case) and to execute test plan

6.5   Regression Testing

Regression Testing	
Definition	Selective, time based retesting of previous tests to: • identify any defects that have been previously fixed are not reoccurring • check that no other previous working functions have failed • check that new transports / changes have not created new problems This is a quality control measure to check that the core processes are working as per the business requirements, and that standard code has not been affected. This will be conducted in parallel SIT.
Approach	Regression testing will reuse the automation test scripts that were created for SIT. The tests will be prioritised based on the following criteria: • Number of defects during SIT • Criticality of the process • Number of interfaces
Objectives	To check for any defects on the build that has already been tested.
Scope	The test team will reuse test scripts created in SIT. These core processes will only be automated for the SAP system. For legacy / third party systems, the test will be stubbed if appropriate. Regression testing will be time-boxed to XX weeks where tests will be executed and defects will be fixed and retested. Where applicable, batches will be tested.

			Handover of test automation scripts to CUSTOMER once regression testing has been completed.
Location			Onshore, Nearshore, Offshore SAP teams Onshore, Nearshore, Offshore CUSTOMER teams (for third party and legacy systems testing, and for data variant testing)
Team-Level Roles & Responsibilities		Business	• Not applicable
		Technical	• Support in defect resolution • Provision of QA environment • Provision of relevant test data in SAP and third party / legacy systems • Connection of third party / legacy systems
		SAP Test	• Define the scope of the regression testing phase • Execute regression tests (including required test data and authorisations where applicable) • Provide documented defect evidence and retest evidence • Monitor progress of regression testing in accordance with test schedule
		CUSTO MER Test	• Progress test steps in legacy and third party systems • Defect resolution of legacy and third party systems defects
Data			• Migrated converted test data to be used
Environment			• TBD
Security			• Role based testing, assuming authorisations is available.
Deliverables			• Documented evidence in that all tests have been completed • Documented evidence to be stored in Solution Manager 7.2
Entry Criteria			• The system is fully built and there are no missing functionality or WRICEFs • The environment sanity tests have been conducted and have all passed successfully • The required legacy systems are available and are successfully connected to the environment • There are no critical defects outstanding • All the necessary documentation, design, and requirements information should be available that will allow testers to operate the system and judge the correct behaviour • Documentation has been updated to reflect the current state of the system if there are any changes from system testing • Tests have been ready for test execution • Tests are scheduled in a test plan in the Test Your Processes app • Test environment is successfully installed, configured, functioning properly and accessible • Test support is engaged and ready to assist (such as the build team to help fix defects) • Kick off for regression testing has been conducted whereby all testers and support resources understand the approach, scope, objectives of the test phase.
Exit Criteria			• There number of critical, high, medium and low defects are within the numbers agreed in the SOW • The system has been tested with migrated data • The system has been tested with all integration systems in scope as specified in the functional specification. • Test cases scheduled for system integration testing have all been executed • There number of critical, high, medium and low defects are within the numbers agreed in the SOW • Handover of test automation to CUSTOMER has been done • System Integration Test Completion report has been completed
Signoff			• System Integration Test Completion report signoff by SAP and CUSTOMER project management. Regression testing summary will be included in the System Integration Test Completion report.

Tools	• The two apps that will be used (featuring test automation tool) for S/4HANA Cloud edition under Manage Your Solution:
	  o Manage Your Test Processes: to create test case
	  o Test Your Processes: to create test plan (using test case) and to execute test plan

6.6 User Acceptance Testing (UAT)

<table>
<tr><td colspan="3" align="center">User Acceptance Testing</td></tr>
<tr><td>Definition</td><td colspan="2">The business owners agrees on the changed functionality. The tests are run by the key business users.</td></tr>
<tr><td>Approach</td><td colspan="2">UAT test planning, preparation and execution will be conducted by CUSTOMER. SAP will support the test management effort for this phase.
The UAT phase can re-use the SIT test automation scripts as required or create new scripts.
A kick off will be conducted to define the approach, scope and test plan for UAT.
There will be 2 cycles of UAT:
• Cycle 1: Core process scripts – XYZ number of tests
• Cycle 2: Process variant scripts – XYZ number of tests</td></tr>
<tr><td>Objectives</td><td colspan="2">To check if the system can support day-to-day business and user scenarios and ensure the system is sufficient and correct for business usage.</td></tr>
<tr><td>Scope</td><td colspan="2">Manual testing will be conducted by CUSTOMER.
Automation testing will be run by CUSTOMER, if required.</td></tr>
<tr><td>Location</td><td colspan="2">Onshore, Nearshore, Offshore CUSTOMER teams (for third party and legacy systems testing, and for data variant testing)</td></tr>
<tr><td rowspan="4">Team-Level Roles & Responsibilities</td><td>Business</td><td>• Develop and execute UAT tests (includes required test data) for any applicable defect fixes
• Execute UAT tests as per requirements
• Support in defect resolution
• Provide documentary evidence to support defect fixes</td></tr>
<tr><td>Technical</td><td>• Provision of pre-prod environment
• Provision of relevant test data in SAP and third party / legacy systems
• Connection of third party / legacy systems</td></tr>
<tr><td>SAP Test</td><td>• One resource to support UAT test management</td></tr>
<tr><td>CUSTOMER Test</td><td>• Organise test team with key business resources
• Plan, prepare and execute UAT tests
• Progress test steps in legacy and third party systems
• Defect resolution of legacy and third party systems defects</td></tr>
<tr><td>Data</td><td colspan="2">• Cycle 1 and Cycle 2 - Migrated test data
• Business users to define the data that they want to use for testing</td></tr>
<tr><td>Environment</td><td colspan="2">• TBD</td></tr>
<tr><td>Security</td><td colspan="2">• Cycle 1 and Cycle 2 – Role based testing</td></tr>
<tr><td>Deliverables</td><td colspan="2">• Documented evidence that all tests have been completed
• Documented evidence to be stored in Solution Manager 7.2</td></tr>
<tr><td>Entry Criteria</td><td colspan="2">• The system is testable and there are no missing functionality, gaps or WRICEFs for that wave.
• The required legacy systems are available and are successfully connected to the environment
• Test data is defined, ready and available in the test system
• There are no critical defects outstanding
• Tests have been prepared ready for test execution</td></tr>
</table>

	• Tests are scheduled in a test plan and allocated to testers • Tests are scheduled in a test plan in the Test Your Processes app for test automation • Test environment is successfully installed, configured, functioning properly and accessible • The environment sanity tests have been conducted and have all passed successfully • Test support is engaged and ready to assist (such as the build team to help fix defects) • Kick off for user acceptance testing has been conducted whereby all testers and support resources understand the approach, scope, objectives of the test phase. (Individual kick offs may be held for each phase during user acceptance testing).
Exit Criteria	• The number of critical, high, medium and low defects are within the numbers agreed in the SOW • The system has been tested with all integration systems in scope as specified in the functional specification. • Test cases scheduled for system integration testing have all been executed • User Acceptance Test Completion report has been completed
Signoff	• User Acceptance Test Completion report signoff by SAP and CUSTOMER project management.

Tools	• Solution Manager to store blueprint requirements and any specific manual tests
	• The two apps that will be used (featuring test automation tool) for S/4HANA Cloud edition under Manage Your Solution:
	    o Manage Your Test Processes: to create test case
	    o Test Your Processes: to create test plan (using test case) and to execute test plan

6.7   Performance Testing (PSV)

Performance Testing		
Definition		Testing to determine the performance of a software product. Performance testing will help identify bottlenecks in the system, provide recommendations for performance tuning, and understand compliance with performance goals and requirements.
Approach		A performance test strategy will determine the performance approach, which will be produced together with CUSTOMER. Generally the approach will be to: • Define the current baseline • Create performance tests • Gather and analyse test data • Produce a report of recommendations
Objectives		To measure the quality attributes of the system, such as scalability, reliability and resource usage, to make informed decisions related to the system.
Scope		There will be one cycle of performance testing. The scope will be determined in the test strategy.
Location		Onshore and Nearshore SAP team Onshore and Nearshore CUSTOMER team (for technical support)
Team-Level Roles & Responsibilities	Business	• Not applicable
	Technical	• Define non-functional requirements • Gather baseline data • Develop and execute performance tests (includes required test data) for any applicable defect fixes • Support in defect resolution • Provide documentary evidence to support defect fixes

	SAP Test	• Performance test team to scope and plan performance test scripts • Performance test team to prepare performance test strategy • Performance team to execute performance tests and produce a recommendation report
	CUSTO MER Test	• Identify and allocate technical resource to support the performance testing
Data		• Migrated test data to be used
Environment		• TBD
Security		• Role based testing
Deliverables		• Documented evidence that all tests have been completed • Performance test completion report, including performance related recommendations
Entry Criteria		• The system is fully built and there are no missing functionality or WRICEFs • The required legacy systems are available and are successfully connected to the environment • There are no critical defects outstanding • Tests have been prepared ready for test execution • Tests are scheduled in a test plan and allocated to testers • Test environment is successfully installed, configured, functioning properly and accessible • The environment sanity tests have been conducted and have all passed successfully • Testing tools have been successfully installed and are functioning properly and appropriate access has been given. • Test support is engaged and ready to assist (such as the build team to help fix defects) • Kick off for user acceptance testing has been conducted whereby all testers and support resources understand the approach, scope, objectives of the test phase. (Individual kick offs may be held for each phase during user acceptance testing).
Exit Criteria		• There number of critical, high, medium and low defects are within the numbers agreed in the SOW • The system has been tested with migrated data • The system has been tested with all integration systems in scope as specified in the functional specification. • Test cases scheduled for system integration testing have all been executed • Performance Test Completion report has been completed
Signoff		• Performance Test Completion report signoff by CUSTOMER project management.
Tools		• <<<Chosen PERFORMANCE TEST TOOL>>>

7   TEST APPROACH

The approach to testing for this programme has been influenced by the following:

- CUSTOMER Test Principles and Guidelines

- SAP's Activate Methodology

- SAP Manage Your Solution processes

SAP's functional testing methodology supports the wave / sprint approach used in this programme as shown in Figure 4 - Test execution during and across Waves and Sprints below.
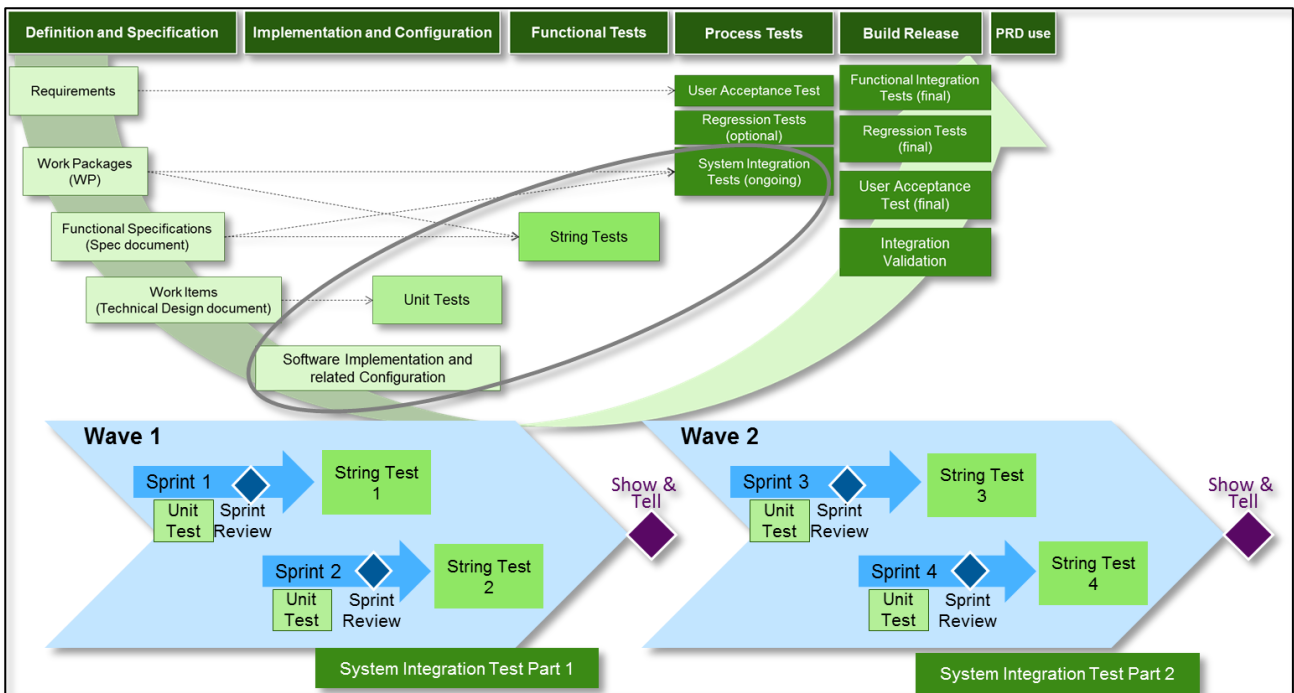
Figure 4 - Test execution during and across Waves and Sprints

Each wave will comprise of a number of sprints. Each sprint will have a unit testing and a string testing phase. System integration testing and basic UAT testing can start in each wave too, which will use test automation. After this, a show and tell session will be done by the test team to demonstrate the solution developed in the wave to CUSTOMER. Some basic regression testing will also be done after a wave has completed to check that previously working functionality is still functioning as expected. A final system integration validation phase and regression testing will take place once the waves are completed. After this, a final UAT test phase will be conducted by CUSTOMER

7.1   Testing lifecycle: The Test Approach

7.1.1   *Functional Test Automation*

The key activities that will take place during the testing phase is shown in Figure 5: Test Automation Approach **Error! Reference source not found.**. Automation Testing is not mandatory, but recommended. It not only helps to verify the implemented business-critical processes, but also reduces effort in manual testing. The main objective of using the testing apps is to check if business processes are implemented properly and validate the business scenarios.

Test Preparation Activities

- Configure Test Automation Tool
- Determine Testing Scope
- Create Test Process or Test Script
- Add Test Process Step and Record Actions
- Create Data Binding Parameters
- Edit Action Data and Change visibility of Test Process

Test Plan Creation and Execution

- Create Test Plan
- Change Action Data Using Data Variant
- Adapt Test Plan to Customizing Changes
- Run or Execute Test Plan
- Correct and Re-run Test Plan

Figure 5: Test Automation Approach

1. Test Preparation

Test preparation activities are conducted using the Manage Your Test Processes app in the FIORI Launchpad. The purpose of this deliverable is to prepare test processes or test scripts for testing the business processes configured in the solution using the Test Automation tool. The tool works only for SAP Cloud Identity Provider tenant configured as Identity Provider.

A. Configure Test Automation Tool

The purpose of this task is to describe pre-requisites and configuration steps for Test Automation tool

B. Determine Testing Scope

The purpose of this task is to:
   i.   Define end-to-end business flow
   ii. Determine required roles for testing your process
   iii. Accumulate test data for recording actions

C. Create Test Process or Test Script

The purpose of this task is to prepare custom test processes that defines business scenarios. There are some standard test processes (as per SAP best practice) that are provided as part of the test tool.

A test process includes test process steps and each step is a set of actions recorded.

D. Add Test Process Step and Record Actions

The purpose of this task is to add test process steps in a test process and then record actions for each test process step.

E. Create Data Binding Parameters

The purpose of this task is to create data binding parameters for editable actions and use them. The parameters can be created by reading values while recording using "Read" option. The read values get stored in parameters. The parameters are then used in subsequent steps where real-time value are called during execution. A value from a previous step (source) can also be called in the current step (target) during execution.

F. Edit Action Data and Change visibility of Test Process

The purpose of this task is to modify actions after recording and manage visibility of the changes in test plan. The recorded actions can be modified in following ways:

1. Mark action as "Optional": If the optional action fails while execution, it will have no impact on the overall test plan status.
2. Change values: The recorded action values can be changed as per business need. The values can be selected as System Variable or Input Help using F4.
3. Select or change data binding parameter: The data binding parameter can be selected using F4.
4. Change technical details: The technical details for each action can be changed as per business need.
5. Add/delete actions: The actions can be added or deleted from the test process step.

Make the changes "Visible in test plan" or "Not visible in test plan" using "Change Visibility" option.

Deliverables: Approved test scope, Automation test scripts / processes

2. Test Plan Creation and Execution

The purpose of this deliverable is to validate end-to-end business flow configured in the solution using the Test Your Processes Automation tool. This is done in two phases:

i)   test plan preparation – tasks A to C below
ii)   test plan execution – tasks D and E below

1. Create Test Plan

The purpose of this task is to create the test plan. This is done by including standard or custom test processes (created using Manage Your Test Processes app) in the sequence that defines end-to-end business flow. The test plan once created cannot be changed. Only the action data can be changed using data variants.

2. Change Action Data Using Data Variant

The purpose of this task is to edit action data using data variants. The data variant can be created to change action values and select data binding parameters. The existing data variant can be edited, deleted and can be set as default.

3. Adapt Test Plan to Customizing Changes

The purpose of this task is to adapt some of the test processes in the test plan as per the customization in SSC UI. Currently, "Change adaptability" feature is valid only for the **_Procurement for direct materials_** business process.

Note: It is mandatory to choose "Change adaptability" for the test plan that includes **Procurement for direct material**s test process as it involves "approval" step for the Purchase Order (PO) value exceeding a certain limit. After selecting "Change adaptability", "approval step" is enabled or disabled based on the PO value.

When the test plan runs, the total value of purchase order is checked against the defined value in SSC UI configuration. As per the purchase order approval customization, if the PO value is greater than the pre-defined limit in customizing with respect to the given purchasing organization, it requires an approval. Hence, the approval step gets enabled. Else the approval step is disabled.

4. **Run or Execute Test Plan**

The purpose of this task is to execute the test plan. The execution process is auto-refreshed after every 15 sec to display the test results. After execution, the test plan status is either "Success" or "With Errors" depending on the status of actions and test process steps. Screenshots and Detailed Action Log are generated for every action that has been executed.

Scenario 1: Success
The test plan with status "Success" will have all "Success" test process steps and "Success" actions.

Scenario 2: With Errors

The test plan "With Errors" will have "Failed" test process steps.

The first "Failed" test process step in test plan will have one "Failed" action followed by "Cancelled" actions. This is because when an action fails, the following actions do not execute, hence their statuses become "Cancelled".

Similarly, after a "Failed" test process step, following test process steps do not execute and their statuses become "Failed".

5. **Correct and Re-run Test Plan**

The purpose of this task is to identify the errors in the test plan "With Errors" by viewing the screenshot and detailed action log for the failed action and fix them. Once the errors are fixed, re-run the test plan.

Deliverables: Test Plan, Test Results

3. Manual Testing

There will be some instances where manual testing will be required such as:

1. Testing processes that are not in scope of the testing apps – such as third party systems

2. Testing processes that are very infrequent

3. Testing processes that require human observation e.g. user friendliness, customer experience

The manual testing approach will use Solution Manager 7.2 to add, plan and track manual tests.

7.1.2 Performance Testing

SAP will work with CUSTOMER and other project team members to create a high level test plan and automated load test scripts to identify performance parameters for core services when high numbers of virtual users simultaneously execute transactions on the system.

To complete this performance testing initiative, SAP will take the following actions and provide the accompanying objectives and goals:

Phase I	Phase II	Phase III	Phase IV	Phase V
• **Strategy and discovery – Review client and business systems**	• **Design**	• **Construction**	• **Execution**	• **Analysis** • **Document defects, regression testing**
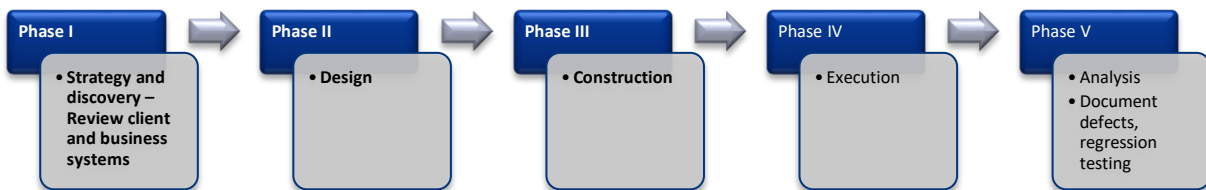
Figure 6 - Performance Testing Lifecycle

Phase I: Strategy and discovery – Review client and business systems

In this stage, SAP Consultant(s) will review the business process documentation to validate the critical business processes, already identified by the project team, to be included in the load test. SAP and the project team will decide which major process areas to include in the test based on timelines, resources and budget. SAP will work together with the CUSTOMER to organize these cases into prioritized test scripts for subsequent development and execution.

Phase Goals: Approved high-level business processes to be used in the performance test.

Phase II – Design

In this phase, SAP performance test consultants will work with the applications, infrastructure, and business process subject matter experts (SMEs) to finalize the test design for the performance test and define System Level Agreements (SLAs) and Key Performance Metrics (KPMs) for each test scenario. In parallel to the test mentioned previously, a detailed data creation plan for all test scenarios will be created.

Phase Goals: Approved test plan (test design), data creation plan, and project work plan/schedule

Phase III – Construction

During this phase, SAP performance test consultants will use the approved test design from Phase II to build the performance test scripts with the <<<PERFORMANCE TOOL>>> toolset. Also in this phase, all monitors are configured prior to test execution. SAP performance test consultants will work with the CUSTOMER system and network administrators to install all required software and/or agents for monitoring. Once all monitors have been configured, tested, and verified to meet all monitoring criteria, Phase IV test execution can begin.

Phase Goals: Test Scripts, configured performance monitors, configured controller

Phase IV – Execution

In this phase, SAP will execute the tests that were created above, gradually increasing the number of virtual users from zero to the target levels as described by the test scenarios defined during the requirements stage. Any defects that were raised by each load test execution will be recorded for fixing by the appropriate team. Time permitting, SAP will then rerun the load test to ensure that the fix successfully eradicated the defect. If more defects are found, the process will be repeated according to agreed timelines.

Phase Deliverable: Executed tests, documented defects, applied patches (by CUSTOMER personnel)

Phase V - Analysis

Because constant analysis is performed for each test execution, phases IV and V work in parallel. At the completion of testing, SAP will generate and present a final report that summarizes all performance test runs, test results, open issues, closed issues, conclusions, changes to the application/architecture, and recommendations.

Phase Goals: Final performance test completion report.

8   BATCH TESTING

<<<Define the batch tests to be performed and when>>>

Batches that are in scope of testing will be identified during the solution design phase. Batches will be tested as early as possible, once available for testing. Focus on batch testing specifically will be during SIT cycle X. Test data preparation for batches will be managed by the test data co-ordinator. The test environment used for batch testing will be set up by the basis team.

9   SUSPENSION AND RESUMPTION CRITERIA

Suspension criteria specify the criteria to be used to suspend all or a portion of the testing activities while resumption criteria specify when testing can resume after it has been suspended. These criteria will be judged on a per work stream basis:

9.1   Suspension

•   Unavailability of external dependent systems during execution.
•   When a defect sev 1 is introduced that cannot allow any further testing.
•   A specific holiday shuts down both development and testing.
•   An unplanned incident shuts down either development or testing
•   If more than # sev 1 defects are detected and are open at any one time
•   If more than # sev 2 defects are detected and are open in any work stream at any one time
•   Any sev 1 or sev 2 defects found during sanity checking of environment

9.2   Resumption

Testing will only resume when all suspension criteria issues are resolved or the number of defects are below the suspension level.

10   POSITIVE AND NEGATIVE TESTING

Positive "happy path" tests will be performed to test that the business process is working successfully and as expected. If an error occurs during positive testing, then the test fails. Negative testing is to test that the system can gracefully handle unexpected user behaviour or invalid input. Therefore, throwing an exception during a negative test is not an unexpected event. However, the test will check that the system does not crash, in turn testing the stability and reliability of the system.

Both positive and negative tests will be conducted during build cycle testing, SIT and UAT. Negative tests could test for:

   1)   Missing mandatory fields – test how the system handles missing mandatory fields

2) Using incorrect data types for specific field types – entering alpha characters in a numeric field
3) Testing the allowed number of characters – entering more than the number of characters allowed for testing
4) Allowed data bounds and limits – for example, enter a value that is over a set limit
5) Bad data in interface files – for example, a corrupt file is sent to or from the message hub.

11   REQUIREMENTS TRACEABILITY MANAGEMENT

Requirements traceability is an important way to show the relationship between requirements and test cases. Each requirements could have one or many test cases are linked to it. Each test case may test one or more requirement. This bi-directional relationship allows traceability. By tracking the status of the test cases, an indication of the current project requirements can be derived.

Requirements traceability will be managed through Solution Manager. The solution documentation in Solution Manager, where the requirements are kept will be linked to test scripts identified within Solution Manager. Each component, test case, and test script will be linked to one or more requirements. Reports from Solution Manager 7.2 can show the status of the current requirements based on the linked tests. Note that the test automation will not be directly linked to Solution Manager, but a dummy test can be added in its place in Solution Manager to show the coverage.
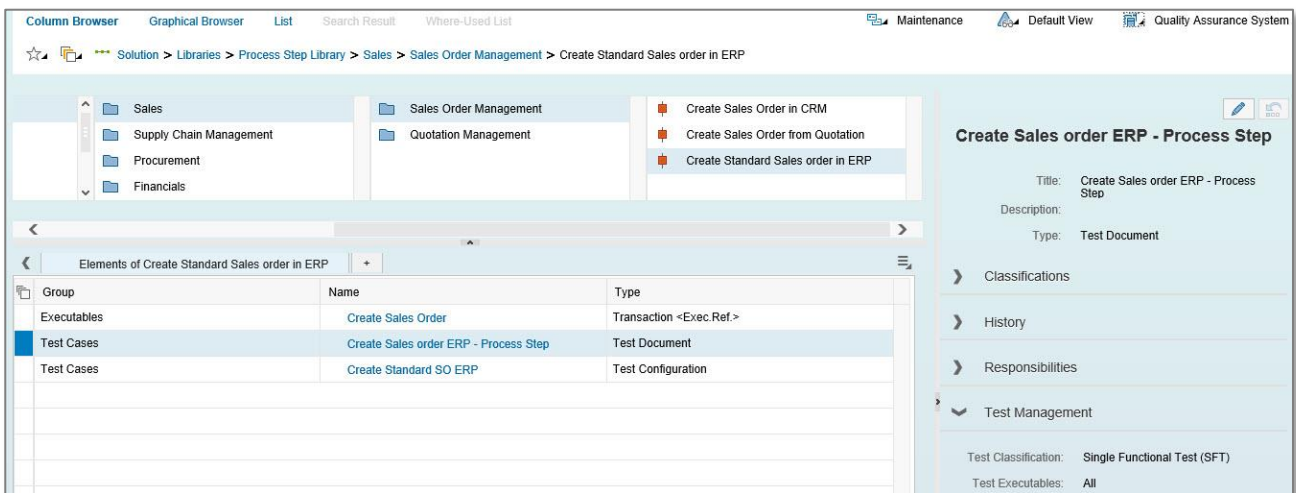
Figure 7 - Process Steps defined in Process Step Library with reference to executables from Executable Library and assigned Test Cases

12   TEST MANAGEMENT

Generally, Test Management is accountable for
- Ensuring all test artefacts are managed within the chosen test tool for test preparation, execution and defect management
- Ensuring traceability from business scenarios to executed test scenarios
- Providing guidance and direction on test activities to project management
- Overseeing the appropriate level of details in testing
- Auditing test activities
- Provisioning of test tools
- Coordinating data requirements with functional and data migration teams
- Ensuring availability of test environments.

12.1   Team Structure <<< To be Updated>>

The test team for the programme will comprise of resources from both SAP and CUSTOMER as follows:

- SAP test team

    o Test Management – to co-own and manage the testing activity for the programme up to and including the SIT test phase.

    o Test Co-ordination – to co-ordinate the testing on a day to day basis to ensure that testing is progressed according to the test plan

    o Manual Testers – to prepare and execute manual test cases

    o Automation Testers – to plan and prepare automation and manual test cases

- CUSTOMER test team

    o Test Management - to work alongside SAP test management to co-own and manage the test activity for the programme, up to and including the UAT test phase.

    o Test Co-ordination – to co-ordinate the testing on a day to day basis to ensure that testing is progressed according to the test plan. This will be for data variant testing and for progressing legacy steps during SIT testing, and during UAT.

    o Manual Testers – to prepare and execute manual test cases

    o Automation Testers – to support and take over the technical testing from SAP at the end of SIT.

The SAP test team structure shown in Figure 8 - SAP Test Team Structure below. Most of the test team will be based remotely, either in nearshore or offshore centers. Whilst team members may be based remotely, they will be able to come onshore as and when required. This will be especially important during the ramp up of testing, to gain knowledge on the solution workshops, build cycles and WRICEF for example.

Section 12.2 Roles & Responsibilities below describes the roles and responsibilities in more detail. The team will ramp up over time as the build cycles commence. The test schedule and resource plan is attached in section 12.2.3 Resource Schedule below.

The CUSTOMER test team is outlined in Figure 9 - CUSTOMER Test Team Structure. The CUSTOMER test team will complement the SAP test team. The CUSTOMER test team's main focus area are data variant testing, progressing legacy test steps in SIT, and user acceptance testing.

<<<ADD A TEST TEAM STRUCTURE ORG CHART FOR THE SAP TEST TEAM>>>

Figure 8 - SAP Test Team Structure

<<<ADD A TEST TEAM STRUCTURE ORG CHART FOR THE CUSTOMER TEST TEAM>>>

Figure 9 - CUSTOMER Test Team Structure

12.2   Roles & Responsibilities

This section will describe the roles and responsibilities identified for the SAP and CUSTOMER test teams.

12.2.1 SAP test team roles & responsibilities

Role	Responsibility
SAP Test Manager	• Document and obtain sign off of the test strategy for the programme, as agreed by SAP and CUSTOMER, covering both the CUSTOMER owned phases of the program and the SAP testing. • Responsible for the overall quality of testing and adherence to the Test strategy • Defining and implementing test governance, process, test tools etc. • Manage delivery of all test activities in line with the programme aims & objectives, planning and coordinating test preparation and delivery activities by Test Leads and Testers • Obtain sign off for test completion reports where appropriate. • Provide agreed progress reports from a testing perspective • Ensures overall quality of testing is maintained by SAP and Test Leads • Create weekly POAP produced for the testing workstream, aligning with the CUSTOMER test manager.
SAP Test QA and Governance	• Part time, ad-hoc, non-chargeable role to do spot checks to ensure testing quality and governance • Works closely with test manager to ensure overall quality of testing and adherence to the Test strategy • Provide advice and guidance on quality of SAP testing • Provide ongoing support to programs, projects, and groups involved in testing • Provide advice and guidance on test strategy, test planning, preparation and test execution • Report quality issues to a test manager
SAP Test Leads (Onsite / Nearshore)	• Involved in the planning, monitoring, and control of the testing activities and tasks • Assist in defining the test scope, test strategy, test plans, test completion reports • Manage local test resources on a day to day basis • Lead, guide and monitor the analysis, design, implementation and execution of the test cases • Assist in monitoring, measuring, controlling and reporting on the test progress • Work closely with the test programme manager and distributed test teams • Prepare input for agreed progress reports • Raise issues and risks • Provide on the quality of the tests that are produced by the test team • Document test completion reports where appropriate and submit to SAP Test Manager
SAP User Acceptance Test Lead	• Support the CUSTOMER test manager in preparing for UAT testing, including: o Identifying key business resources o Defining the tests in scope o Preparing test data o Ensure test readiness of UAT • Assist in preparation of a test plan for UAT • Support the test preparation and test execution during UAT • Assist in completing the test completion report for UAT • Assist in managing risks and issues • Assist in providing input to agreed progress reports from a testing perspective • Assist in defect triage meetings during UAT
SAP Automation and Regression Test	• Manage and own the regression testing during SAP testing • Plan and prepare the automation regression suite • Manage automation testers • Ensure adherence to the test strategy and overall project timelines • Provide assistance when requested to create mass data for testing

	• Ensure test automation tooling is in place ready for test automation • Plan and prepare for the regression testing phase using automation and manual testing • Provide input into agreed progress reports • Handover to the CUSTOMER test automation lead
SAP Test Master Data Co-ordinator	• Own the master data co-ordination for SAP testing until SIT • Gather test data requirements from testers and functional consultants • Liaise with the master data team to gather correct and valid data for SAP testing • Liaise with test automation team to generate test data if applicable • Manage number ranges to ensure segregation of data • Liaise with CUSTOMER test data coordinator and legacy teams to ensure valid data is in the appropriate systems • Co-ordinate the availability of migrated test data for SIT • Obtain migrated data that is relevant and applicable for use for SIT • Report to the SAP test manager and escalate issues and risks
SAP Test Defect Manager	• Chair daily defect triage meetings in a structured manner during UAT • Challenge and follows through defect resolution to an acceptable outcome to both the programme and the teams involved • Provide arbitration and defect process guidance • Conduct defect administration, including providing daily reports and updates • Provide test team with defect retesting list on a daily basis • Scope to cover UAT testing
SAP Performance Tester	• Conduct system performance testing to test system reliability, capacity and scalability. • Work with CUSTOMER and SAP testing team to develop performance test plans and cases. • Analyse test results and coordinate with teams for bug fixes. • Generate test summary reports for management review. • Analyse root causes of performance issues and provide corrective actions recommendations • Conduct job trainings and provide assistance to CUSTOMER Performance Tester as needed. • Develop automated test scenarios and environments for performance testing.
SAP Automation Tester	• Write automated test scripts using agreed standards and tools • Document scripts to agreed standards • Perform maintenance on automated test scripts • Execute and schedules automated test runs as required • Examine test logs and investigates any faults found during test runs • Log issues found in software under test • Work closely with other team members to gather automated testing requirements • Inform other teams of faults found when required • Work with the test manager to discuss the automated testing needs of projects
SAP Manual Tester	• Analyse requirements from user case documentation and solution workshops • Provide input into test plan preparation • Prepare test scenarios • Prepare test cases for build cycle and system integration testing (core scripts and process variants) • Prepare test data requirements for test data co-ordinator • Peer review test scripts • Execute test scripts • Defect tracking, retesting and assisting in defect resolution • Communicate with test lead, test manager, functional consultants and build team

Role	Responsibility
SAP Manual Tester – Workstream Lead	- Same responsibilities as the Manual Tester role - In addition, the work stream lead will: - Understand the scope for their workstream area - Provide input into the test plan - Co-ordinate the test activity within their workstream area and the test lead - Be the single point of contact for any queries regarding their workstream area - Escalate and risks and issues to the test lead - Liaise with the functional consultants for any queries raised by their team - Align with the test strategy and test plan

12.2.2 CUSTOMER test team roles & responsibilities

Role	Responsibility
CUSTOMER Test Manager	- Input into the test strategy for the programme, as agreed by SAP and CUSTOMER, covering both the CUSTOMER owned phases of the program and the SAP testing. - Responsible for the overall quality of testing and adherence to the test strategy for all test activities in scope for CUSTOMER - Assist SAP test manager in defining and implementing test governance, process, test tools etc. - Manage delivery of all test activities in scope for CUSTOMER, in line with the programme aims & objectives, planning and coordinating test preparation and delivery activities within the CUSTOMER test team - Provide access to CUSTOMER resources required by the CUSTOMER and SAP test team such as resources for legacy systems, data validation testing, and UAT. - Produce test scenarios for data validation testing and UAT testing - Provide agreed progress reports from a testing perspective for all test activities in scope for CUSTOMER - Ensures overall quality of testing is maintained by CUSTOMER - Provide input and align with the weekly POAP produced for the testing workstream
CUSTOMER Test QA and Governance	- CUSTOMER role, similar to the equivalent SAP role to do spot checks to ensure testing quality and governance - Works closely with the CUSTOMER test manager to ensure overall quality of testing and adherence to the Test strategy - Provide advice and guidance on quality as per CUSTOMER's guiding principles and test policy - Provide ongoing support to programs, projects, and groups involved in testing - Provide advice and guidance on test strategy, test planning, preparation and test execution - Report quality issues to a test manager
CUSTOMER Test Master Data Co-ordinator	- Own the master data co-ordination for CUSTOMER testing - Gather test data requirements from testers and functional consultants - Liaise with the master data team and SAP test data co-ordinator to gather correct and valid data for testing - Liaise with SAP test automation team to generate test data if applicable - Manage number ranges to ensure segregation of data - Liaise with legacy teams and SAP test data co-ordinator to ensure valid data is in the appropriate systems - Obtain migrated data that is relevant and applicable for use for testing - Report to the CUSTOMER test manager and escalate issues and risks

CUSTOMER Test Defect Manager	• Chair daily defect triage meetings in a structured manner for UAT and legacy system related defects • Challenge and follows through defect resolution to an acceptable outcome to both the programme and the teams involved • Provide arbitration and defect process guidance • Conduct defect administration, including providing daily reports and updates • Provide test team with defect retesting list on a daily basis • Scope to cover UAT and legacy system defects • Can provide custom reports and configuration in Solution Manager 7.2 to suit the needs of the project.
CUSTOMER Performance Tester	• Works with SAP Performance Test Lead to take over the performance testing assets once SAP have completed the performance testing phase • Takes action on the recommendations provided by the SAP Performance Test Lead • Progresses performance testing for CUSTOMER as required
CUSTOMER Automation Tester	• Work with SAP Automation Test Lead to take over the automation testing assets once SAP have completed the automation testing phase • Maintain the regression test automation deck for CUSTOMER • Create any test data required using automation scripts for CUSTOMER testing • Progresses automation testing for CUSTOMER as required
CUSTOMER Manual Tester / Key Business User / Testing Leads	• Prepare test scenarios for UAT • Prepare test cases for data variant testing and UAT • Prepare test data requirements for CUSTOMER test data co-ordinator • Peer review test scripts • Execute test scripts • Defect tracking, retesting and assisting in defect resolution • Communicate with CUSTOMER test manager, functional consultants and build team

12.2.3 Resource Schedule (<<<To be updated>>>)

A detailed schedule of resources for SAP testing can be found in the following attachment. The resources align to the project plan as at the time of writing. The resources schedule may change as required to suit project needs, and will be owned by the SAP Test Manager, and managed by the SAP test leads.

<<<ADD A RESOURCE SCHEDULE TO SHOW WHICH RESOURCES WILL BE DEPLYOED WHEN AS PER THE PLAN ON A PAGE>>>

12.2.4 Training << To be reviewed>>>

Training will be provided to all testing resources in order to ensure that a consistent quality approach is taken to testing for the project.

This training will include training and awareness sessions on test scripting, test execution and defect management, as well as other test processes and practices in alignment with this test strategy.

12.3   Test Environments (<<<To be updated>>>)

The test environments to be used for each test phase are show in Figure 10 - Test Environments for testing. The environments will be managed by the project Basis team. The local QA environment and the Pre-production environment will require legacy systems to be connected to allow for integration testing. These environments will be smoke tested (pipecleaned) to confirm that the systems are connected successfully. This testing will be undertaken by the project Basis team.
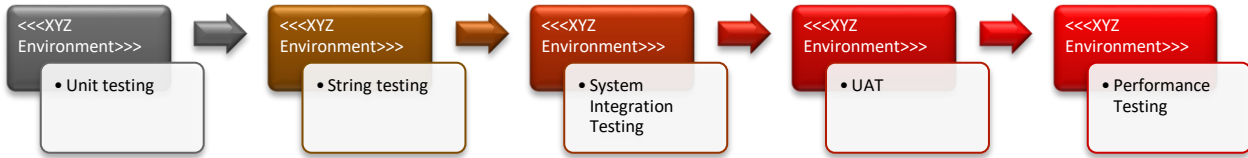
Figure 10 - Test Environments for testing

13 TESTING TOOLS

SAP's Solution Manager 7.2 offers a suite of integrated tools to allow traceability from the Blueprint to the test execution results and defects – see Figure 11 - SAP's Solution Manager Test Suite.
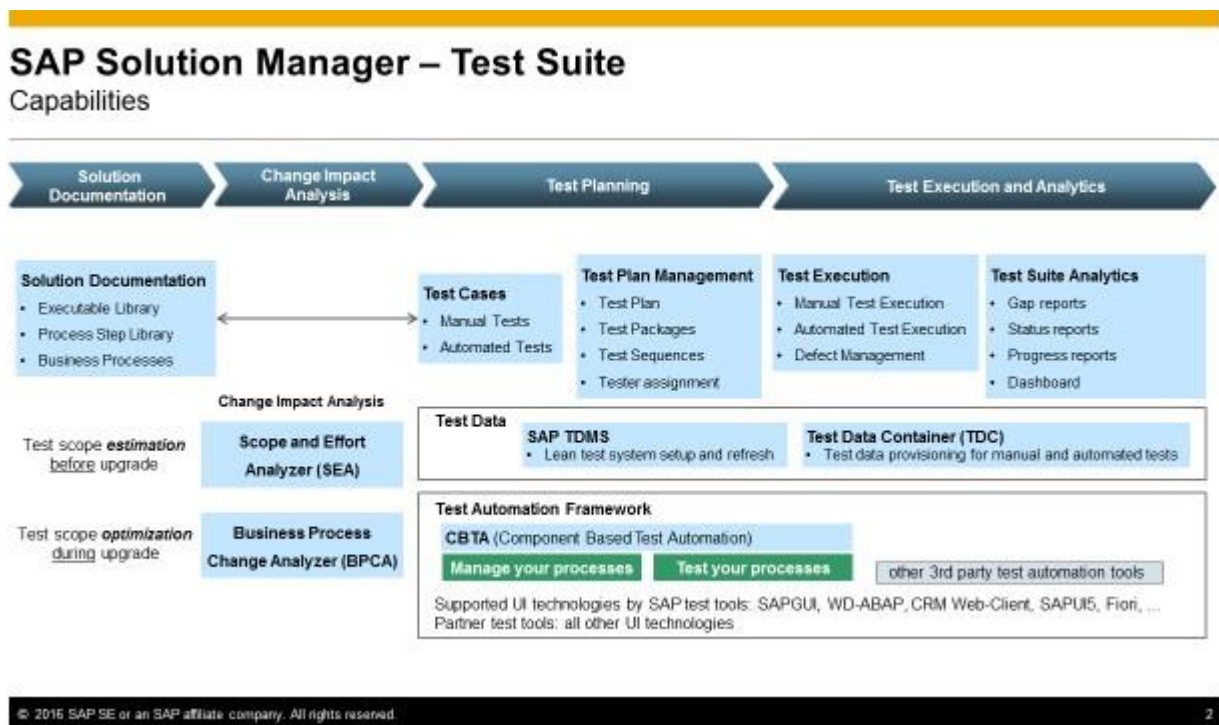
Figure 11 - SAP's Solution Manager Test Suite

This test tool solution provides capabilities to perform test management, manual, automation and performance testing:

- **Test Management -** All test requirements, test cases and test scripts from string test onwards will be captured and stored in Solution Manager 7.2. For reporting on execution, pass/fail rates, defect

status and an indication of whether software quality is improving sufficiently to meet project deadlines, Solution Manager 7.2 together with Microsoft Excel will be used. Test defects from all test phases after unit testing will be captured and tracked in Solution Manager 7.2 in order to maintain consistency of tool usage and reporting on projects. Automation tests that use the Fiori apps will not be linked directly to Solution Manager 7.2, but instead a dummy test will be used in Solution Manager to provide comprehensive test coverage.

- *Manual testing* – Solution manager's blueprint / solution documentation will form the requirements for manual tests. From here, manual business components are created during system testing that are then assembled to create integrated tests for SIT.

- *Test automation* – A functional test automation deck will be created using the Test Your Processes app from the FIORI Launchpad. This app is an automation testing app that to create and run (or execute) test plans. The test result, progress and status of executed test processes, process steps and actions during and after execution can be viewed. A Test Plan is a set of one or more test processes and is created to test end-to-end business processes, using the Manage Your Test Processes app. Test Process is a set of one or more test process steps and test process step is a series of actions (input, click, select radio button, search and so on).
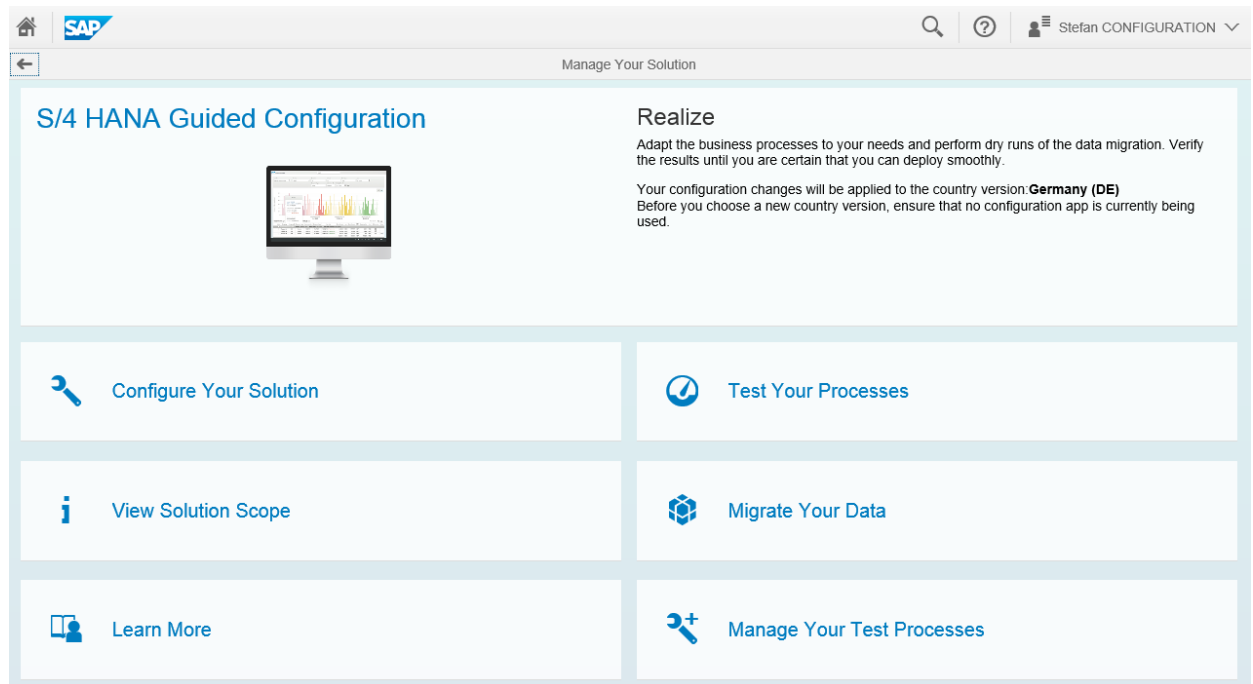
Figure 12: Screenshot of the FIORI Launchpad

- *Performance testing* – For performance testing, <<<PERFORMANCE TEST TOOL>>> will be used, to simulate volume loads on the core applications to evaluate response times and throughput performance to predict system behavior and performance.

Using these tools will not only help in the current programme, but they will remain as a reusable asset whenever testing is required in the future such as to update the SAP system, or install new SAP modules. The tools used in this solution are described in detail in 20.5 Appendix: Test Tool Description below.

14   REPORTING AND KEY MEETINGS

A number of reports and meeting will be provided meetings will during the duration of testing. The table below - Table 2 - Table showing reporting and key meetings for each test phase - shows which reports and meetings will be conducted per test activity.

Table 2 - Table showing reporting and key meetings for each test phase <<< Tobe be reviewed>>>

Test Phase / Activity	Weekly POAP / Status Report	Daily Test Team Meeting	Daily Status Report	Defect Triage	Test Completion Report
Test planning for all test phases	✓				
Test preparation for all test phases	✓				
Unit Testing	✓ [3]				
String Testing	✓	✓		✓	✓
System Integration Testing[4]	✓ [5]	✓	✓	✓	✓
UAT[6]	✓	✓ [7]	✓	✓	✓
Automation Testing	✓	✓		✓	
Performance Test	✓	✓		✓	✓

A description of each reporting and meeting type in scope is given below. Where applicable, Solution Manager 7.2 will be used to collate information on total test cases executed and what have passed/failed and whether defects have been assigned. Reporting will also cover test case planning progress, execution and provide indicative tracking against project plans. The SAP Test Manager will be responsible to distribute the reports as per the programme guidelines. See 20.2 Appendix: Progress Reporting Metrics below for information on what metrics are to be included in each test phase.

14.1   Weekly report – Plan on a page (POAP)
A weekly report will be provided to the project in an agreed format as mandated by the programme management. The POAP will be in Microsoft PowerPoint format, and will show progress of tasks against a high level plan. It will also give a brief summary of the week's activities, and a projection of what will be conducted in the following week. It will also contain any risks and mitigation actions. Over time, the content of the POAP may be modified to suit the needs of the project. For example, further information on test preparation, test execution and defect resolution may be given. The SAP test manager and the CUSTOMER

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[3] To be included in the POAP prepared by the individual SAP build teams, therefore will not be managed by the SAP test team

[4] Data validation testing and reporting to be prepared by the <<<CUSTOMER>>> test manager

[5] Data validation testing updates to be provided by the <<<CUSTOMER>>> test manager to produce a consolidated POAP

[6] All UAT related reports and meetings, including defect triage will be prepared and distributed by the <<<CUSTOMER>>> test manager

[7] UAT daily meetings will be conducted by the <<<CUSTOMER>>> Test Manager

test manager will agree the content of the POAP during a weekly alignment meeting. Therefore, the POAP for testing will be a joint POAP between CUSTOMER and SAP.

14.2 Daily Test Team Meeting

The SAP Test Leads will hold a daily test team meeting which will involve the entire SAP test team, whether they are located onshore, nearshore or offshore. The purpose of this meeting is to communicate with all test team members on progress and any update and information from the project. The test team will be given an opportunity to raise any risks, issues or questions that they may have. The daily task list will be discussed and agreed in this meeting.

14.3 Daily Test Summary

During SIT test execution, at the end of each UK working day, an e-mail will be sent by the SAP test manager to the testers, functional leads, programme manager, programme delivery manager, CUSTOMER test manager and other nominated representatives from CUSTOMER containing the following information:

- Test Scripts attempted

- Number of Test Scripts failed.

- Open Incidents

- Indicator of whether testing is on target according to the test plan

14.4 Sprint Retrospective Meeting

In this meeting all team members reflect on the past sprint and check three things: what went well during the sprint, what didn't, and what improvements could be made in the next sprint. The meeting should be time-boxed (e.g. 3 hours).

The Sprint Retrospective is an integral part of the "inspect and adapt" process. This meeting the team will allow the team to improve their overall output and focus on improving the overall team performance. Therefore, actionable suggestions to improve performance should be available at the end of the meeting.

14.5 Defect Triage

During SIT and UAT, the defect manager will conduct a daily defect triage meeting to discuss open defects. The daily meetings will be attended by:
- Programme management (optional)
- SAP test manager
- SAP onsite and nearshore test leads
- SAP build team:
  - Workstream leads
  - Development leads
- CUSTOMER test manager
- CUSTOMER defect manager
- SAP UAT Test Support (during UAT test phase)

During the meeting, the defects will be analysed, and the actions and timescales for resolution will be discussed. Also, new defects opened since the last triage meeting will be reviewed, assigned or rejected. The meeting will not discuss the technical detail of the defects, for which further meetings can be scheduled. The approach taken to each triage meeting is as follows:
- SAP defect manager sends out a defect report with the new defects introduced since last triage meeting.
- SAP defect manager chairs the daily triage meeting.
- During meeting, each defect is analysed to see whether correct severity are assigned to it. Severity is corrected if need be. The SAP defect manager will own the assignation of defect severity to the defects.

- Defects are discussed by the team. This involves discussing complexity of the defect, risks,
- Assignment, rejection, reassignment of defects is done. Updates are captured in bug tracking system.
- After meeting completion, minutes of meetings are sent out to involved parties.

14.6 Test Completion Reports

For each applicable test phase, a test completion report will be produced documenting the testing undertaken, the planned tests not completed, the issues identified, their resolution and a recommendation as to whether to continue. This will be written by SAP for String Test and SIT, and by CUSTOMER for UAT testing. The document will be an indication of the quality, measure outstanding risks, and demonstrate the level of confidence in tested software. For SAP owned test phases, the SAP Onshore Test Lead will prepare the test completion report. Completion of a test phase is achieved when the exit criteria have been met. E-mail or physical sign-off will be required at the completion of each testing level based on a Test Completion Report. The list of approvers is the same as the approvers of this document and will provide approval of the test completion reports.

15 TEST DATA STRATEGY

Data for testing activities will be required for all test phases, with a common data set being maintained from String Testing onwards. Test data provisioning will be managed by the test data co-ordinators from SAP and CUSTOMER. Test data will be obtained primarily from:

- Live production data (If available) ("Legacy") – to be provided by the data migration team

- Data entered manually into the system by the testers

- Data generated using automation scripts – to be provided by the test automation team

The creation and selection of test data needs to be based on the following objectives:
- Productive data will be used as early as possible without significantly reducing the efficiency of testing.

- Wherever possible, test data will be sourced from a client copy or entered by testers/automation. If conditioning of data is unavoidable, this should be done using programs that are re-executable, to re-apply changes on re-converted base data in a repeatable manner

- Test data should be based on subsets of production, not complete production, if possible. Data should be established with test preparation and execution efficiency, as well as the cost of testing environments, in mind.

- The number of groups involved in the selection, preparation and delivery of test data should be kept to a minimum. Common data requirements within a testing phase (between many applications tested at the same testing level) should be integrated to reduce the extraction, conversion and retention of superfluous data.

- The plans for delivery of test data need to be synchronised with the plans for data migration. This is particularly important when dealing with interfaces systems.

- A single contact within each testing team (the test data coordinator for SAP and CUSTOMER should be responsible for communication and liaison with the internal and external parties responsible for the delivery of test data.

- Test Data, via a client copy, should be delivered as early as possible. It is preferable to deliver a data that satisfies 80% of the requirements at the beginning of scripting, rather than deliver data satisfying 95% of the requirements at the end of scripting

- Co-ordination of test data development with the creation of the training data will yield efficiencies. The feasibility of this objective must be evaluated during test planning activity, through liaison with the teams designing and delivering training courses.

There are obvious benefits in the sharing of test data amongst a number of testers with common data requirements. This concept should also be considered for application across testing levels, and may yield the following advantages:

➢ In some cases, test scenarios, scripts and conditions may be passed on to the next level with the same data (although the scripts would need to be expanded based on the objectives of the next level)

➢ Teams become familiar with data that will be available throughout the testing process

➢ Less time is spent developing separate extractions and test databases.

<<<UPDATE WITH THE FOLLOWING POINTS: How will test data be maintained and refreshed? Also will there be a requirement to scramble the test data, or ensure that hard copy outputs are appropriately stored under lock and key? <<<Add a document reference if that is more appropriate>>>

16   SECURITY TESTING (ROLES AND AUTHORISATIONS)

Testing carried out based on role permission granted to a set of users is called security testing. The most important feature of these tests is to verify the individual roles and their permissions to each function, module, and unit of the system. Security testing will be tested in SIT, as soon as roles and authorisations have been setup in the test environment. During test case planning, roles will need to be determined so they can be tested during SIT. The SAP test lead will work SAP security consultant to understand these roles and their permissions.

17   DEFECT MANAGEMENT

All defects identified as part of the Realize testing phases (except those identified in unit testing) will be documented and managed to closure using the testing tool Solution Manager 7.2. For unit testing issues are triaged between SAP development areas. Issues are tracked and owned by the work stream leads. The table below notes the defects recording approach for all test phases in the Realize phase. From String testing onwards, defects will be reviewed in defect triage meetings (see section 14.5 above)

SAP Test Phase	Defect Recording Approach
Unit Test	Maintained by Functional Leads
String Testing	Solution Manager 7.2
System Integration Testing	Solution Manager 7.2
UAT	Solution Manager 7.2

Table 3- Test Phases and the defect recording approach

During all testing phases any deemed defects or issues will be recorded and categorised according to severity and priority. A defect or issue can be raised against any system component including (and not exclusively) documentation, software, hardware, data, configurations, test procedures, reporting and legacy systems.
<<<Define if legacy system defects be recorded and progressed in the same Solution Manager 7.2 project? >>>
Failed test cases, and their associated evidence up to the point of failure, will be verified by the tester at the time of the test and then stored. Any changes to the test plan will be communicated to the project along with an impact analysis.

17.1   Severity and Priority Levels

The severity levels associated with a defect are as defined in the table below (as per the Statement of Work). The applicable severity level will be assigned by SAP Defect Manager for each defect that is raised as part of the Realize phase, in accordance with these definitions:

Table 4 - Severity levels and their definition

Severity	Description
"Severity Level 1"	The defect results in a total failure of the system and Licensee would be unable to use any part of the production system for operational purposes.
"Severity Level 2"	The defect(s) result(s) in a failure of significant parts of the system and Licensee would be unable to use these parts of the Production System for operational purposes OR the defect(s) would cause(s) the Production System to produce incorrect, incomplete, or inconsistent results. No practical workarounds are possible. A material number of Severity Level 3 defects may be classified as a Severity Level 2 defect where collectively such defects have Severity Level 2 impact and no practical workarounds are possible.
"Severity Level 3"	The defect results in a failure of parts of the system or the usability of the system, acceptable processing alternatives exist and the performance and functionality of the relevant system is not materially impaired.
"Severity Level 4"	The defect does not impair usability and relates to the aesthetics of the system.

For defects reported during the SIT, Performance and UAT test phases shall use reasonable endeavours to resolve those defects in accordance with the target resolution times set out in the following table, and taking into account the exit criteria set out in this test strategy. The time taken to resolve a Defect will be measured from the time the defect is reported to the development team. The acceptability of a workaround will be commensurate to the phase of testing being performed. In UAT, there must be a processing alternative that produces an equivalent result in all material respects to the Blueprint requirement without a serious increase in manual or processing workload.

The defect manager will prioritise the resolution of defects in accordance with their severity level. Any workaround may be allow a defect to be reclassified as a medium/low defect or full resolution.

The defect priorities are determined as follows:

Table 5 - Priority levels and their definitions, including target remedy

Priority	Definition	String -Target Remedy	Integration - Target Remedy	Performance - Target Remedy	UAT -Target Remedy
Critical	Must be fixed in the next build	Workaround within 24 Hours Resolve Defect within 2 weeks	Workaround within 24 Hours Resolve Defect within 2 weeks	Workaround within 24 Hours Resolve Defect within 2 weeks	Workaround within 24 Hours Resolve Defect within 2 weeks
High	Must be fixed in any of the upcoming builds but should be included in the release	Workaround within 48 Hours Resolve Defect within 2 weeks	Workaround within 48 Hours Resolve Defect within 2 weeks	Workaround within 48 Hours Resolve Defect within 2 weeks	Workaround within 48 Hours Resolve Defect within 2 weeks
Medium	May be fixed after the release / in the next release.	Workaround or resolution in two weeks. If a workaround then resolution in 4 weeks unless workaround agreed as remedy	Workaround or resolution in two weeks. If a workaround then resolution in 4 weeks unless workaround agreed as remedy	Workaround or resolution in 1 week. If a workaround then resolution in 3 weeks unless workaround agreed as remedy	Workaround or resolution in 2 weeks. If a workaround then resolution in 3 weeks unless workaround agreed as remedy
Low	May or may not be fixed at all.	Workaround or suggested resolution approach within 4 weeks	Workaround or suggested resolution approach within 4 weeks	Workaround or suggested resolution approach within 4 weeks	Workaround or suggested resolution approach within 4 weeks

17.2 Testing phase exit criteria <<<To be reviewed>>>

With mutual agreement between SAP and CUSTOMER project management, where it can be reasonably justified as being in the best interests of the project (in particular, the maintenance of agreed project timescales), the resolution of any open defects in excess of the criteria in the table below of this section, may be deferred until the next project phase or testing activity up to and including UAT, subject to mutual agreement of an appropriate full resolution plan.

As described in the Statement of Work, the Unit , SIT, Performance and UAT test phases shall be completed and accepted by CUSTOMER provided the number of open defects do not exceed the maximum defect numbers set out in the table below. All such criteria are subject to an adequate breadth of testing being completed as defined in this Test Strategy document and (subject to the additional requirements applicable to UAT described below) all 'High' severity Defects having agreed workarounds in place.

Table 6 - Test phase exit criteria

	Critical	High	Medium	Low
System	0	10	400	1000
Integration	0	10	400	1000
Performance	0	5*	N/A	N/A
UAT	0	0	**75	250

* Workarounds must be in place for all of the High severity Defects with a full resolution plan agreed between the parties.
** The sum of the medium issues must not result in a failure of, or the inability of Customer to use, significant parts of the SAP Retail Template. Any moderate or Low Defects that SAP is not able to remedy before the Project exits Run phase support shall remain as open issues within the Issues Log and SAP will following the conclusion of Run phase support so that it has provided guidance within the Issues Log ("Issues Log Report") on suggested remedies for any outstanding Defects listed in the Issues Log to the Customer's support teams.

17.3 Defect Management Process

Figure 13 - Test defect raising and resolution process below describes the defect management process that will be used during the programme.
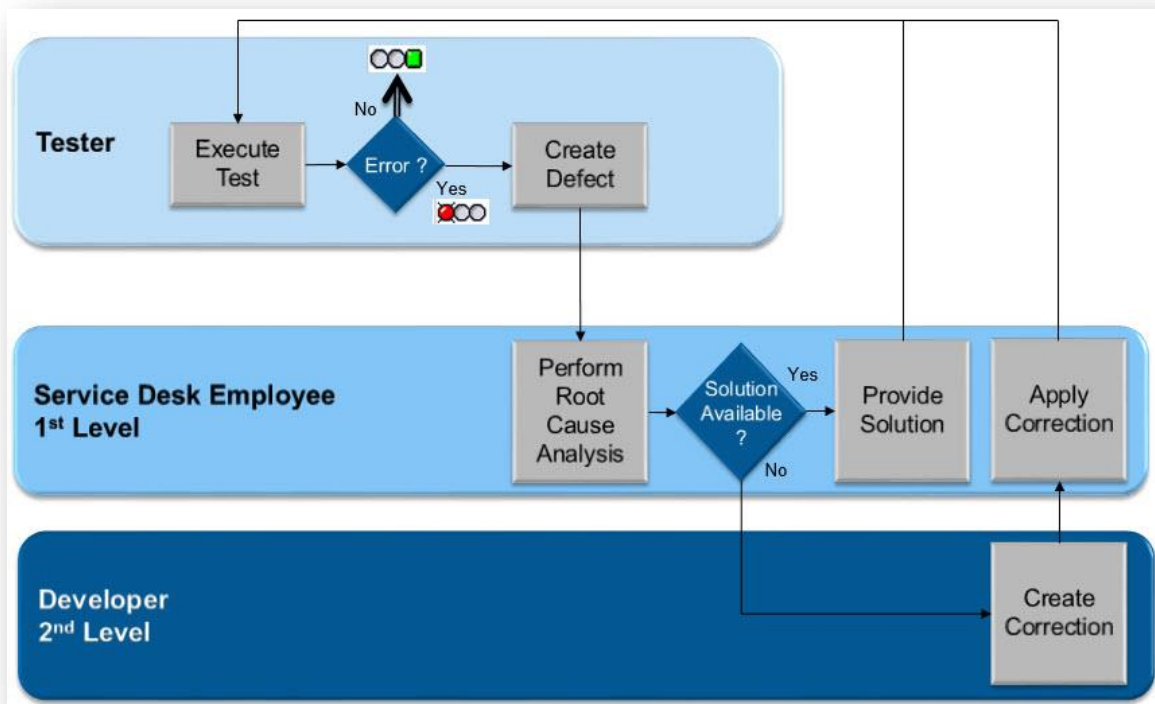
Figure 13 - Test defect raising and resolution process

17.4 Responsibility

The Defect Manager will manage the defect resolution process as follows:

- Defect manager will ensure Solution Manager 7.2 is updated with defect details and status
- Defects will be assigned to the appropriate area for resolution.
- No transport migrations will occur without a defect id being provided.
- Technology or Business teams will update any necessary documents where updates to requirements required as part of a defect resolution.
- Development / build teams will provide fixes as part of the defect resolution where a design or code change has been identified or
- The Defect Manager will convene regular defect meetings to co-ordinate severity and priority of defects raised, in order for timely resolution of defects.

18 TEST DELIVERABLES

The tangible documentation that form the testing deliverables are:

Table 7 - List of key deliverables

Deliverable	Deliverable Description	Project Phase	Dependencies
Test Strategy	This document sets the strategy for testing that will be conducted by the SAP test team (in conjunction with CUSTOMER) for the programme	Explore	CUSTOMER Test Policy
PSV Test Approach	Document used during the kick-off to advise the team of the test approach for that test phase. It will contain the test plan to show what tests will be created in this phase	Realize	Test Strategy
String Test Closure Report	Document that summarises the test phase after execution. It documents the test activities and the final results that will allow stakeholders to make a decision on whether to pass the test phase.	Realize	Test Results, Exit Criteria in Test Strategy
SIT Test Closure Report	Document that summarises the test phase after execution. It documents the test activities and the final results that will allow stakeholders to make a decision on whether to pass the test phase.	Realize	Test Results, Exit Criteria in Test Strategy
PSV Test Closure Report	Document that summarises the test phase after execution. It documents the test activities and the final results that will allow stakeholders to make a decision on whether to pass the test phase.	Realize	Test Results, Exit Criteria in Test Strategy

19 RISKS, ISSUES, ASSUMPTIONS, DEPENDENCIES & DECISIONS (RAIDD)

The test workstream will maintain a RAID log in an Excel format that will be owned by the SAP Test Manager. This RAID log will be reviewed on a weekly basis with the CUSTOMER Test Manager. The log will contain mitigation approaches to be used.

The following items are dependencies before testing can commence:

- Solution scope has been agreed and finalized
- Valid test data is available for testing
- Test strategy is agreed and signed off
- Test plan has been prepared and communicated
- Testing resources are in place and aligned to the test strategy and test plan
- Testable items have been built
- Test tooling is in place and accessible

- Support teams are in place and briefed on the approach

Assumptions

The following assumptions were made during the development of the document:

- Full system landscape readiness must be guaranteed for each test cycle, including any non-SAP systems where applicable.

- Testing team will have some Industry Specific functional experience.

- All systems in scope are within SAP technologies.

- CUSTOMER will make available their internal expert business process resources to become members of the SAP testing team as needed.

- SAP functional consultants, along with CUSTOMER (as needed) will provide all input and data needed for test cases

- CUSTOMER programme is using the Blueprint capability in Solution Manager and all business processes are properly defined and documented to allow for the most efficient change management during the project (and post) as possible.

- CUSTOMER will identify and supply the CUSTOMER test team with the required knowledge to support the testing effort, in particular for non-SAP systems and performance testing

- CUSTOMER will provide business analysts as needed to support testing and signoff the test strategy, test plan and documentation

- All requirements and business process needed for a particular testing cycle will be aligned with the deployment cycles will be available at the start of each project cycles

- Performance Testing - The most important and most used of scenarios for each work stream (chosen with detailed criteria) shall be scripted for the performance test no more than 10 scripts with a maximum of 20 steps/clicks each.

- Test Analyst – One Test Analyst with Testing and functional expertise will be necessary per work stream area.

- All test tooling will be acquired and sufficient licenses available by CUSTOMER before the start of the project.

- All test tooling equipment will be available and ready to use prior than the start of the Realize Phase

- Unit Testing is completed before the start of each String Testing Phase

- Project Management Plans are in place before System Integration Testing commences – governs changes to the system, design decisions, documentation, etc. Specifically:

    o Scope Management Plan

    o Integration Management Plan,

    o Integration Change Control Process

    o Issue Management Process

    o Risk Management Plan

20 APPENDIX

20.1 Glossary of terms

Term	Description
Authorization	Authorization profiles give users their access to the SAP System. They contain authorizations, which are identified using the name of an authorization object and the name of an authorization. If a profile is specified in a user master record, the user is assigned all of the authorizations defined in this profile
Automated testing	Testing undertaken using tools which automate the execution of a test script or technical process
Build cycle Testing	Also known as string testing, this test phase will test scenarios and its variants to check that it meets requirements.
Business Process	This is a set of logically business process which defines the business flow related at the organisational level for <Client Name>; once completion of the task and activities this will enable to achieve a specific business outcome/goal.
Business Scenario	This is a "real life" scenario which occurs within the business based on multiple business processes which are triggered in parallel or sequential to form the end-to-end business flow. The objective is to provide context of business activities / events that will be used to validate the solution and outline boundaries for a required functionality within the business requirements and business processes.
Change control	The process and procedures to identify, document, review, and authorize any changes to the software under configuration management
Configuration management	The process of identifying and defining the deliverable product set in a system, controlling the release and change of these items throughout the system life cycle, recording and reporting the status of product items and change requests, and verifying the completeness and correctness of the product items.
Core Process	A set of related and interdependent process steps that is essential to an organisation so that it can add value. These core process steps must work during system testing.
Cutover	The point in time a new system is implemented and the old system is discontinued.
Cutover Testing	The Cutover test phase will verify all go-live processes including: the technical and functional system deployment, business verifications and processes such as reconciliation, data conversions or migrations with production volumes and production data and finally confirm installation/cut over time window.
Data cleansing	The process to correct data errors in a collection of data in order to bring the level of quality to an acceptable level to meet the information customers' needs.
Data migration	The process of translating data from one format to another. Data migration is necessary when an organization decides to use a new computing systems or database management system that is incompatible with the current system. Typically, data migration is performed by a set of customized programs or scripts that automatically transfer the data.
Data variant	A data variant test case is one where different data types will be entered into a process variant test case, therefore various data types can be tested. Data variants will be planned, prepared and executed by CUSTOMER to allow early knowledge transfer and preparation for UAT.
Defect	Any non-conformance to specified requirements by a component, module or WRICEF.
Development	Changes to a system, in SAP terms this includes ABAP code changes, user exits, custom reports and transactions, SAP Scripts, configuration.
Disaster Recovery testing	The testing of the process of restoring the system to full operation after an interruption or complete loss in service, including equipment repair/replacement, file recovery/restoration, and resumption of service to users.
Functional Analysis	A role which understands Process, business function and design.
Go-live	The point in time a new system is implemented
Governance	The exercise of authority, management and control. Term often used in promoting a culture of participatory governing, where communities are actively involved in decision-making processes. In this instance, for testing, there will be a CUSTOMER and an SAP Quality and Governance Manager.

Term	Description
Integration Test / SIT / System Integration Testing	Tests that validate end-to-end business scenarios within the Requirements Matrix. Coarse detail granularity The purpose of integration testing is to bring all the components that make up the system to be tested, as it will be used in the production environment.
LoadRunner	HP LoadRunner™ is a performance testing product for predicting system behaviour and performance. Using limited hardware resources, LoadRunner emulates hundreds or thousands of concurrent users to put the application through the rigors of real-life user loads.
Manage Your Processes	A FIORI App to administrate the test processes. In this app, which processes should be available in the test tool and change existing or add new test processes can be configured. Adding new process steps can be done manually or via a recording of system activities.
Message Hub	A system through which interfaces pass through between the SAP system and other third party systems.
Non-core system / third party systems / legacy systems	Systems that are in production but not under the control of the project. The project maybe reliant on these systems
OAT	OAT is the operation support organisation's chance to inspect the finished system and to sign-off that they are able to support it in production. It is analogous to BAT, but for operations
Performance Test	Testing to determine the performance of a software product. This could include, load, stress and volume testing.
Plan on a Page	A weekly report produced by all workstreams. The SAP test manager will produce this in collaboration with the CUSTOMER test manager.
PMO / OMG	Project Management Office / Operational Management Group, the overall project planning function
Process Variants	A set of related and interdependent process steps that is essential to an organisation so that it can add value. These process variants are a different way of executing a core variant. They must work during system testing.
Production system	A system that is currently (or will be before go-live) in production in the business
QA System	Quality Assurance system.
QC, Solution Manager 7.2, Solution Manager 7.2	Solution Manager 7.2 ® – planning & defect management tool
QT Pro, Quick Test, QTP	QuickTest™ Professional – An automated testing tool.
Regression Testing	A term that defines the focus and objectives of testing based on the unchanged portion of business functions in a system. Regression verifies that no unwanted changes were introduced to one part of the system as a result of making changes to another part.
Sanity Testing / Shakedown test	Execution of a small subset of the defined tests designed to check the stability of the test environment and to decide if the component or application(s) is ready for detailed testing before entry into a formal testing phase, alternatively referred to as a sanity check.
Solution Manager	SAP's solution for providing support to many parts of the project life cycle. It encompasses many components including a document repository, road maps, change and request management, service desk, access to SAP note system etc.
TCR	Test Completion Report – issued at the end of a testing phase to gain signoff of the completed test phase.
Technical / Basis	Aspects of the solution pertaining to architecture and infrastructure, e.g. the system hardware and software set up, system performance etc. i.e. not business process related.

Term	Description
Test (or Test Script)	A test procedure specification. The complete set of input values, execution preconditions, procedural steps, expected results and execution post conditions, developed for a particular scenario or test condition to verify compliance with the stated requirement(s).
Test Approach	A slide set describing the approach to testing per test phase. It will contain more information than the overall strategy and approach but does not include a detailed schedule.
Test case	The detailed objectives, data, procedures and expected results to conduct a test or part of a test.
Test condition	The attribute to be tested. There may exist multiple test cases to test one test condition
Test Condition	An item or event associated with a component or system that could be verified by one or more Tests, e.g. a function, transaction, feature, quality attribute, or structural element.
Test Levels	Part of the application development lifecycle. Also known as Phase or Stage of Testing. For example, Unit, Build Cycle, Integration, UAT.
Test Phase	A distinct set of testing activities that is organized and managed together in a single phase. A test phase is linked to the responsibilities in a project. Examples of test phases are System Integration Test and User Acceptance Test.
Test scenario	A test scenario documents an individual test which describes a particular way a business process should be tested. It should include the preconditions (what relevant data exists at the start of the test case execution) and inputs.
Test scenario	The high level description of the testing that should be performed in order to prove the requirement(s) under test. This is a group of test cases based on key functionality which are categorised as test scenarios rolling them into business scenarios aligning to business outcomes/goals. The test scenarios identified are Pre-requisite data creation; Ordering; Planning & Execution and Invoicing which are further broken into functional teams Yard Logistics/Transport Management; Transport Planning & Schedule; Transportation Execution Management and Commercials who are responsible to deliver and test the components as required.
Test schedule	The detailed schedule (sequence) of test cases for execution within a test phase, typically this will include dependencies, estimates on timing, resource allocation etc.
Test script	A test script contains the detailed steps required to test a case it is the document that supports a test case, the term can be used synonymously with test case although not all test cases will have scripts, e.g. some tech or OA testing which will use operational support documentation instead of a specially created test script.
Test Step (Procedural Step)	A step within a test. Each procedural step has a clear definition of the action and expected result to validate the requirements under test.
Test tools	Applications used to facilitate testing, includes tools for automation and management.
Test types	Defines the form of testing that will be performed within a Level of testing. For each level, there may be many types of testing performed. A specific type of testing may also be performed at multiple levels of the application development lifecycle. For example, load and volume testing, performance testing
Test Your Processes	The SAP S/4HANA solution also provides test automates and test scripts. This app allows the creation of test plan, adapt customer data in the system and test the configuration changes that have been performed via the Self-Service Configuration UIs.
UAT	User Acceptance Testing. This is where the business users outside of the project team have an opportunity to review the end solution prior to the go live.
Unit Test	Verifies change is correct as per specification. Finest detail granularity testing only a work item from a user story. This is where individual transactions are tested to ensure they meet the requirements specified. This includes verifying program logic, branches, field values and rules, condition boundaries.

20.2 Appendix: Progress Reporting Metrics

	Unit	System	Integration	UAT	Regression
No. and % Test Scenarios Defined		✓	✓	✓	✓
No. and % Test Scripts created		✓	✓	✓	✓
No. and % Completed (passed) Tests	✓	✓	✓	✓	✓
No. and % Tests failed	✓	✓	✓	✓	✓
No. and % Tests in progress	✓	✓	✓	✓	✓
Outstanding Defect Totals	✓	✓	✓	✓	✓
Outstanding defects by functional / technical area	✓	✓	✓	✓	✓
Outstanding Fix Work (estimated man hours)	✓	✓	✓	✓	✓
% Requirements completed		✓	✓	✓	✓

20.3 Appendix: Test Levels

Test Case Classification
Classification of all test cases to define their purpose

UT — **Unit Tests**
- Manual or automated tests performed by developers at software object level

STR — **String Tests**
- Manual tests performed by functional consultants, key user or other expert outside LOB

UAT — **User Acceptance Tests**
- Manual tests performed by business process experts (BPx) or key users

IT — **Integration Tests**
- Manual tests performed by functional consultants, business process experts (BPx) or key users

RT — **Regression Tests**
- Manual or automated tests performed by functional consultants or key users or other expert outside LOB

20.4 Appendix: High level test processes in scope
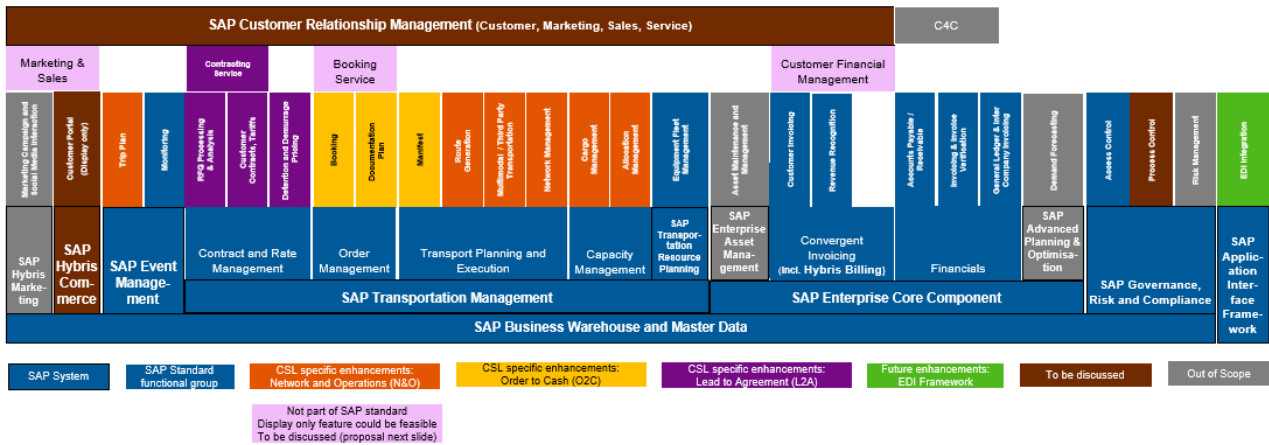
20.5 Appendix: Test Tool Description

SAP Solution Manager 7.2

SAP Solution Manager has comprehensive manual and automation test capabilities that are needed to test SAP Business Suite, SAP S/4HANA and digital industry solutions. It supports SAP, non-SAP and hybrid solutions – on premise and cloud editions. It is widely-adopted by several thousand SAP customers and SAP IT. It supports automated test planning for innovation and maintenance activities using the change impact analyser tool. It offers state-of-the-art test automation with low maintenance for automated test scripts and seamlessly integrated with all SAP Solution Manager 7.2 applications. There is no data replication to third-party repositories required, hence providing low TCO and supports all functional test types, e.g. String Tests, Integration Tests, Regression Tests

SAP Solution Manager - Test Suite
A full-blown application for manual / automated testing and change impact analysis

Functional Scope
- Manual and automated functional tests
- Automated change impact analysis of maintenance activities for test scope optimization of regression tests
- New requirements triggering semi-automated test planning for user acceptance tests and functional integration tests
- High degree of test automation possible
- Supports agile development approach within requirements-to-deploy process through Focused Build for SAP Solution Manager
- Seemlessly integrated with SAP Solution Manager Process Management, Solution Documentation, ChaRM, ITSM, ...

SAP and non-SAP Solutions
- SAP Business Suite
- SAP S/4HANA (On-Premise, Cloud Edition)
- Non-SAP applications (On-Premise, Cloud)

Integration
- Test system refresh and test data provisioning
- 3rd party test automation tools

Single Source of Truth
- All related information in 1 central SAP Solution Manager system
- No complex data replications

SAP Solution Manager Test Suite is the default Test Suite for all SAP customers,
except for customers with a strategic decision for a partner test suite

16

Test Your Processes

Automated customer tests drastically reduce test – specifically regression test – efforts in the implementation project. The SAP S/4HANA solution does not only come with pre-configured business processes, but provides **test automates** and **test scripts**. With these tools and content, the test efforts (today a major portion of the efforts in an implementation project) can be reduced. You can create your own test plan, adapt customer data in the system and test the configuration changes that have been performed via the Self-Service Configuration UIs.

SAP Predefined Test Plan — 0% Coverage — Planned

Adapt test logic automatically

14 Processes | Planned 14 | In Process 0 | Failed 0 | Success 0

Processes

E2E Scenario: Order to Cash - Project Based Services for Germany

E2E Scenario: Sales Order Processing & Accounts Receivable for Germany

E2E Scenario: Procurement Processing & Accounts Payable for Germany

Order to Cash: Sell from Stock for Germany

Manage Your Test Processes

You can administrate the test processes in this area. Here, you decide which processes should be available in the test tool and change existing or add new test processes. Adding new process steps can be done manually or via a recording of system activities.

Manage Your Test Processes

General Information

Process Description: Incoming Payments

Type: Custom

Application Area: Financial Accounting

Process Steps (3)   Search   Add above Add below Delete

	Name	Category
☐	Start Payment Run	Custom
☐	Executing Payments	Custom
☐	Approving the Payment	Custom

Save   Cancel

SAP Appenidx 6 – VPAT

SAP Test Data Migration Server 4.0 SP08 (Web Dynpro for ABAP 7.40)
Accessibility Product Status for WCAG 2.0

Document Classification: Customer
Date: 30.03.2015
Name of Product: SAP Test Data Migration Server 4.0 SP08

Contact for more Information: accessibility@sap.com

Testing Environment: SAP NetWeaver® 7.40; JAWS® for Windows® speech output 12 (64 bit) with English speech output; Microsoft® Windows® 7.2 (64 bit); Windows® Internet Explorer 9 (64 bit)

Support for accessibility feature of this product requires SAP NetWeaver. To receive the document "Front-End Requirements and Infrastructure for Accessibility" as well as the corresponding SAP NetWeaver accessibility status documents, please contact SAP using the e-mail address above.

IMPORTANT NOTICE

Accessibility Product Status WCAG 2.0 - Summary Table

Criterion	Status	Remarks and Explanations
Principle 1: Perceivable Information and user interface components must be presentable to users in ways they can perceive.	supported	
Principle 2: Operable User interface components and navigation must be operable.	supported	
Principle 3: Understandable Information and the operation of user interface must be understandable.	supported with exceptions	For details see below.
Principle 4: Robust Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.	supported with exceptions	For details see below.

Accessibility Product Status WCAG 2.0 - Detail

Criterion	Priority	Status	Remarks and Explanations
Principle 1 - Guideline 1.1.			
Success Criterion 1.1.1 Non-text Content: All non-text content that is presented to the user has a text alternative that serves the equivalent purpose, except for the situations listed below. Controls, Input: If non-text content is a control or accepts user input, then it has a name that describes its purpose. (Refer to Guideline 4.1 for additional requirements for controls and content that accepts user input.) Time-Based Media: If non-text content is time-based media, then text alternatives at least provide descriptive identification of the non-text content. (Refer to Guideline 1.2 for additional requirements for media.) Test: If non-text content is a test or exercise that would be invalid if presented in text, then text alternatives at least provide descriptive identification of the non-text content. Sensory: If non-text content is primarily intended to create a specific sensory experience, then text alternatives at least provide descriptive identification of the non-text content. CAPTCHA: If the purpose of non-text content is to confirm that content is being accessed by a person rather than a computer, then text alternatives that identify and describe the purpose of the non-text content are provided, and alternative forms of CAPTCHA using output modes for different types of sensory perception are provided to accommodate different disabilities. Decoration, Formatting, Invisible: If non-text content is pure decoration, is used only for visual formatting, or is not presented to users, then it is implemented in a way that it can be ignored by assistive technology.	Level A	supported	
Principle 1 - Guideline 1.2.			
Success Criterion 1.2.1 Audio-only and Video-only (Prerecorded): For prerecorded audio-only and prerecorded video-only media, the following are true, except when the audio or video is a media alternative for text and is clearly labeled as such: Prerecorded Audio-only: An alternative for time-based media is provided that presents equivalent information for prerecorded audio-only content. Prerecorded Video-only: Either an alternative for time-based media or an audio track is provided that presents equivalent information for prerecorded video-only content.	Level A	not applicable	
Success Criterion 1.2.2 Captions (Prerecorded): Captions are provided for all prerecorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labeled as such.	Level A	not applicable	
Succes Criterion 1.2.3 Audio Description or Media Alternative (Prerecorded): An alternative for time-based media or audio description of the prerecorded video content is provided for synchronized media, except when the media is a media alternative for text and is clearly labeled as such.	Level A	not applicable	

Success Criterion 1.2.4 Captions (Live): Captions are provided for all live audio content in synchronized media.	Level AA	not applicable	
Success Criterion 1.2.5 Audio Description (Prerecorded): Audio description is provided for all prerecorded video content in synchronized media.	Level AA	not applicable	
Principle 1 - Guideline 1.3.			
Success Criterion 1.3.1 Info and Relationships: Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text.	Level A	supported	
Success Criterion 1.3.2 Meaningful Sequence: When the sequence in which content is presented affects its meaning, a correct reading sequence can be programmatically determined	Level A	supported	
Success Criterion 1.3.3 Sensory Characteristics: Instructions provided for understanding and operating content do not rely solely on sensory characteristics of components such as shape, size, visual location, orientation, or sound.	Level A	supported	
Principle 1 - Guideline 1.4.			
Success Criterion 1.4.1 Use of Color: Color is not used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.	Level A	supported	
Success Criterion 1.4.2 Audio Control: If any audio on a Web page plays automatically for more than 3 seconds, either a mechanism is available to pause or stop the audio, or a mechanism is available to control audio volume independently from the overall system volume level.	Level A	not applicable	
Success Criterion 1.4.3 Contrast (Minimum): The visual presentation of text and images of text has a contrast ratio of at least 4.5:1, except for the following: Large Text: Large-scale text and images of large-scale text have a contrast ratio of at least 3:1; Incidental: Text or images of text that are part of an inactive user interface component, that are pure decoration, that are not visible to anyone, or that are part of a picture that contains significant other visual content, have no contrast requirement. Logotypes: Text that is part of a logo or brand name has no minimum contrast requirement.	Level AA	supported	
Success Criterion 1.4.4 Resize text: Except for captions and images of text, text can be resized without assistive technology up to 200 percent without loss of content or functionality.	Level AA	supported	
Success Criterion 1.4.5 Images of Text: If the technologies being used can achieve the visual presentation, text is used to convey information rather than images of text except for the following: Customizable: The image of text can be visually customized to the user's requirements; Essential: A particular presentation of text is essential to the information being conveyed. Note: Logotypes (text that is part of a logo or brand name) are considered essential.	Level AA	supported	
Principle 2 - Guideline 2.1.			
Success Criterion 2.1.1 Keyboard: All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes, except where the underlying function requires input that depends on the path of the user's movement and not just the endpoints. Note 1: This exception relates to the underlying function, not the input technique. For example, if using handwriting to enter text, the input technique (handwriting) requires path-dependent input but the underlying function (text input) does not. Note 2: This does not forbid and should not discourage providing mouse input or other input methods in addition to keyboard operation.	Level A	supported	
Success Criterion 2.1.2 No Keyboard Trap: If keyboard focus can be moved to a component of the page using a keyboard interface, then focus can be moved away from that component using only a keyboard interface, and, if it requires more than unmodified arrow or tab keys or other standard exit methods, the user is advised of the method for moving focus away.	Level A	supported	
Principle 2 - Guideline 2.2.			
Success Criterion 2.2.1 Timing Adjustable: For each time limit that is set by the content, at least one of the following is true: (Level A) Turn off: The user is allowed to turn off the time limit before encountering it; or Adjust: The user is allowed to adjust the time limit before encountering it over a wide range that is at least ten times the length of the default setting; or Extend: The user is warned before time expires and given at least 20 seconds to extend the time limit with a simple action (for example, "press the space bar"), and the user is allowed to extend the time limit at least ten times; or Real-time Exception: The time limit is a required part of a real-time event (for example, an auction), and no alternative to the time limit is possible; or Essential Exception: The time limit is essential and extending it would invalidate the activity; or 20 Hour Exception: The time limit is longer than 20 hours.	Level A	not applicable	

Success Criterion 2.2.2 Pause, Stop, Hide: For moving, blinking, scrolling, or auto-updating information, all of the following are true: Moving, blinking, scrolling: For any moving, blinking or scrolling information that (1) starts automatically, (2) lasts more than five seconds, and (3) is presented in parallel with other content, there is a mechanism for the user to pause, stop, or hide it unless the movement, blinking, or scrolling is part of an activity where it is essential; and Auto-updating: For any auto-updating information that (1) starts automatically and (2) is presented in parallel with other content, there is a mechanism for the user to pause, stop, or hide it or to control the frequency of the update unless the auto-updating is part of an activity where it is essential.	Level A	not applicable	
Principle 2 - Guideline 2.3.			
Success Criterion 2.3.1 Three Flashes or Below Threshold: Web pages do not contain anything that flashes more than three times in any one second period, or the flash is below the general flash and red flash thresholds.	Level A	not applicable	
Principle 2 - Guideline 2.4.			
Success Criterion 2.4.1 Bypass Blocks: A mechanism is available to bypass blocks of content that are repeated on multiple Web pages.	Level A	supported	
Success Criterion 2.4.2 Page Titled: Web pages have titles that describe topic or purpose.	Level A	supported	
Success Criterion 2.4.3 Focus Order: If a Web page can be navigated sequentially and the navigation sequences affect meaning or operation, focusable components receive focus in an order that preserves meaning and operability.	Level A	supported	
Success Criterion 2.4.4 Link Purpose (In Context): The purpose of each link can be determined from the link text alone or from the link text together with its programmatically determined link context, except where the purpose of the link would be ambiguous to users in general.	Level A	supported	
Success Criterion 2.4.5 Multiple Ways: More than one way is available to locate a Web page within a set of Web pages except where the Web Page is the result of, or a step in, a process.	Level AA	supported	
Success Criterion 2.4.6 Headings and Labels: Headings and labels describe topic or purpose.	Level AA	supported	
Success Criterion 2.4.7 Focus Visible: Any keyboard operable user interface has a mode of operation where the keyboard focus indicator is visible.	Level AA	supported	
Principle 3 - Guideline 3.1.			
Success Criterion 3.1.1 Language of Page: The default human language of each Web page can be programmatically determined.	Level A	supported with exceptions	All UI elements: It is not possible to mark and detect if more than one language is used.
Success Criterion 3.1.2 Language of Parts: The human language of each passage or phrase in the content can be programmatically determined except for proper names, technical terms, words of indeterminate language, and words or phrases that have become part of the vernacular of the immediately surrounding text.	Level AA	supported with exceptions	All UI elements: It is not possible to mark and detect if more than one language is used.
Principle 3 - Guideline 3.2.			
Success Criterion 3.2.1. On Focus: When any component receives focus, it does not initiate a change of context.	Level A	supported	
Success Criterion 3.2.2 On Input: Changing the setting of any user interface component does not automatically cause a change of context unless the user has been advised of the behavior before using the component.	Level A	supported	
Success Criterion 3.2.3 Consistent Navigation: Navigational mechanisms that are repeated on multiple Web pages within a set of Web pages occur in the same relative order each time they are repeated, unless a change is initiated by the user.	Level AA	supported	
Success Criterion 3.2.4 Consistent Identification: Components that have the same functionality within a set of Web pages are identified consistently.	Level AA	supported	
Principle 3 - Guideline 3.3.			
Success Criterion 3.3.1 Error Identification: If an input error is automatically detected, the item that is in error is identified and the error is described to the user in text.	Level A	supported	
Success Criterion 3.3.2 Labels or Instructions: Labels or instructions are provided when content requires user input.	Level A	supported	
Success Criterion 3.3.3 Error Suggestion: If an input error is automatically detected and suggestions for correction are known, then the suggestions are provided to the user, unless it would jeopardize the security or purpose of the content.	Level AA	supported	
Success Criterion 3.3.4 Error Prevention (Legal, Financial, Data): For Web pages that cause legal commitments or financial transactions for the user to occur, that modify or delete user-controllable data in data storage systems, or that submit user test responses, at least one of the following is true: Reversible: Submissions are reversible. Checked: Data entered by the user is checked for input errors and the user is provided an opportunity to correct them. Confirmed: A mechanism is available for reviewing, confirming, and correcting information before finalizing the submission.	Level AA	supported	
Principle 4 - Guideline 4.1.			

Success Criterion 4.1.1 Parsing: In content implemented using markup languages, elements have complete start and end tags, elements are nested according to their specifications, elements do not contain duplicate attributes, and any IDs are unique, except where the specifications allow these features. Note: Start and end tags that are missing a critical character in their formation, such as a closing angle bracket or a mismatched attribute value quotation mark are not complete.	Level A	not supported	
Success Criterion 4.1.2 Name, Role, Value: For all user interface components (including but not limited to: form elements, links and components generated by scripts), the name and role can be programmatically determined; states, properties, and values that can be set by the user can be programmatically set; and notification of changes to these items is available to user agents, including assistive technologies.	Level A	supported with exceptions	Dropdown list box: Screen reader announces "edit" before each list item when the list item is accessed using arrow keys. Therefore screen reader announcement is "edit list item". Group: Screen reader does not announce certain group headers: GridLayout 4L1, GridLayout 4M, GridLayout 4L3, GridLayout 4R1.

Introduction to Voluntary Product Accessibility Template® (VPAT®) for SAP Test Data Migration Server 4.0 SP13

Document Classification: Customer

To accurately describe the accessibility capability of SAP Test Data Migration Server 4.0 SP13, more than a single VPAT document is needed. Below is a list of VPAT documents associated with SAP Test Data Migration Server 4.0 SP13.

List of VPAT documents for SAP Test Data Migration Server 4.0 SP13:

[SAP Test Data Migration Server 4.0 SP13 (Web Dynpro for ABAP)](#)
[SAP Test Data Migration Server 4.0 SP13 (SAP GUI)](#)

SAP Test Data Migration Server 4.0 SP13 (Web Dynpro for ABAP)
Voluntary Product Accessibility Template® (VPAT®)

Contact for more Information: accessibility@sap.com

Testing Environment: SAP enhancement package 2 for SAP NetWeaver® 7.0; JAWS® for Windows® speech output 15 (64 bit) with English speech outpu
Microsoft® Windows® 7 (64 bit); Windows® Internet Explorer 11 (64 bit)

Support for accessibility feature of this product requires SAP NetWeaver. To receive the document "Front-End Requirements and Infrastructure for Accessibility" as well as the corresponding
documents, please contact SAP using the e-mail address above.

IMPORTANT NOTICE

Voluntary Product Accessibility Template - Summary Table

Criteria	Supporting Features	Remarks and explanations
Section 1194.21 Software Applications and Operating Systems	not applicable	
Section 1194.22 Web-based intranet and internet information and applications	supported with exceptions	See below for details.
Section 1194.23 Telecommunications Products	not applicable	
Section 1194.24 Video and Multi-media Products	not applicable	
Section 1194.25 Self-Contained, Closed Products	not applicable	
Section 1194.26 Desktop and Portable Computers	not applicable	
Section 1194.31 Functional Performance Criteria	supported with exceptions	See below for details.
Section 1194.41 (a) Information, Documentation and Support	supported with exceptions	See below for details.

Voluntary Product Accessibility Template - Section 1194.21 Software Applications and Operating Systems - Detail

Criteria	Supporting Features	Remarks and explanations
(a) When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.	not applicable	
(b) Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.	not applicable	
(c) A well-defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes. The focus shall be programmatically exposed so that Assistive Technology can track focus and focus changes.	not applicable	
(d) Sufficient information about a user interface element including the identity, operation and state of the element shall be available to Assistive Technology. When an image represents a program element, the information conveyed by the image must also be available in text.	not applicable	
(e) When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.	not applicable	
(f) Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.	not applicable	
(g) Applications shall not override user selected contrast and color selections and other individual display attributes.	not applicable	
(h) When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.	not applicable	
(i) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.	not applicable	
(j) When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.	not applicable	

Criteria	Supporting Features	Remarks and explanations
(k) Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.	not applicable	
(l) When electronic forms are used, the form shall allow people using Assistive Technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.	not applicable	

Voluntary Product Accessibility Template - Section 1194.22 Web-based Intranet and Internet information and applications - Detail

Criteria	Supporting Features	Remarks and explanations
(a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).	supported	
(b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.	not applicable	
(c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.	supported with exceptions	[Package:Specify the data slice date] Icon: The application uses GREEN color icon to convey certain information about status of some elemen in terms of some alternative texts.
(d) Documents shall be organized so they are readable without requiring an associated style sheet.	not supported	
(e) Redundant text links shall be provided for each active region of a server-side image map.	not applicable	
(f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.	not applicable	
(g) Row and column headers shall be identified for data tables.	supported	
(h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.	supported	
(i) Frames shall be titled with text that facilitates frame identification and navigation.	supported	
(j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.	not applicable	
(k) A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.	not applicable	
(l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by Assistive Technology.	supported with exceptions	All UI elements: The application uses scripting languages to display content, but the information provided by the scr
(m) When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).	not applicable	
(n) When electronic forms are designed to be completed on-line, the form shall allow people using Assistive Technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.		Toggle Button: Even after the button 'View element explorer' is activated, screen reader still reads 'To activate pres Date navigator: The current date and the current calendar week are not identified. Text: Text presentation information for all the texts in the formatted text view is not read. Screen reader reads "edit" at the end of headers. Dropdown, Input field: Drop down list boxes, input field are identified as 'Read-only'. Button, Link, Toolbar: Extra word 'Table' is made at the end of the toolbar reading.Also "Table" is read at the beginning of "Link To URL", "Toolbar Link To Action", "Toolbar Link To URL","Tag Cloud", "Page Header Title". Breadcrumb: The identity of breadcrumb is not conveyed, it is just read as link. Also the state of UI 'Selected, dis; reader. Button: a) Buttons are not identified in some situations when button displayed as an icon. Also the expand extra reading of URL. b) The state of the toggle button 'Toggled' or 'not toggled' is not read. c) The tooltip provided for 'Browse' button is incorrect.

	supported with exceptions	Tagcloud: When the focus is on the complete set of tagcloud, all the UI elements inside it is been read. Text presentation information inside tag cloud is not read. Threshold Slider: Upon navigating within the Threshold Slider using arrow keys, 'blank' is appended to the reading. IFrame: An extra tab stop with information "Test Page" is present in the Iframe. Splitter Control: The associated functionality of the Splitter control cannot be resized using keyboard. Menu: Closure of any of the opened menu bar 'Menu2, 3, 4, 5' using esc key, focus moves to 'Menu1'. [Portfolio] Link: The link 'Analysis' has an extra tab stop and is read out as table with 4 columns and 1 row. Tray: There is an extra tab stop along with speech output, after 'Favorite' tray. Button: The buttons 'Expand/Collapse' are not reachable via keyboard. [Project Composer] Icon: The label 'Project Template Started for the "Work…' … [User lock in the reciever client] Group: The 'documentation' group is identified as table, when accessed. [Package:Specify the data slice date] Icon: The application uses GREEN color icon to convey certain information about status of some elemen in terms of some alternative texts. [Project] Group: The group names 'Project Data', 'Project Template' are not reachable or accessible using keyboard Button: On activating 'Edit' button focus moves to the header 'Project Test Proj'. [Project Template] Text: Once any project is been deleted, the 'Success/Confirmation' message stating the deletion of proje informed that the 'Project is successfully deleted'. All UI elements: The application uses scripting languages to display content, but the information provided by the scr
(o) A method shall be provided that permits users to skip repetitive navigation links.	supported	
(p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.	not applicable	

Voluntary Product Accessibility Template - Section 1194.23 Telecommunications Products - Detail		
Criteria	**Supporting Features**	**Remarks and explanations**
(a) Telecommunications products or systems which provide a function allowing voice communication and which do not themselves provide a TTY functionality shall provide a standard non-acoustic connection point for TTYs. Microphones shall be capable of being turned on and off to allow the user to intermix speech with TTY use.	not applicable	
(b) Telecommunications products which include voice communication functionality shall support all commonly used cross-manufacturer non-proprietary standard TTY signal protocols.	not applicable	
(c) Voice mail, auto-attendant, and interactive voice response telecommunications systems shall be usable by TTY users with their TTYs.	not applicable	
(d) Voice mail, messaging, auto-attendant, and interactive voice response telecommunications systems that require a response from a user within a time interval, shall give an alert when the time interval is about to run out, and shall provide sufficient time for the user to indicate more time is required.	not applicable	
(e) Where provided, caller identification and similar telecommunications functions shall also be available for users of TTYs, and for users who cannot see displays.	not applicable	
(f) For transmitted voice signals, telecommunications products shall provide a gain adjustable up to a minimum of 20 dB. For incremental volume control, at least one intermediate step of 12 dB of gain shall be provided.	not applicable	
(g) If the telecommunications product allows a user to adjust the receive volume, a function shall be provided to automatically reset the volume to the default level after every use.	not applicable	

Criteria	Supporting Features	Remarks and explanations
(h) Where a telecommunications product delivers output by an audio transducer which is normally held up to the ear, a means for effective magnetic wireless coupling to hearing technologies shall be provided.	not applicable	
(i) Interference to hearing technologies (including hearing aids, cochlear implants, and assistive listening devices) shall be reduced to the lowest possible level that allows a user of hearing technologies to utilize the telecommunications product.	not applicable	
(j) Products that transmit or conduct information or communication, shall pass through cross-manufacturer, non-proprietary, industry-standard codes, translation protocols, formats or other information necessary to provide the information or communication in a usable format. Technologies which use encoding, signal compression, format transformation, or similar techniques shall not remove information needed for access or shall restore it upon delivery.	not applicable	
(k)(1) Products which have mechanically operated controls or keys shall comply with the following: Controls and Keys shall be tactilely discernible without activating the controls or keys.	not applicable	
(k)(2) Products which have mechanically operated controls or keys shall comply with the following: Controls and Keys shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls and keys shall be 5 lbs. (22.2N) maximum.	not applicable	
(k)(3) Products which have mechanically operated controls or keys shall comply with the following: If key repeat is supported, the delay before repeat shall be adjustable to at least 2 seconds. Key repeat rate shall be adjustable to 2 seconds per character.	not applicable	
(k)(4) Products which have mechanically operated controls or keys shall comply with the following: The status of all locking or toggle controls or keys shall be visually discernible, and discernible either through touch or sound.	not applicable	

Voluntary Product Accessibility Template - Section 1194.24 Video and Multi-media Products - Detail

Criteria	Supporting Features	Remarks and explanations
a) All analog television displays 13 inches and larger, and computer equipment that includes analog television receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals. As soon as practicable, but not later than July 1, 2002, widescreen digital television (DTV) displays measuring at least 7.8 inches vertically, DTV sets with conventional displays measuring at least 13 inches vertically, and stand-alone DTV tuners, whether or not they are marketed with display screens, and computer equipment that includes DTV receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals.	not applicable	
(b) Television tuners, including tuner cards for use in computers, shall be equipped with secondary audio program playback circuitry.	not applicable	
(c) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain speech or other audio information necessary for the comprehension of the content, shall be open or closed captioned.	not applicable	
(d) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain visual information necessary for the comprehension of the content, shall be audio described.	not applicable	
(e) Display or presentation of alternate text presentation or audio descriptions shall be user-selectable unless permanent.	not applicable	

Voluntary Product Accessibility Template - Section 1194.25 Self-Contained, Closed Products - Detail

Criteria	Supporting Features	Remarks and explanations
(a) Self contained products shall be usable by people with disabilities without requiring an end-user to attach Assistive Technology to the product. Personal headsets for private listening are not Assistive Technology.	not applicable	
(b) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.	not applicable	
(c) Where a product utilizes touchscreens or contact-sensitive controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).	not applicable	
(d) When biometric forms of user identification or control are used, an alternative form of identification or activation, which does not require the user to possess particular biological characteristics, shall also be provided.	not applicable	

Criteria	Supporting Features	Remarks and explanations
(e) When products provide auditory output, the audio signal shall be provided at a standard signal level through an industry standard connector that will allow for private listening. The product must provide the ability to interrupt, pause, and restart the audio at anytime.	not applicable	
(f) When products deliver voice output in a public area, incremental volume control shall be provided with output amplification up to a level of at least 65 dB. Where the ambient noise level of the environment is above 45 dB, a volume gain of at least 20 dB above the ambient level shall be user selectable. A function shall be provided to automatically reset the volume to the default level after every use.	not applicable	
(g) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.	not applicable	
(h) When a product permits a user to adjust color and contrast settings, a range of color selections capable of producing a variety of contrast levels shall be provided.	not applicable	
(i) Products shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.	not applicable	
(j) (1) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following: The position of any operable control shall be determined with respect to a vertical plane, which is 48 inches in length, centered on the operable control, and at the maximum protrusion of the product within the 48 inch length.	not applicable	
(j)(2) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following: Where any operable control is 10 inches or less behind the reference plane, the height shall be 54 inches maximum and 15 inches minimum above the floor.	not applicable	
(j)(3) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following: Where any operable control is more than 10 inches and not more than 24 inches behind the reference plane, the height shall be 46 inches maximum and 15 inches minimum above the floor.	not applicable	
(j)(4) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following: Operable controls shall not be more than 24 inches behind the reference plane.	not applicable	

Voluntary Product Accessibility Template - Section 1194.26 Desktop and Portable Computers - Detail		
Criteria	**Supporting Features**	**Remarks and explanations**
(a) All mechanically operated controls and keys shall comply with §1194.23 (k) (1) through (4).	not applicable	
(b) If a product utilizes touchscreens or touch-operated controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).	not applicable	
(c) When biometric forms of user identification or control are used, an alternative form of identification or activation, which does not require the user to possess particular biological characteristics, shall also be provided.	not applicable	
(d) Where provided, at least one of each type of expansion slots, ports and connectors shall comply with publicly available industry standards	not applicable	

Voluntary Product Accessibility Template - Section 1194.31 Functional Performance Criteria - Detail		
Criteria	**Supporting Features**	**Remarks and explanations**
(a) At least one mode of operation and information retrieval that does not require user vision shall be provided, or support for Assistive Technology used by people who are blind or visually impaired shall be provided.	supported with exceptions	Partial support provided by screen reader. Please refer to the previous applicable VPAT sections.
(b) At least one mode of operation and information retrieval that does not require visual acuity greater than 20/70 shall be provided in audio and enlarged print output working together or independently, or support for Assistive Technology used by people who are visually impaired shall be provided.	supported with exceptions	Partial support provided by screen reader. Please refer to the previous applicable VPAT sections.
(c) At least one mode of operation and information retrieval that does not require user hearing shall be provided, or support for Assistive Technology used by people who are deaf or hard of hearing shall be provided.	supported	
(d) Where audio information is important for the use of a product, at least one mode of operation and information retrieval shall be provided in an enhanced auditory fashion, or support for assistive hearing devices shall be provided.	not applicable	

Criteria	Supporting Features	Remarks and explanations
(e) At least one mode of operation and information retrieval that does not require user speech shall be provided, or support for Assistive Technology used by people with disabilities shall be provided.	not applicable	
(f) At least one mode of operation and information retrieval that does not require fine motor control or simultaneous actions and that is operable with limited reach and strength shall be provided.	supported with exceptions	Partial support provided by keyboard access. Please refer to the previous applicable VPAT section:

Voluntary Product Accessibility Template - Section 1194.41 Information, Documentation, and Support - Detail

Criteria	Supporting Features	Remarks and explanations
(a) Product support documentation provided to end-users shall be made available in alternate formats upon request, at no additional charge.	Supported with exceptions and additional charges may apply.	Accessibility format of documentation is available upon request by contacting accessibility@sap.co
(b) End-users shall have access to a description of the accessibility and compatibility features of products in alternate formats or alternate methods upon request, at no additional charge.	Supported with exceptions and additional charges may apply.	Users may contact accessibility@sap.com or utilize the customer message system to request supp
(c) Support services for products shall accommodate the communication needs of end-users with disabilities.	supported	Users may contact accessibility@sap.com or utilize the customer message system to request supp

SAP Test Data Migration Server 4.0 SP13 (SAP GUI)
Voluntary Product Accessibility Template® (VPAT®)

Document Classification: Customer
Date: 10.05.2017
Name of Product: SAP Test Data Migration Server 4.0 SP13

Contact for more Information: accessibility@sap.com

Testing Environment: SAP enhancement package 2 for SAP NetWeaver® 7.0; JAWS® for Windows® speech output 15 (64 bit) with English speech outpu
SAP GUI 740 and Patch 2; SAPGUI Screenreader extension version: 39; Microsoft® Windows® 7 (64 bit)

Support for accessibility feature of this product requires SAP NetWeaver. To receive the document "Front-End Requirements and Infrastructure for Accessibility" as well as the corresponding documents, please contact SAP using the e-mail address above.

IMPORTANT NOTICE

Voluntary Product Accessibility Template - Summary Table

Criteria	Supporting Features	Remarks and explanations
Section 1194.21 Software Applications and Operating Systems	supported with exceptions	See below for details.
Section 1194.22 Web-based intranet and internet information and applications	not applicable	
Section 1194.23 Telecommunications Products	not applicable	
Section 1194.24 Video and Multi-media Products	not applicable	
Section 1194.25 Self-Contained, Closed Products	not applicable	
Section 1194.26 Desktop and Portable Computers	not applicable	
Section 1194.31 Functional Performance Criteria	supported with exceptions	See below for details.
Section 1194.41 (a) Information, Documentation and Support	supported with exceptions	See below for details.

Voluntary Product Accessibility Template - Section 1194.21 Software Applications and Operating Systems - Detail

Criteria	Supporting Features	Remarks and explanations
(a) When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.	supported with exceptions	In table control, when short cut key Ctrl+Home is pressed at any row then focus remains at the sam Having only a list to show on the screen and pressing Ctrl+Tab then the focus is trapped at the Ent When using Calendar Control in horizontal navigation layout and the focus marks the whole calenda this group, but the current date from within the group.
(b) Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.	not applicable	
(c) A well-defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes. The focus shall be programmatically exposed so that Assistive Technology can track focus and focus changes.	supported	
(d) Sufficient information about a user interface element including the identity, operation and state of the element shall be available to Assistive Technology. When an image represents a program element, the information conveyed by the image must also be available in text.	supported with exceptions	SAP Toolbar Control: No announcement of Keyboard shortcuts of functions in dropdown menu.
(e) When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.	supported	
(f) Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.	not applicable	
(g) Applications shall not override user selected contrast and color selections and other individual display attributes.	supported	
(h) When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.	not applicable	
(i) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.	supported	
(j) When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.	supported	

Criteria	Supporting Features	Remarks and explanations
(k) Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.	not applicable	
(l) When electronic forms are used, the form shall allow people using Assistive Technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.	supported with exceptions	SAP Toolbar Control: No announcement of Keyboard shortcuts of functions in dropdown menu. In table control, when short cut key Ctrl+Home is pressed at any row then focus remains at the sam During navigation via Strg+Tabu on a screen containing only one List, the focus is trapped at the E When using Calendar Control in horizontal navigation layout and the focus marks the whole calend this group, but the current date from within the group.

Voluntary Product Accessibility Template - Section 1194.22 Web-based Intranet and Internet information and applications - Detail

Criteria	Supporting Features	Remarks and explanations
(a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).	not applicable	
(b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.	not applicable	
(c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.	not applicable	
(d) Documents shall be organized so they are readable without requiring an associated style sheet.	not applicable	
(e) Redundant text links shall be provided for each active region of a server-side image map.	not applicable	
(f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.	not applicable	
(g) Row and column headers shall be identified for data tables.	not applicable	
(h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.	not applicable	
(i) Frames shall be titled with text that facilitates frame identification and navigation.	not applicable	
(j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.	not applicable	
(k) A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.	not applicable	
(l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by Assistive Technology.	not applicable	
(m) When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).	not applicable	
(n) When electronic forms are designed to be completed on-line, the form shall allow people using Assistive Technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.	not applicable	
(o) A method shall be provided that permits users to skip repetitive navigation links.	not applicable	
(p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.	not applicable	

Voluntary Product Accessibility Template - Section 1194.23 Telecommunications Products - Detail

Criteria	Supporting Features	Remarks and explanations
(a) Telecommunications products or systems which provide a function allowing voice communication and which do not themselves provide a TTY functionality shall provide a standard non-acoustic connection point for TTYs. Microphones shall be capable of being turned on and off to allow the user to intermix speech with TTY use.	not applicable	
(b) Telecommunications products which include voice communication functionality shall support all commonly used cross-manufacturer non-proprietary standard TTY signal protocols.	not applicable	
(c) Voice mail, auto-attendant, and interactive voice response telecommunications systems shall be usable by TTY users with their TTYs.	not applicable	

Criteria	Supporting Features	Remarks and explanations
(d) Voice mail, messaging, auto-attendant, and interactive voice response telecommunications systems that require a response from a user within a time interval, shall give an alert when the time interval is about to run out, and shall provide sufficient time for the user to indicate more time is required.	not applicable	
(e) Where provided, caller identification and similar telecommunications functions shall also be available for users of TTYs, and for users who cannot see displays.	not applicable	
(f) For transmitted voice signals, telecommunications products shall provide a gain adjustable up to a minimum of 20 dB. For incremental volume control, at least one intermediate step of 12 dB of gain shall be provided.	not applicable	
(g) If the telecommunications product allows a user to adjust the receive volume, a function shall be provided to automatically reset the volume to the default level after every use.	not applicable	
(h) Where a telecommunications product delivers output by an audio transducer which is normally held up to the ear, a means for effective magnetic wireless coupling to hearing technologies shall be provided.	not applicable	
(i) Interference to hearing technologies (including hearing aids, cochlear implants, and assistive listening devices) shall be reduced to the lowest possible level that allows a user of hearing technologies to utilize the telecommunications product.	not applicable	
(j) Products that transmit or conduct information or communication, shall pass through cross-manufacturer, non-proprietary, industry-standard codes, translation protocols, formats or other information necessary to provide the information or communication in a usable format. Technologies which use encoding, signal compression, format transformation, or similar techniques shall not remove information needed for access or shall restore it upon delivery.	not applicable	
(k)(1) Products which have mechanically operated controls or keys shall comply with the following: Controls and Keys shall be tactilely discernible without activating the controls or keys.	not applicable	
(k)(2) Products which have mechanically operated controls or keys shall comply with the following: Controls and Keys shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls and keys shall be 5 lbs. (22.2N) maximum.	not applicable	
(k)(3) Products which have mechanically operated controls or keys shall comply with the following: If key repeat is supported, the delay before repeat shall be adjustable to at least 2 seconds. Key repeat rate shall be adjustable to 2 seconds per character.	not applicable	
(k)(4) Products which have mechanically operated controls or keys shall comply with the following: The status of all locking or toggle controls or keys shall be visually discernible, and discernible either through touch or sound.	not applicable	

Voluntary Product Accessibility Template - Section 1194.24 Video and Multi-media Products - Detail

Criteria	Supporting Features	Remarks and explanations
a) All analog television displays 13 inches and larger, and computer equipment that includes analog television receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals. As soon as practicable, but not later than July 1, 2002, widescreen digital television (DTV) displays measuring at least 7.8 inches vertically, DTV sets with conventional displays measuring at least 13 inches vertically, and stand-alone DTV tuners, whether or not they are marketed with display screens, and computer equipment that includes DTV receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals.	not applicable	
(b) Television tuners, including tuner cards for use in computers, shall be equipped with secondary audio program playback circuitry.	not applicable	
(c) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain speech or other audio information necessary for the comprehension of the content, shall be open or closed captioned.	not applicable	
(d) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain visual information necessary for the comprehension of the content, shall be audio described.	not applicable	
(e) Display or presentation of alternate text presentation or audio descriptions shall be user-selectable unless permanent.	not applicable	

Voluntary Product Accessibility Template - Section 1194.25 Self-Contained, Closed Products - Detail

Criteria	Supporting Features	Remarks and explanations

Criteria	Supporting Features	Remarks and explanations
(a) Self contained products shall be usable by people with disabilities without requiring an end-user to attach Assistive Technology to the product. Personal headsets for private listening are not Assistive Technology.	not applicable	
(b) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.	not applicable	
(c) Where a product utilizes touchscreens or contact-sensitive controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).	not applicable	
(d) When biometric forms of user identification or control are used, an alternative form of identification or activation, which does not require the user to possess particular biological characteristics, shall also be provided.	not applicable	
(e) When products provide auditory output, the audio signal shall be provided at a standard signal level through an industry standard connector that will allow for private listening. The product must provide the ability to interrupt, pause, and restart the audio at anytime.	not applicable	
(f) When products deliver voice output in a public area, incremental volume control shall be provided with output amplification up to a level of at least 65 dB. Where the ambient noise level of the environment is above 45 dB, a volume gain of at least 20 dB above the ambient level shall be user selectable. A function shall be provided to automatically reset the volume to the default level after every use.	not applicable	
(g) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.	not applicable	
(h) When a product permits a user to adjust color and contrast settings, a range of color selections capable of producing a variety of contrast levels shall be provided.	not applicable	
(i) Products shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.	not applicable	
(j) (1) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following: The position of any operable control shall be determined with respect to a vertical plane, which is 48 inches in length, centered on the operable control, and at the maximum protrusion of the product within the 48 inch length.	not applicable	
(j)(2) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following: Where any operable control is 10 inches or less behind the reference plane, the height shall be 54 inches maximum and 15 inches minimum above the floor.	not applicable	
(j)(3) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following: Where any operable control is more than 10 inches and not more than 24 inches behind the reference plane, the height shall be 46 inches maximum and 15 inches minimum above the floor.	not applicable	
(j)(4) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following: Operable controls shall not be more than 24 inches behind the reference plane.	not applicable	

Voluntary Product Accessibility Template - Section 1194.26 Desktop and Portable Computers - Detail

Criteria	Supporting Features	Remarks and explanations
(a) All mechanically operated controls and keys shall comply with §1194.23 (k) (1) through (4).	not applicable	
(b) If a product utilizes touchscreens or touch-operated controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).	not applicable	
(c) When biometric forms of user identification or control are used, an alternative form of identification or activation, which does not require the user to possess particular biological characteristics, shall also be provided.	not applicable	
(d) Where provided, at least one of each type of expansion slots, ports and connectors shall comply with publicly available industry standards	not applicable	

Voluntary Product Accessibility Template - Section 1194.31 Functional Performance Criteria - Detail

Criteria	Supporting Features	Remarks and explanations

(a) At least one mode of operation and information retrieval that does not require user vision shall be provided, or support for Assistive Technology used by people who are blind or visually impaired shall be provided.	supported with exceptions	Partial support provided by screen reader. Please refer to the previous applicable VPAT sections.
(b) At least one mode of operation and information retrieval that does not require visual acuity greater than 20/70 shall be provided in audio and enlarged print output working together or independently, or support for Assistive Technology used by people who are visually impaired shall be provided.	supported with exceptions	Partial support provided by screen reader. Please refer to the previous applicable VPAT sections.
(c) At least one mode of operation and information retrieval that does not require user hearing shall be provided, or support for Assistive Technology used by people who are deaf or hard of hearing shall be provided.	supported	
(d) Where audio information is important for the use of a product, at least one mode of operation and information retrieval shall be provided in an enhanced auditory fashion, or support for assistive hearing devices shall be provided.	not applicable	
(e) At least one mode of operation and information retrieval that does not require user speech shall be provided, or support for Assistive Technology used by people with disabilities shall be provided.	not applicable	
(f) At least one mode of operation and information retrieval that does not require fine motor control or simultaneous actions and that is operable with limited reach and strength shall be provided.	supported with exceptions	Partial support provided by keyboard access. Please refer to the previous applicable VPAT sections

Voluntary Product Accessibility Template - Section 1194.41 Information, Documentation, and Support - Detail		
Criteria	**Supporting Features**	**Remarks and explanations**
(a) Product support documentation provided to end-users shall be made available in alternate formats upon request, at no additional charge.	Supported with exceptions and additional charges may apply.	Accessibility format of documentation is available upon request by contacting accessibility@sap.co
(b) End-users shall have access to a description of the accessibility and compatibility features of products in alternate formats or alternate methods upon request, at no additional charge.	Supported with exceptions and additional charges may apply.	Users may contact accessibility@sap.com or utilize the customer message system to request supp
(c) Support services for products shall accommodate the communication needs of end-users with disabilities.	supported	Users may contact accessibility@sap.com or utilize the customer message system to request supp

SAP Appendix 7 – Existing Agreements

SAP PUBLIC SECTOR AND EDUCATION, INC.
SOFTWARE END-USER LICENSE AGREEMENT
("Agreement")

This Agreement is made effective as of the 18th day of February, 2000, by and between SAP Public Sector and Education, Inc., Delaware corporation, with offices at The Ronald Reagan Building, International Trade Center, 1300 Pennsylvania Avenue, NW, Suite 500 / North Tower / Gray, Washington, DC 20004 ("SAP"), and State of Arkansas, with offices at One Capitol Mall, Little Rock, Arkansas 72201 ("Licensee").

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       (b) Licensee shall not copy, translate, disassemble, or decompile, nor create or attempt to create, by reverse engineering or otherwise, the source code from the object code of the Software. In the event source code is provided to Licensee, SAP, in its sole discretion, reserves the right to delete, or to require the deletion of, such source code and all copies thereof in Licensee's possession or control whenever a future Release, Version, or Correction Level provides for like functionality in an object code format.

       (c) Subject to Section 6.3(b), all Modifications and Extensions to the Software and Documentation shall be considered part of the Software and Documentation for purposes of this Section 6.

6.2 Protection of Proprietary Information. In order to protect the rights of SAP and its licensors and Licensee in their respective Proprietary Information, SAP and Licensee agree to take all reasonable steps and the same protective precautions to protect the Proprietary Information from disclosure to third parties as with its own proprietary and confidential information. Unless otherwise required by the Arkansas Freedom of Information Act or a bona fide court order and only to the extent as required by such Act or order, neither party shall, without the other party's prior written consent, disclose, provide, or make available any of the Proprietary Information of the other party in any form to any person, except to its bona fide employees, officers, directors, or third parties whose access is necessary to enable such party to exercise its rights hereunder. Each party agrees that prior to disclosing any Proprietary Information of the other party to any third party, it will obtain from that third party a written acknowledgment that such third party will be bound by the same terms as specified in this Section 6 with respect to the Proprietary Information and naming SAP as a third party beneficiary.

6.3 Modifications and Extensions.
       (a) Licensee may make Modifications and Extensions to the Software, other than third party software, for Use on the Designated Unit(s) under the terms set forth in this section. Licensee shall register all Modifications to the Software with SAP prior to making such Modifications. Licensee agrees to insert in all copies of the Software as modified all copyright, trade secret, or other notices thereon or therein as SAP may from time to time direct.

       (b) In the event Licensee without SAP's participation develops any Modification or Extension (hereinafter referred to as "Licensee Extension" or "Licensee Modification") to the Software, Licensee shall have all rights, title, and interest in such Licensee Modification or Licensee Extension subject to SAP's rights in the Software. Licensee agrees to offer SAP the first right to negotiate a license to or assignment of such Licensee Modification or Licensee Extension and the parties agree to negotiate such rights in good faith. Licensee agrees that prior to SAP's waiver of its first right to negotiate, such Licensee Modification or Licensee Extension will be used solely in connection with Licensee's business operations, and that such Licensee Modification or Licensee Extension will not be marketed, licensed or sublicensed, sold, assigned, or otherwise transferred or made available to any third party or other entity.

       (c) In the event SAP develops either independently, or jointly with Licensee, any Modification or Extension to the licensed Software, such Modification or Extensions and all rights associated therewith will be the exclusive property of SAP and SAP AG, and Licensee will not grant, either expressly or impliedly, any rights, title, interest, or licenses to such Modifications or Extensions to any third party. Licensee shall be entitled to Use such Modifications and Extensions developed for or with Licensee on the Designated Unit(s) under the terms set forth in this Agreement. Licensee agrees to assign all right, title and interest in and to jointly developed Modifications and Extensions to SAP. Licensee agrees to execute, acknowledge and deliver to SAP all documents and do all things necessary, at SAP's expense, to enable SAP to obtain and secure such Modifications or Extensions throughout the world. Licensee agrees to secure the necessary rights and obligations from relevant employees, or third parties in order to satisfy the above obligations.

       (d) The parties hereto agree that the granting of any rights, title, or interest to Licensee in any Modification or Extension shall not be construed by the parties hereto, any court of law or equity, or any arbitration panel to mean that SAP has granted or given up any rights, title, or interest in or to the SAP Proprietary Information.

       (e) Licensee agrees not to take any action that would limit SAP's independent development, sale, assignment, licensing or use of its own software or Modifications or Extensions thereto.

7.   PERFORMANCE WARRANTY.
7.1 Warranty Period; Warranty. SAP warrants that the Software will substantially conform to the functional specifications contained in the Documentation for twelve months following Delivery (the "Warranty Period") when Used without material alteration on the Designated Unit(s). SAP's warranty is

subject to Licensee providing SAP necessary access, including remote access, to the Software. Licensee shall provide SAP with sufficient test time and support on Licensee's Designated Unit(s) to correct the defect.

.2   Scope of Warranty.
   (a)   The warranty set forth in this Section 7 shall not apply: (i) if the Software is not used in accordance with the Documentation; or (ii) to any Extensions or Modifications; or (iii) if the defect is caused by: a Modification or Extension, Licensee, or a third-party software malfunction.

   (b)   SAP does not warrant that the Software will operate uninterrupted or that it will be free from minor defects or errors which do not materially affect such performance or that the applications contained in the Software are designed to meet all of Licensee's business requirements.

7.3   Express Disclaimer. SAP AND ITS LICENSORS DISCLAIM ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE EXCEPT TO THE EXTENT THAT ANY WARRANTIES IMPLIED BY LAW CANNOT BE VALIDLY WAIVED.

8.   INDEMNIFICATION.
8.1   SAP Representation. SAP represents that its licensors own the Proprietary Information licensed by SAP hereunder, including all intellectual property rights therein, and that SAP has all rights from its licensors necessary to license, in accordance with the terms of this Agreement, such Proprietary Information to Licensee.

8.2   No Representation Regarding Combination Use. SAP and its licensors make no representation with respect to the possibility of infringement by Combination Use of the Software. The parties agree that SAP has no duty to investigate nor to warn Licensee of any such possibility. "Combination Use" means Use of the Software in conjunction with any of the following, unless such Use is prescribed in the Documentation: (i) any software other than the Software; (ii) any apparatus other than a Designated Unit; and/or (iii) any activities of Licensee not licensed under this Agreement.

8.3   Indemnification of Licensee. Except for Combination Use, SAP shall indemnify Licensee against all claims, liabilities, and costs, including reasonable attorneys' fees, reasonably incurred in the defense of any claim brought against Licensee in the Territory by third parties alleging that Licensee's Use of the Software and Documentation infringes or misappropriates: (i) any United States patent of which SAP is aware; or (ii) a copyright; or (iii) trade secret rights, provided that, Licensee promptly notifies SAP in writing of any such claim and SAP is permitted to control fully the defense and any settlement of such claim as long as such settlement shall not include a financial obligation on Licensee. Licensee shall cooperate fully in the defense of such claim and may appear, at its own expense, through counsel reasonably acceptable to SAP. SAP may, in its sole discretion, settle any such claim on a basis requiring SAP to substitute for the Software and Documentation alternative substantially equivalent non-infringing programs and supporting documentation.

8.4   SAP's Right to Commence Infringement Actions. SAP alone shall be responsible for taking such actions which it determines are reasonably necessary or desirable in its sole discretion in connection with any infringement or alleged infringement by a third party of any portion of the Software and Documentation. Licensee shall not undertake any action in response to any infringement or alleged infringement of the Software and Documentation without the prior written consent of SAP, which consent shall not be unreasonably withheld. Licensee agrees to cooperate with and assist SAP by taking whatever action which SAP determines to be reasonably necessary or desirable. SAP agrees to reimburse Licensee for reasonable legal fees and other expenses incurred in connection with any such claim, suit, damage, or loss.

8.5   SAP's Duty to Indemnify Licensee. THE PROVISIONS OF THIS SECTION 8 STATE THE SOLE, EXCLUSIVE, AND ENTIRE LIABILITY OF SAP AND ITS LICENSORS TO LICENSEE, AND IS LICENSEE'S SOLE REMEDY WITH RESPECT TO THE INFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY RIGHTS.

9.   LIMITATIONS OF LIABILITY.
9.1   Licensee's Remedies. Licensee's sole and exclusive remedies for any damages or loss in any way connected with the Software or services furnished by SAP and its licensors, whether due to SAP's negligence or breach of any other duty, shall be, at SAP's option: (i) to bring the performance of the Software into substantial compliance with the functional specifications; (ii) re-performance of services; or (iii) return of an appropriate portion of any payment made by Licensee with respect to the applicable portion of the Software or services.

9.2   SAP Not Responsible. SAP will not be responsible under this Agreement for: (i) any alteration of the Software to fit the particular requirements of Licensee; or (ii) the correction of any defects resulting from Modifications or Extensions or as a result of misuse of the Software by Licensee; or (iii) preparation or conversion of data into the form required for use with the Software or (iv) ensuring the security of Licensee's networked installation of the Software. THE SOFTWARE IS NOT SPECIFICALLY DEVELOPED OR LICENSED HEREUNDER FOR USE IN ANY DIRECT AND ACTIVE OPERATIONS OF ANY EQUIPMENT IN ANY NUCLEAR, AVIATION, MASS TRANSIT, OR MEDICAL APPLICATIONS, OR IN ANY OTHER INHERENTLY DANGEROUS APPLICATIONS. THE PARTIES HERETO AGREE THAT USE OF THE SOFTWARE AND THIRD-PARTY SOFTWARE FOR FINANCIAL APPLICATION PURPOSES OR SUCH OTHER ADMINISTRATIVE PURPOSES SHALL NOT BE DEEMED INHERENTLY DANGEROUS APPLICATIONS IF SUCH USE DOES NOT AFFECT THE OPERATIONS OR MAINTENANCE OF SUCH EQUIPMENT. SAP AND ITS LICENSORS SHALL NOT BE LIABLE FOR ANY CLAIMS OR DAMAGES ARISING FROM INHERENTLY DANGEROUS USE OF THE SOFTWARE AND/OR THIRD-PARTY SOFTWARE LICENSED HEREUNDER.

9.3   Limitation of Liability. ANYTHING TO THE CONTRARY HEREIN NOTWITHSTANDING, EXCEPT FOR DAMAGES RESULTING FROM UNAUTHORIZED USE OR DISCLOSURE OF THE PROPRIETARY INFORMATION, UNDER NO CIRCUMSTANCES SHALL SAP ITS LICENSORS OR LICENSEE BE LIABLE TO EACH OTHER OR ANY OTHER PERSON OR ENTITY FOR AN AMOUNT OF DAMAGES IN EXCESS OF THE PAID LICENSE FEES OR BE LIABLE IN ANY AMOUNT FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR INDIRECT DAMAGES, LOSS OF GOOD WILL OR BUSINESS PROFITS, WORK STOPPAGE, DATA LOSS, COMPUTER FAILURE OR MALFUNCTION, OR EXEMPLARY OR PUNITIVE DAMAGES. The provisions of the Agreement allocate the risks between SAP and Licensee. The License Fees reflect this allocation of risk and the limitations of liability herein.

9.4   Severability of Actions. IT IS EXPRESSLY UNDERSTOOD AND AGREED THAT EACH AND EVERY PROVISION OF THIS AGREEMENT WHICH PROVIDES FOR A LIMITATION OF LIABILITY, DISCLAIMER OF WARRANTIES, OR EXCLUSION OF DAMAGES IS INTENDED BY THE PARTIES TO BE SEVERABLE AND INDEPENDENT OF ANY OTHER PROVISION AND TO BE ENFORCED AS SUCH.

10. ASSIGNMENT.

Licensee may not, without SAP's prior written consent, assign, delegate, sublicense, pledge, or otherwise transfer this Agreement, or any of its rights or obligations under this Agreement, or the SAP Proprietary Information, to any party. Any permitted assignment of this Agreement shall provide that the provisions of this Agreement shall continue in full force and effect and that Licensee shall guaranty the performance of its assignee and shall remain liable for all obligations hereunder. SAP may assign this Agreement to SAP America, Inc. or SAP AG. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns.

11. GENERAL PROVISIONS.

11.1 Rights to Injunctive Relief. Both parties acknowledge that remedies at law may be inadequate to provide SAP or Licensee with full compensation in the event of Licensee's material breach of Sections 2, 6, 10 or 11.5, or SAP's material breach of Section 6 with respect to Licensee Proprietary Information, and that the non-breaching party may therefore be entitled to seek injunctive relief in the event of any such material breach.

11.2 Severability. It is the intent of the parties that in case any one or more of the provisions contained in this Agreement shall be held to be invalid or unenforceable in any respect, such invalidity or unenforceability shall not affect the other provisions of this Agreement, and this Agreement shall be construed as if such invalid or unenforceable provision had never been contained herein.

11.3 No Waiver. If either party should waive any breach of any provision of this Agreement, it shall not thereby be deemed to have waived any preceding or succeeding breach of the same or any other provision hereof.

11.4 Counterparts. This Agreement may be signed in two counterparts, each of which shall be deemed an original and which shall together constitute one Agreement.

11.5 Export Control Notice. Regardless of any disclosure made by Licensee to SAP of an ultimate destination of the Software, Documentation, Third-Party Database, and other provided SAP Proprietary Information Licensee acknowledges that the Software, Documentation, Proprietary Information, and the Third-Party Database are being released or transferred to Licensee in the United States and are therefore subject to the U.S. export control laws. Licensee acknowledges its exclusive obligation to ensure that its exports from the United States are in compliance with the U.S. export control laws. Licensee shall also be responsible for complying with all applicable governmental regulations of any foreign countries with respect to the use of the Proprietary Information outside of the United States. Licensee agrees that it will not submit the Software to any government agency for licensing consideration or other regulatory approval without the prior written consent of SAP. Licensee shall defend, indemnify, and hold SAP and its licensors harmless from and against any and all claims, judgments, awards, and costs (including reasonable legal fees) arising out of Licensee's noncompliance with applicable U.S. or foreign law with respect to the use or transfer of the SAP Proprietary Information outside the United States by Licensee.

11.6 Confidential Terms and Conditions. Licensee shall not disclose the terms and conditions of this Agreement and the pricing contained therein to any third-party, unless otherwise required by the Arkansas Freedom of Information Act or a bona fide court order and only to the extent as required by the Act or order, neither party shall use the name of the other party in publicity, advertising, or similar activity, without the prior written consent of the other, except that Licensee hereby consents to SAP's inclusion of Licensee's name in customer listings which may be published as part of SAP's marketing efforts.

11.7 Governing Law. This Agreement shall be governed by and construed under the State of Arkansas law without reference to its conflicts of law principles. Venue shall be Pulaski County, Arkansas. In the event of any conflicts between foreign law, rules, and regulations, and United States of America law, rules, and regulations, United States of America law, rules, and regulations shall prevail and govern.

11.8 Notices. All notices or reports which are required or may be given pursuant to this Agreement shall be in writing and shall be deemed duly given when delivered to the respective executive offices of SAP and Licensee at the addresses first set forth above.

11.9 Force Majeure. Any delay or nonperformance of any provision of this Agreement (other than for the payment of amounts due hereunder) caused by conditions beyond the reasonable control of the performing party shall not constitute a breach of this Agreement, and the time for performance of such provision, if any, shall be deemed to be extended for a period equal to the duration of the conditions preventing performance.

11.10 Entire Agreement. This Agreement and each Appendix hereto constitute the complete and exclusive statement of the agreement between SAP and Licensee regarding licensure and Maintenance of software, and all previous representations, discussions, and writings are merged in, and superseded by, this Agreement. This Agreement may be modified only by a writing signed by both parties. This Agreement and each Appendix hereto shall prevail over any additional, conflicting, or inconsistent terms and conditions which may appear on any purchase order or other document furnished by Licensee to SAP.

IN WITNESS WHEREOF, the undersigned, intending to be legally bound, have duly executed this Agreement to become effective as of the date first above written.

STATE OF ARKANSAS

By: _____

Title: _____

PUBLIC SECTOR AND EDUCATION, INC.

By: _____

Title: _PRESIDENT_____

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MAINTENANCE SCHEDULE ("Schedule")
to
SAP PUBLIC SECTOR AND EDUCATION, INC.
SOFTWARE END-USER LICENSE AGREEMENT effective February 18, 2000 ("Agreement")
with
STATE OF ARKANSAS ("Licensee")

This Schedule is hereby annexed to and made a part of the Agreement specified above. In each instance in which provisions of this Schedule contradict or are inconsistent with the provisions of the Agreement, the provisions of this Schedule shall prevail and govern, and the contradicted or inconsistent provisions of the Agreement shall be deemed amended accordingly.

1. Licensee may request and SAP shall provide, to such degree as SAP makes such services generally available in the Territory, maintenance service ("Maintenance_") from SAP with respect to the Software. Maintenance by SAP is limited to the Customer Competency Center(s) specified herein. Maintenance currently includes the delivery of Releases, Versions, Correction Levels and Software correction packages, support via telephone, remote support/update, and SAP's On-line Software Services. Maintenance does not include the adaptation of any Modifications or Extensions developed by or for Licensee to new Releases or Versions. In order to receive Maintenance hereunder, Licensee must make all required remote support and update connections to each Designated Unit, at its expense, as requested by SAP. Maintenance will only be offered for the most recent Version of the Software and the two prior Versions, provided Licensee is using the latest Correction Level of such Version.

2. TeamSAP Support Services:

   Provided Licensee is paying standard Maintenance Fees, Licensee currently receives a choice of one of the following services per live installation per year:

   A. One GoingLive Check for any new Software or other SAP application implementation
   B. GoingLive Upgrade Check for an upgrade to a higher functional Release (e.g. from R/3 4.0 to 4.5) or
   C. Two EarlyWatch sessions for the continual optimization of your already live system

   To schedule GoingLive Check or Early Watch sessions customer must contact Americas Customer Support Services at 800-677-7271 or internationally at 610-355-6821 and choose option 6 to schedule these services. To assist you in this, SAP has established the following scheduling pre-requisites:

   A. To receive the GoingLive Check or GoingLive Upgrade Check you must inform SAP at least three months prior to your go live or upgrade date.
   B. To receive the EarlyWatch service, SAP requests a minimum of two months advanced notification.

   Further information and detail about individual SAP services can be found on SAP*Net site* (http://sapnet.sap.com/teamsapsupport or http://sapnet.sap-ag.de/teamsapsupport).

3. In order to receive Maintenance, Licensee agrees to promptly disclose to SAP and provide copies to SAP of any Modifications and to keep and maintain adequate and current records of all Modifications (which records shall be made reasonably available to SAP).

4. Maintenance, from SAP, for the Software licensed hereunder is limited to the following site: One Capitol Mall, Little Rock, Arkansas 72201

5. In order to receive Maintenance, Licensee agrees to establish and maintain Customer Competency Center(s) ("CCC") at the site(s) specified above within twelve (12) months of the Effective Date of this Schedule in accordance with the following. Each CCC must maintain an internal Help Desk to provide first level support to Licensee's Users relating to basis and application software questions or problems. Such internal Help Desk(s) must be staffed during Licensee's normal working hours, but no less than (8) eight hours a day, (5) five days a week. All Users may have access to SAP's on-line Software Services (OSS) however, only Licensee CCC employees are authorized to contact SAP after attempting to resolve the matter via Licensee's internal Help Desk. Each CCC shall coordinate Licensee's Modification and Extension notification and disclosure requirements and shall coordinate Licensee's development requests. Licensee's CCC is responsible for the administration and management of the requirements specified in the Agreement including, but not limited to, performing periodic self audits to ensure Licensee's compliance with the license grant, maintaining master and installation data and managing the receipt of new Releases, Version, and Correction Levels of the Software. In the event Licensee does not establish and maintain CCC(s) in accordance with the above, SAP reserves the right to increase Licensee's then current maintenance percentage factor then in effect.

   Maintenance fees shall be paid quarterly in arrears and shall be specified in Appendices to the Agreement. In addition, Licensee shall be invoiced an annual fee of USD 1,500 for up to three (3) SAP On-line Software Services (OSS) connections.

   Maintenance Services offered by SAP may be changed annually by SAP at any time upon three months prior written notice. After Year 1, the Maintenance Fees and any limitations on increases are subject to Licensee's compliance with the CCC requirements

specified above. Maintenance may be terminated by either party in writing at any time upon three months' prior written notice and Licensee shall be entitled to a pro-rata refund of prepaid Maintenance fees. Notwithstanding the forgoing, SAP may terminate Maintenance after thirty (30) days written notice of Licensees failure to pay Maintenance Fees.

7. In the event Licensee elects not to commence Maintenance upon the first day of the month following initial delivery of the Software, or Maintenance is otherwise declined for some period of time, and is subsequently requested or reinstated, SAP will invoice the customer the accrued maintenance service fees associated with such time period.

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SOFTWARE LICENSE AND SUPPORT AGREEMENT
Software Order Form No. 19 ("Order Form")
Effective December 21 , 2017 ("Effective Date")

Between   **SAP Public Services, Inc.**
                           3999 West Chester Pike
                           Newtown Square, PA 19073
                           (hereinafter "SAP")

And

                           State of Arkansas
                           One Union Plaza - 10th Floor
                           Little Rock, AR 72203
                           (hereinafter "Licensee")

PREAMBLE: SAP and Licensee agree that this Order Form is a binding agreement for SAP software licenses and support, governed by the SAP Software End-User License Agreement between SAP and Licensee dated February 18, 2000 ("Initial Agreement"), all exhibits, appendices, schedules or other addenda attached to or referenced by the Initial Agreement or this Order Form ("Schedules"). All components are integral to this agreement, collectively form a single agreement with all other orders subject to the Initial Agreement and collectively are referred to herein as the "Agreement." For purposes of this Order Form, any reference in this Order Form to the GTC shall mean the Initial Agreement, and all references to the term "Appendix" or "Appendices" under the Agreement shall be replaced by the term "Order Form". The following order of precedence shall be applied in the event of conflict or inconsistency between provisions of the components of this Agreement: (i) the Software Order Form; (ii) the Schedules; and (iii) the Initial Agreement.

1.   **LICENSED SOFTWARE AND FEES:** The Software licensed to Licensee pursuant to this Order Form and the associated fees are identified in Schedule 1. All license fees are net after discount, if applicable. The total net license fees identified in Schedule 1 and payable under this Order Form are **979,771.79 USD**, which shall be invoiced upon execution of this Order Form.

      If Licensee has an affiliate or subsidiary with a separate agreement for SAP software licenses and/or support services, with SAP SE, any SAP SE affiliate (including SAP) and/or any other distributor of SAP software, the Software shall not be Used to run such affiliate's or subsidiary's business operations and such affiliate or subsidiary shall not receive any support services under this Agreement even if such separate agreement has expired or is terminated, unless otherwise agreed in writing by the parties.

2.   **SAP SUPPORT SERVICES AND FEES:** SAP and Licensee agree that SAP Enterprise Support is the applicable SAP Support offered by SAP for the Software licensed under this Order Form as set forth in the SAP Support Schedule to the Agreement.

      SAP Support Fees shall commence as of the first day of the month following the Effective Date of this Order Form. The initial term of SAP Support shall begin on the Effective Date and continue for the remainder of the current calendar year ("Initial Term"). After the Initial Term and subject to the Agreement and SAP Support Schedule, SAP Support shall renew at the beginning of each calendar year for the subsequent one year period. Notwithstanding anything to the contrary in the Agreement, Licensee may terminate all SAP Support under the Agreement (for all orders) effective December 31, 2017 by providing written notice to SAP at any time prior to or on such date. After December 31, 2017, notice periods are as set forth in the SAP Support Schedule. All other terms regarding termination of SAP Support shall remain unchanged. SAP Annual Support Fees shall be paid annually in advance and shall be as specified below. After the Initial Term, any limitations on increases to the SAP Support Fees are subject to Licensee's compliance with the Customer COE requirements specified in the applicable SAP Support Schedule.

      The SAP Enterprise Support Fee for the Software licensed under this Order Form is priced at the then current annual SAP Enterprise Support Factor in effect (currently 22%) multiplied by the total Maintenance Base (set forth in the Schedule 1 as "Maintenance Base") for the licensed Software stated in Schedule 1. The current annual SAP Enterprise Support Fee for the Software licensed under this Order Form is set forth in Schedule 1 as the "Annual Support Fee". SAP agrees that the SAP Enterprise Support Factor shall remain at 22% until December 31, 2020. Thereafter, the SAP Enterprise Support Fee is subject to change once during a calendar year upon three (3) months' notice to Licensee and

SAP may increase Licensee's Enterprise Support Fee hereunder from the prior year by the percentage increase in the Consumer Price Index (CPI), applied on a cumulative year-over-year basis starting from either the effective date of this Order Form or the date of Licensee's last SAP Enterprise Support Fee increase, whichever occurred later. CPI as used herein means "U.S. Consumer Price Index for all Urban Consumers, U.S. City Average - All Items 1982-1984 = 100 Base for a twelve (12) month period prior to such increase as published by the Bureau of Labor Statistics".

Not raising fees in any given year or years is not a waiver of SAP's right to do so. SAP Support Fees shall be invoiced on an annual (12 month period) in advance basis effective July 1 of a calendar year. For avoidance of doubt, the 12 month billing period is July 1st through June 30th. Any SAP Support Fees due prior to July 1 shall be invoiced on a pro-rata basis for the given 12 month period in effect. SAP Support Fees will increase as additional software is licensed.

SAP Solution Manager is available to all SAP Support customers to the extent stated in the applicable SAP Support schedule, but does not currently interface with selected SAP BusinessObjects portfolio products.

Notwithstanding the foregoing terns of this Section 2, SAP agrees Licensee will not be charged the SAP Support Fees under this Order Form for the period of January 1, 2018 through June 30, 2018.

3. **PAYMENT TERMS:** All fees are in USD. The payment terms for the license fees specified in Section 1 above are net sixty (60) days from date of invoice. All payment terms for Support are net thirty (30) days from date of invoice.

4. **DELIVERY:** Delivery of all Software licensed hereunder will be made by making such Software available for download or other electronic transmission to Licensee's location at: **One Union Plaza - 10th Floor, Little Rock, AR 72203** ("Delivery Location").

Licensee acknowledges having received the remote access information listed below allowing download of the Software through the SAP ServiceMarketplace (http://service.sap.com/swdc):
   USER ID: S0013205285
   INITIAL PASSCODE: 0V1X$Y@/

Licensee confirms that it has access to SAP Service Marketplace as required to download the Software licensed under this Agreement.

Licensee agrees not to request any physical delivery of Software or Support Services and should it occur that any such delivery will be rejected by Licensee. Licensee agrees and understands that the calculation of Taxes may be affected by the delivery method and Delivery Location of the Software and corresponding SAP Support.

5. **LICENSED SOFTWARE:** The Software licensed to Licensee pursuant to this Order Form consists of the component(s) identified in Schedule 1. Only individuals licensed as Named Users under the Agreement are permitted to Use the Software and third party software licensed under the Agreement. Such Use shall be in accordance with their respective Named User type, the identified Licensed Level, and the terms of this Order Form. Each Software product licensed hereunder may be referred to as a "Package". At SAP's request, Licensee shall deliver to SAP a report, as defined by SAP, evidencing Licensee's usage of the Software.

Licensed SAP Software may utilize limited functionality of other SAP Software products ("SAP Runtime Software"). Unless Licensee has expressly licensed the SAP Runtime Software (under this or a separate Order Form), Licensee's Use of such SAP Runtime Software is limited to access by and through the licensed SAP Software for the sole purpose of enabling performance of the licensed SAP Software. In the event Licensee Uses the SAP Software to build and/or operate a custom developed or third party application, additional license fees may be required.

There are no applicable country/language specific versions licensed by Licensee from SAP hereunder.

6. **PRODUCT SPECIFIC TERMS AND METRIC TYPES:** The following product specific terms and metric types apply to the Software licensed under this Order Form as applicable. In the event of a conflict or

inconsistency between Schedule 1 and this Section 6, Schedule 1 shall take precedence.

6.1 SAP SOFTWARE:

Generic Products [(g)]:

"X" if Licensed	Software	License Metric	Licensed Level
X	SAP Test Data Migration Server [(k)]	300 GB Database Size [(1)]	10

(a) *SAP Test Data Migration Server*. SAP Test Data Migration Server includes SAP Mobile Platform as Runtime Software.

(1) **Database Size** is defined as the database size of the productive system and is calculated individually for each system (i.e., each ERP, BI and CRM system).

SAP HANA [(b) (g)]:

"X" if Licensed	Software	License Metric	Licensed Level
X	SAP HANA Runtime Edition for Applications and SAP BW [(c) (d) (e) (f)]	HSAV [(2)]	1

(b) *Definitions*.
   i. *Data Sources*. Any software product(s) and/or database instance(s) for which Licensee has secured an appropriate license.

(c) If a limited use version of SAP HANA Runtime edition for Applications and SAP BW ("HANA REAB"), and one or more of the following SAP HANA editions: SAP HANA Base Edition, SAP HANA Spatial Edition, HANA Platform Edition, HANA Enterprise Edition (individually, "HANA Full Use Edition"), are licensed and deployed in the same HANA tenant database within a HANA system, then at least 50% of the tenant database must be used to operate one or more of the HANA Full Use Editions. Notwithstanding anything to the contrary, SAP BW and SAP BW/4HANA running on HANA REAB can be deployed in the shared HANA database tenant with HANA Full Use Editions without any capacity limitations, provided no other HANA REAB Supported Software is deployed in the same HANA tenant.

(d) *Terms of use for Twitter API contained within SAP HANA, Enterprise Edition; SAP HANA, Runtime edition for Applications and SAP BW; and SAP HANA, Enterprise Information Management Option*.
The following shall apply to SAP HANA, Enterprise Edition; SAP HANA, Runtime edition for Applications and SAP BW; and SAP HANA, Enterprise Information Management Option: Use of the Twitter API is subject to the Licensee's acceptance of any applicable terms and conditions published by Twitter. Licensee is solely responsible for its use of the Twitter API and for obtaining all API keys and account credentials required to access or use the Twitter API. Licensee indemnifies SAP from any claims relating to the use of the Twitter API by the Licensee or its End Users. The Twitter API is excluded from SAP representations, warranties, indemnifications and support obligations.

(e) *SAP HANA, Runtime Edition for Applications and SAP BW, licensed by SAP HANA Application Value*.
SAP HANA Runtime Edition for Applications and SAP BW is a runtime database ("HANA REAB") licensed for Use in conjunction with Licensee's Use of Software and/or Third Party Software, and solely to the extent such Software components are licensed by Licensee ("HANA REAB Supported Software") in accordance with the terms herein.

REAB Runtime Software Rights. The HANA REAB license includes the following Runtime Software:
   (1) SAP HANA Platform;
   (2) SAP Data Integrator ('DI");
   (3) SAP Smart Data Integration ("SDI");
   (4) SAP Landscape Transformation replication server ("SLT");
   (5) SAP ASE and MaxDB databases;
   (6) SAP Data Warehousing Foundation;

(7) SAP Dynamic Tiering;
(8) SAP Business Warehouse Accelerator;
(9) SAP Near-line storage for SAP BW (NLS for BW);
(10) SAP HANA Rules Framework;
(11) SAP HANA Data Privacy Option.

SAP HANA Platform includes the HANA Studio component. All data modeling, distribution, creation and extension of data structures, including tables and virtual tables via Smart Data Access used in HANA REAB must be performed via the HANA REAB Supported Software. Use of DI, SDI and SLT is limited solely to loading data into HANA REAB or HANA REAB Supported Software. Data may be loaded from an appropriately licensed Data Source via DI, SDI or SLT or via HANA REAB Supported Software interfaces. SDI may also be used with Smart Data Access in a data federation scenario.

Use of the SAP HANA Studio component is limited solely to administering, monitoring and creating custom views for the HANA REAB database instance. All reporting must be performed via the HANA REAB Supported Software or via custom views created using HANA Studio. Such custom views may be accessed by SAP or non-SAP BI tools.

NLS for BW includes a runtime license of (a) SAP IQ Enterprise Edition, (b) SAP IQ Enterprise Edition-Very Large Database Management Option and (c) SAP IQ Enterprise Edition-Unstructured Data Analytics Option, which may solely be used with SAP BW.

SAP BusinessObjects Enterprise on REAB. When used as a runtime database for the SAP BusinessObjects Enterprise, HANA REAB may be used (i) as a database for the Central Management Server (CMS) repository, (ii) as an audit database for the BI Platform, and (iii) as a platform by the SAP BusinessObjects Design Studio runtime for SAP HANA component.
SAP Data Hub on HANA REAB. When used as a runtime database for SAP Data Hub, HANA REAB may be used as a database via the SAP Data Hub application for the design, operations, management and monitoring of the SAP Data Hub Software.

The license fee for HANA REAB is calculated on the basis of the HANA SAP Application Value for Licensee's HANA REAB Supported Software. Licensee shall pay additional license fees for HANA REAB in the event Licensee's HANA SAP Application Value increases.

Licensee acknowledges that Licensee may have to install a HANA REAB-compatible release of the HANA REAB Supported Software in order to enable certain business functions or provide configuration as described above. Future releases of HANA REAB developed for Use with HANA REAB Supported Software may not be compatible with current releases and may not be available via the respective SAP Support offering. Technical migration from HANA REAB Supported Software to another release of the Software and/or Third Party Software as used separately from HANA REAB and/or to another database offering may not be possible.

(f) Product versions marked as "Earlier Versions" on SAP Service Marketplace may only be downloaded and/or used by Licensees who are or previously were Sybase customers and who have or previously had licensed the particular earlier version of software that they wish to download and/or use.

(g) *SAP NetWeaver Foundation Runtime License*. An application-specific runtime license of SAP NetWeaver Foundation is included with all Software Package licenses provided that SAP NetWeaver is delivered with the software. This runtime license grants the Licensee the right to Use SAP NetWeaver Foundation only with (i) the licensed SAP application (including customization), (ii) Modifications (iii) Add-Ons to the SAP application that do not access the information contained in the database of the SAP applications, and (iv) third party applications that do not access the information contained in the database of the SAP applications. Licensee's Developer Users may Use the tools included in SAP NetWeaver Foundation runtime license only for the development of these Modifications and Add-Ons described above. Licensee's Use of the Planning Application Kit to develop planning applications that leverage in-memory processing of core planning functions requires a separate license for the applicable version of SAP Business Planning and Consolidation.

(2) **HANA SAP Application Value (HSAV)** is the sum of prices for licensed Software, excluding those

items identified in the list of prices and conditions that do not contribute to the HANA SAP Application Value.

S/4 HANA PACKAGES [(h) (i) (j)]**:**

"X" if Licensed	Software	License Metric	Licensed Level
X	SAP S/4HANA Enterprise Management for ERP customers [(k)]	Flat Fee [(3)]	1

(h) S/4HANA Packages shall only be deployed on a SAP HANA database installation (collectively "S/4HANA Installation"). Only S/4 HANA Packages (and no other Software) shall be deployed on a S/4HANA Installation. For clarity, the preceding sentence only applies to software licensed from SAP, its affiliates and or its authorized distributors and resellers. Notwithstanding anything to the contrary in the Agreement, S/4HANA Packages are not licensed for Use with any third party runtime database. For the avoidance of doubt, the Deployment and Communication Rights and Restrictions terms set forth in the Amendment to the Agreement issued December 20, 2017 apply to S/4HANA Packages.

(i) *Named User and Metric Requirements for S/4HANA Packages*. The only S/4HANA Package that requires SAP Named User licenses is S/4HANA Enterprise Management.

(j) *SAP S/4HANA Compatibility Packs*. "S/4HANA Compatibility Pack" shall mean an S/4HANA compatible copy of the Software shown in the "Classical Solution" column of the Matrix (the list of applicable Software located at the following link: https://uacp.hana.ondemand.com/http.svc/rc/PRODUCTION/pdfac0fa9551dd88809f10000000b441 570/1511%20000/en-US/MATRIX_OP1511.pdf). The S/4HANA Compatibility Pack may be Used by Licensee as, and in accordance with the terms of, an S/4HANA Package. Such Use is further subject to the following:
- Licensee must have a license to Use i) such Software in the Classical Solution column of the Matrix and ii) the prerequisite shown on the Matrix.
- So long as the Software in the Classical Solution Column of the Matrix is licensed solely for its Use and deployment on an S/4HANA Installation, no Named User licenses are required to Use such software.
- S/4HANA Compatibility Packs may only be Used until the applicable expiration date shown on the Matrix.

(k) *S/4HANA Enterprise Management*. Licensee shall be deemed to have licensed SAP ERP Package solely for the purpose of meeting the requirement to have a license for SAP ERP Package in order to have the right to Use the ERP Package Compatibility Pack.

S/4HANA Enterprise Management includes the following Runtime Software: SAP GTS, Trade Preferences.

(3) **Flat fee** are fixed package license fees for the software.

7. **DATABASE:** The Software licensed hereunder may require a database product. Except for the SAP HANA database(s) licensed pursuant to Schedule 1 hereof, this Agreement does not contain a license to use any database product, even where integrated or pre-installed as part of the Software.

Each database product is subject to its respective vendor license agreement. SAP makes no representations or warranties as to the terms of any license or the operation of any database product obtained directly from a third party vendor by Licensee. Licensee is responsible for support and maintenance of any database product obtained from a third party vendor, and SAP has no responsibility in this regard.

Where a third party runtime database is licensed under the Agreement ("TPD") and not all SAP Software (excluding third party runtime database) licensed under this Order Form or any other Appendix/Order Form under the Agreement ("SW") is licensed for Use with the TPD, the Deployment & Communications Rights and Restrictions provisions set forth in the Amendment to the Agreement

issued December 20, 2017 shall apply to all SW licensed under the Agreement.

8. **VALIDITY OF OFFER:** The validity of this offer will expire on **December 29, 2017**, unless sooner executed by Licensee, or extended in writing by SAP. Further, this Appendix is contingent upon Licensee executing and returning to SAP, no later than **December 29, 2017**, the Deployment & Communications Rights and Restrictions Amendment to the Agreement issued December 20, 2017.

Accepted By:	Accepted By:
SAP Public Services Inc.	**State of Arkansas**
(SAP)	(Licensee)
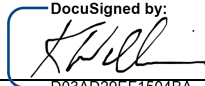
Name:	Jonathan Miller	Name:	Ken Williams
Title:	Corporate Counsel	Title:	CIO
Date:	December 29, 2017	Date:	December 29, 2017

Schedule 1 to Order Form No. 19	
Customer Name	**State of Arkansas**
Net License Fee	979,771.79 USD
Support Type	SAP Enterprise Support
Support Percent %	22.00%
Maintenance Base	979,771.79 USD
Annual Support Fee	215,549.79 USD

Software Licensed						
Product	**TPP**	**SAV**	**License Metric**	**Blocks of (units)**	**License Quantity**	**Net License Fee**
SAP Test Data Migration Server		X	Gigabyte database sizes	300	10	16,875.00
SAP HANA, Runtime edition for Applications & SAP BW - Install Base			HSAV	1	1	959,589.29
SAP HANA, Runtime edition for Applications & SAP BW - New/Subsequent			HSAV	1	1	2,632.50
SAP S/4HANA Enterprise Management for ERP customers			Flat Fee	1	1	675.00

Legend:
TPP- Third Party Product: 'X' indicates the software product is a Third Party Product licensed from SAP
SAV–SAP Application Value: "X" indicates that the product is part of the SAP application value and thus relevant for runtime databases licensed by SAP.

State of Arkansas

Addendum to Professional Services Contract

The following terms and conditions constitute an addendum to the Professional Services Contract between the State of Arkansas Department of Finance and Administration (DFA), and SAP Public Sector and Education, Inc., (SAP) and are hereby incorporated into the contract, executed February 18, 2000.

1. Contract Administration

1.1. Notices

All notices required or permitted pursuant to this contract Addendum shall be in writing and shall be deemed given when personally served, sent by facsimile with personal confirmation of receipt or three days after deposit in the United States Mail, postage prepaid, registered or certified, and addressed to the following parties or such other address as has been designated by a notice complying with the foregoing requirements:

SAP Public Sector and Education, Inc:

> Contracts Manager
> SAP Public Sector and Education, Inc.
> Ronald Reagan/International Trade Center
> 1300 Pennsylvania Avenue, NW
> Suite 500/North Tower/Grey
> Washington, DC 20004
> Tel. 202-312-3500
> Fax 202-312-3501
>
> With a copy to:
>
> Assistant General Counsel
> SAP Public Sector and Education, Inc.
> 3999 West Chester Pike
> Newtown Square, PA 10973
> Tel. 610-661-3281
> Fax 610-661-3282

State: **Mr. Tom Smith, Administrator, Office of
                                    Accounting
                                    State of Arkansas, Department of Finance and
                                    Administration**
                                    **1509 West 7th Street
                                    Little Rock, Arkansas 72201-0303
                                    (501) 682-2583
                                    (501) 682-1086**

1.2. Delegation of Duties

SAP must assume full responsibility for all services required to be performed under this contract Addendum. The State will consider SAP to be the sole point of contact with regard to contractual matters, including payment of any and all charges under the contract. Except as specified in the contract, SAP shall not delegate any duties under the contract to a subcontractor unless the State has given written consent to the delegation. The following subcontractors are hereby authorized by the State to perform services hereunder as directed by SAP: Deloitte Consulting and Brightstar, Inc. The State shall have the right to approve all subcontractors and to require SAP to replace any subcontractor found, in the opinion of the State, either initially or based on performance, to be unacceptable. The State reserves the right to receive copies of and review all subcontracts. The contract management of any subcontractor will be the responsibility of SAP. SAP must make all payments to subcontractors or suppliers. The State will not direct payments for services or products acquired in connection with the contract other than to SAP, nor will the State release SAP from having to perform any obligations under the contract, notwithstanding the fact that a subcontractor may have been engaged by SAP to perform those obligations.

1.3. Governing Law

The contract shall be governed in all respects by the laws of the State of Arkansas without regard to its choice of law rules. Unless otherwise mutually agreed, venue will be the State and federal courts for Little Rock, Arkansas.

1.4. Compliance With Laws

SAP must comply with all applicable State, federal and local laws and ordinances in providing services to the State under the contract. Without limiting the generality of the foregoing, SAP must be able to demonstrate compliance with the Federal Tax Reform Act of 1986, Section 1706, amending Section 530 of the Revenue Act of 1978, dealing with issuance of W-2s to common law employees. SAP is responsible for both federal and State unemployment insurance coverage and standard workers' compensation insurance coverage. SAP must comply with all federal and State tax laws and withholding requirements. The State will not be liable to SAP or its employees or subcontractors for any unemployment

insurance or workers' compensation coverage or federal or State tax withholding requirements. SAP may be required to demonstrate compliance with such laws at the written request of the State.

1.5. Assignment by SAP

SAP shall not assign or transfer any interest in the contract without the prior written consent of the State, which shall not be unreasonably withheld. This prohibition does cover assignments which are related to merger, acquisition, or spin-off, or similar corporate change where the resulting entity is adequately capitalized by generally accepted accounting methods. Notwithstanding, SAP may delegate part of the work to be performed hereunder to subcontractors approved by the State, while maintaining responsibility for performance.

1.6. Severability

Whenever possible, each provision of the contract will be interpreted in such a manner as to be effective and valid under applicable law. If any provision of the Professional Services Contract, including this contract Addendum, the Statement of Work (hereafter "SOW") and all Exhibits thereto, however, is held to be prohibited or invalid under applicable law, such provision will be deemed restated to reflect the original intentions of the parties as nearly as possible in accordance with applicable law, and, if capable of substantial performance the remaining provisions of the contract shall be enforced as if the contract was entered into without the invalid provision. If the ruling and/or controlling principle of law or equity leading to the ruling is subsequently overruled, modified or amended by legislative, judicial or administrative action, then the provision(s) in question as originally set forth in the contract will be deemed valid and enforceable to the maximum extent permitted by the new controlling principle of law or equity.

2. Confidential Information

Both parties shall handle Proprietary Information in accordance with the terms listed in the Software End-User License Agreement (License Agreement) effective February 18, 2000 between SAP and the State.

3. Insurance

3.1. Coverage

SAP shall purchase, from an insurance company either licensed to do business in the State of Arkansas or otherwise approved by the State, or alternatively provide evidence satisfactory to the State of its ability to self-insure, and shall maintain during the term of this Contract, the following types and amounts of insurance coverage:

3.1.1. COMMERCIAL GENERAL LIABILITY INSURANCE

Commercial General Liability Insurance (including premises/operations liability, independent contractors liability, contractual liability, products liability, completed operations liability, broad form property damage liability, personal injury liability and extended bodily injury and death coverage) in a minimum amount of $5,000,000 per occurrence and $10,000,000 aggregate combined single limit for bodily injury or death, personal injury or property damage. Such policy shall include a waiver of subrogation endorsement in favor of the State in a form acceptable to the State.

3.1.2. WORKERS COMPENSATION INSURANCE

Workers Compensation Insurance covering SAP's employees in an amount not less than the limits required by law and Employers Liability Insurance covering SAP employees in an amount not less than $500,000 per occurrence. Such policy shall include a waiver of subrogation endorsement in favor of the State in a form acceptable to the State.

3.1.3. PROFESSIONAL LIABILITY INSURANCE

Professional Liability Insurance issued to and covering SAP's liability for any and all errors or omissions committed by SAP, its subcontractors, agents and employees, in the performance of this Contract. The policy shall have limits of liability of not less than $10,000,000 per occurrence.

3.1.4. FIDELITY EMPLOYEE INSURANCE

Fidelity Employee Insurance, including Computer Crime Insurance naming the State as payee, providing coverage for direct loss to the State and any legal liability of the State arising out of or related to fraudulent or dishonest acts committed by the employees of SAP or its subcontractors, acting alone or in collusion with others, in a minimum amount of $10,000,000 with a maximum deductible of $1,000,000.

3.1.5. COMMERCIAL AUTOMOBILE LIABILITY INSURANCE

Commercial Automobile Liability Insurance including coverage for owned (if any), hired and non-owned vehicles with a combined single limit of $5,000,000 per occurrence for bodily injury, personal injury and property damage.

3.1.6. UMBRELLA LIABILITY INSURANCE

Umbrella Liability Insurance in minimum amount of $25,000,000.

3.1.7. FIRE AND PERSONAL PROPERTY INSURANCE

Fire and Personal Property Insurance (including the contents of any office space used by SAP for any reason under this Contract, and the equipment used by SAP to provide services to the State) up to the replacement value of the objects of such insurance. Such policy shall cover all risks of direct physical loss or damage, including without limitation, flood and earthquake coverage and coverage for computer hardware and software.

3.2. Subcontractors

At the State's request at any time, SAP shall require any one or more of its subcontractors to purchase maintain and provide evidence of such coverage in sufficient time for the State's review prior to the start of work, all of the insurance coverage set forth in this Section 3 in connection with the performance of work by the subcontractors.

3.3. Certificates of Insurance and Other Requirements

Before starting work, SAP must furnish to the project director certificate(s) of insurance or other proof of insurance acceptable to the State verifying the required insurance coverage. The contract number must be shown on the certificate of insurance or other proof of insurance to assure correct filing. These Certificates or other proof of insurance shall, except with respect to Professional Liability Insurance, contain a provision that such insurance shall respond as primary insurance to any insurance carried by the State and shall contain a waiver of subrogation. Each Certificate or other proof of insurance shall provide further that the Project Director shall be given at least thirty days prior written notice (bearing this contract number) of cancellation, non-renewal or reduction in limit or in scope of coverage of such policies. Each commercial general liability, commercial automobile liability and the first $25,000,000 of umbrella liability coverage shall include as additional insureds the State and its agents and employees. SAP shall maintain all required insurance coverage throughout the term of this contract and, in the case of claims made policies, for at least three years following the expiration or termination of this contract. The minimum limits of coverage specified above are not intended, and shall not be construed, to limit any SAP liability or indemnity under this contract to any indemnified party or other persons. SAP shall be responsible for all deductibles with regard to such insurance. If SAP fails to pay any premium for required insurance as specified herein, or if any insurer cancels or significantly reduces any required insurance without the State's written consent, at the State's election (but without any obligation to do so), the State may pay such premium or procure similar insurance coverage from another company or companies; and at the State's election, the State may deduct the entire cost (or part thereof) from any payment due SAP, or SAP shall pay the entire cost (or any part thereof) upon demand.

4. Remedies and Rights to Injunctive Relief; Indemnity

4.1 State's Remedies.

The State's sole and exclusive remedies for any damages or loss in any way connected with the services furnished by SAP and its subcontractors, whether due to SAP's negligence or breach of any other duty, shall be, at SAP's option: (i) re-performance of services; or (ii) return of an appropriate portion of any payment made by State with respect to the applicable services.

4.2 Rights to Injunctive Relief.

Both parties acknowledge that remedies at law may be inadequate to provide SAP or State with full compensation in the event of either party's material breach of Section (Proprietary Information), and that the non-breaching party shall therefore be entitled to seek injunctive relief in the event of any such material breach.

4.3 Indemnification

Subject to Section 4.5, below, each party hereto shall indemnify and defend the other against all claims, liabilities and costs, reasonably incurred in the defense of any claim brought against the other party in the courts of the United States by a third party(s) alleging that a party's use of any material, information or technology supplied by the other party in relation to the services provided hereunder infringes or misappropriates any copyright, trade secret or United States patent of which the party supplying the material, information or technology is or should be aware; provided that the indemnified party promptly notifies the other party in writing of any such claim and the indemnifying party is permitted to control fully the defense and any settlement of such claim as long as such settlement shall not include a financial obligation on the indemnified party. The indemnified party shall cooperate fully in the defense of such claim and may appear, at its own expense, through counsel reasonably acceptable to the other party. The indemnifying party may, in its sole discretion, settle any such claim on a basis requiring such party to substitute for the material, information or technology, alternative, substantially equivalent non-infringing material, information or technology.

In the event that any preliminary injunction, temporary restraining order or final injunction shall be obtained in the Territory, the indemnifying party shall, at its sole option, either:

(a)   obtain the right for continued use of the infringing material, information or technology; or

(b)   modify the infringing material, information or technology to avoid such infringement while obtaining at least equivalent functionality; or

(c)   substitute for the infringing material, information or technology alternative equivalent material, information or technology; or

(d)   after using best efforts to provide (a), (b), or (c) above, provide a refund to the indemnified party of an appropriate amount of paid fees for that part of the material, information or technology under claim of infringement, (unless such part is a major integral function of the services to be provided under this contract Addendum, in which case a full refund of paid fees

would be reimbursable). All such refunds shall be depreciated on a five (5) year straight-line basis.

Duty to Indemnify. THE PROVISIONS OF THIS SECTION 4.3 STATE THE SOLE, EXCLUSIVE, AND ENTIRE LIABILITY OF EACH PARTY TO THE OTHER, AND IS THE SOLE REMEDY WITH RESPECT TO THE INFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY RIGHTS.

4.4 Other Indemnities and Limitation of Liability

Subject to Section 4.5, below, SAP shall indemnify, defend and hold harmless the State, its employees and agents from and against all losses, liabilities, damages and claims (including taxes), and all related costs and expenses (including reasonable attorneys' fees and disbursements and costs of investigation, litigation, settlement, judgments, interest and penalties), arising from or in connection with any of the following:

1. Any claims arising out of or related to occurrences that SAP is required to insure against as provided above, up to the insurance coverage as set forth above;
2. Any claim or demand asserted against the State which results from an act or omission of SAP or any of its subcontractors in its or their capacity as an employer of a person; and
3. Any breach of SAP's confidentiality obligations set forth in the contract.

In any and all claims against the State of Arkansas, or any of its agents or employees, by any employee of SAP or any of its subcontractors, the indemnification obligation under the contract shall not be limited in any way by compensation or benefits payable by or for SAP or any of its subcontractors under worker's disability compensation acts, disability benefits acts, or other employee benefits acts.

4.5 Limitation of Liability
ANYTHING TO THE CONTRARY HEREIN NOTWITHSTANDING, UNDER NO CIRCUMSTANCES SHALL SAP, ITS SUBCONTRACTORS OR STATE BE LIABLE TO EACH OTHER OR ANY OTHER PERSON OR ENTITY FOR AN AMOUNT OF DAMAGES IN EXCESS OF THE FEES PAID HEREUNDER OR BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES, LOSS OF GOOD WILL OR BUSINESS PROFITS, WORK STOPPAGE, DATA LOSS, COMPUTER FAILURE OR MALFUNCTION, ANY AND ALL OTHER COMMERCIAL DAMAGES OR LOSS, OR EXEMPLARY OR PUNITIVE DAMAGES, EVEN IF A PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

4.6 The Limitation of Liability set forth in Section 4.5 above, does not apply to the death or bodily injury caused by the gross negligence or willful misconduct of SAP, its subcontractors, anyone directly or indirectly employed by any of them, or

by anyone for whose acts any of them may be liable, of any person, or the damage, loss or destruction of any real or tangible personal property, in connection with the performance of services by SAP, by any of its subcontractors, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable; provided, however, that this indemnification obligation shall not apply to the extent, if any, that such death, bodily injury or property damage is caused solely by the negligence or reckless or intentional conduct of the State. With respect to real or tangible personal property damage caused by SAP, its subcontractors, anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable for gross negligence, such indemnity shall be limited to the extent of the insurance coverage as set forth in Section 3.

4.7 Indemnification Procedures

Provisions related to indemnification procedures follow.

1. After receipt by the State of notice of the commencement or threatened commencement of any civil, criminal, administrative or investigative action or proceeding involving a claim in respect of which it will seek indemnification, the State shall notify SAP of such claim in writing. Within fifteen (15) days following receipt of written notice from the State relating to any claim, but no later than ten (10) days before the date on which any response to a complaint or summons is due, SAP shall notify the State in writing if SAP elects to assume control of the defense and settlement of that claim (a "Notice of Election").

2. If SAP delivers a Notice of Election relating to any claim within the required notice period, SAP shall be entitled to have sole control over the defense and settlement of such claim; provided, however, that:

   a. The State shall be entitled to participate in the defense of such claim and to employ counsel at its own expense to assist in the handling of such claim and to monitor and advise the State about the status and progress of the defense;

   b. SAP shall at the request of the State, demonstrate to the reasonable satisfaction of the State SAP's financial ability to carry out its defense and indemnity obligations;

   c. SAP shall periodically advise the State about the status and progress of the defense and shall obtain the prior written approval of the State before entering into any settlement of such claim for which the State is responsible or ceasing to defend against such claim, which approval shall not be unreasonably withheld; and

d. To the extent that any principles of Arkansas governmental or public law may be involved or challenged, the State shall have the right, at its own expense, to control the defense of that portion of such claim involving the principle(s) of Arkansas governmental or public law.

3. If SAP does not deliver a Notice of Election relating to any claim of which it is notified by the State as provided above, the State shall have the right to defend the claim in such manner as it may deem appropriate, at SAP's expense. SAP shall promptly reimburse the State for all reasonable costs and expenses.

5. Intellectual Property Rights

5.1 Rights in Data

The State is and will remain the owner of all data provided to SAP pursuant to the contract. SAP will not use this data for any purpose other than providing services under the contract, nor will any part of this data be disclosed, sold, assigned, leased or otherwise disclosed to third parties or commercially exploited by or on behalf of SAP. SAP will not possess or assert any lien or other right against this data.

5.2 Ownership of Deliverables

5.2.1 All rights, title and interest in any Extension or Modification shall be governed by the terms set forth in the terms in the License Agreement.

5.2.2 Except as provided below, upon delivery to the State and payment to SAP, each Deliverable, other than a Modification or Extension, first prepared by SAP for delivery to the State hereunder will become the property of the State. To the extent that any SAP Technology, as defined below, is contained in any such Deliverable, SAP hereby grants the State a paid-up, royalty-free, worldwide, non-exclusive license to use such SAP Technology (as hereafter defined) in connection with the Deliverables.

5.2.3 Ownership of SAP Technology

To the extent that SAP and/or its subcontractors utilize any SAP Technology or any hardware or software of SAP or its subcontractors in connection with the services performed hereunder, such property shall remain the property of SAP and/or its subcontractors and, except for the license granted in paragraph 5.2.2 above, the State shall acquire no right, title or interest in such property.

Nothing in this Agreement shall be construed as precluding or limiting in any way the right of SAP or its subcontractor to provide consulting or other services of any kind or nature to any person or entity as SAP or its subcontractor deem appropriate.

5.2.4 SAP Technology

SAP and its subcontractor have created, acquired or otherwise have rights in, and may in connection with the performance of services hereunder, employ, provide, modify, create, acquire or otherwise obtain, rights in various concepts, ideas, methods, methodologies, procedures, processes, know-how and techniques, including function, process, system and data models, templates, general purpose consulting and software tools, utilities and routines, and logic, coherence and methods of operations of systems (collectively the "SAP Technology").

6   Services Warranty and Anti-Virus Provisions

6.1 Warranty

6.1.1 Warranty Period; Warranty. SAP warrants that the services, including Modifications and Extensions developed by or with SAP hereunder, will be performed consistent with generally accepted industry standards and will substantially conform to the provisions of this contract Addendum through the Go-live date and for 3 months thereafter. For fiscal year end configured business functions as set forth in the Proposal, this warranty shall be for the period of Go-live date through August 31 of the State fiscal year succeeding the Go-Live date and for W-2 and 1099 reporting requirements, this warranty period shall be for the period Go-live date through January 31 of the year succeeding the Go-live date, all subject to the State maintaining the production system including all current SAP issued legal change patches and Correction Levels. Further, SAP's warranty is subject to the State providing SAP necessary access to the Designated Unit(s) and appropriate State personnel. State shall provide SAP with sufficient test time and support on Designated Unit(s) to correct the defect.

SAP warrants that:
1. SAP will use adequate numbers of qualified individuals with suitable training, education, experience and skill to perform the services.
2. SAP has duly authorized the execution, delivery and performance of the contract.
3. SAP has not provided any gifts, payments or other inducements to any officer, employee or agent of the State.
4. SAP will not insert or activate any disabling code into the systems used to provide the services without the State's prior written approval.

6.1.2 Scope of Warranty
(a)   The warranty set forth in this Section 6.1 shall not apply: (i) if the defect is caused by State; or (ii) to Modifications or Extensions not developed by or with SAP under this contract Addendum.

(b)   SAP does not warrant that the services will be free from minor defects or errors which do not materially affect the performance of the Deliverables or that the Deliverables are designed to meet all of State's business requirements.

6.1.3 Express Disclaimer. SAP AND ITS SUBCONTRACTORS DISCLAIM ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXCEPT TO THE EXTENT THAT ANY WARRANTIES IMPLIED BY LAW CANNOT BE VALIDLY WAIVED.

6.2 Software Viruses

SAP shall take all precautions that are reasonable, customary, and commercially practical to avoid providing the State with any software that contains or introduces a virus which contaminates or damages the State's equipment or its mainframe, network, personal computing or other operating environments hardware including the hardware or software of any third party authorized to be connected to the State's computing environments.

7 Personnel

SAP and the State's Independent Project Manager will jointly manage the staffing levels to timely and successfully implement the Software. SAP shall warrant that all persons assigned to the project, excluding State resources and members of the independent project management team, shall be employees or subcontractors of SAP, and shall be fully qualified to perform the work required herein. Other than for temporary staff, each party reserves the right to interview individuals before granting approval for such individual to be assigned to the project.

Key Staff
Each party shall have the right to approve the assignment and replacement by the other party of all key personnel assigned to the project by either party, including the project manager, technical and functional team leads, analytical applications lead and training manager as to SAP and similar State roles as defined in the Project Preparation phase.

Replacement of Personnel

Each party reserves the right to require the other to replace employees whom a party reasonably judges to be incompetent, careless, unsuitable or otherwise objectionable, or whose continued use is deemed contrary to the best interests of the project. Before a written request is issued, authorized representatives of the State and SAP will discuss the circumstance. Upon receipt of a written request from an authorized representative of the other party, the replacing party shall be required to proceed with the replacement. The replacement request will include the desired replacement date and the reason for the request. The replacing party shall use its best efforts to effect the replacement in a manner that does not degrade service or project quality. This provision will not be deemed to give the

requesting party the right to require the other party to terminate any employee's employment. Rather, this provision is intended to give the requesting party only the right to require that the other party discontinue using an employee in the performance of services on the project. Notwithstanding, as to State employees, the State shall have final authority to determine whether or not it is in the best interests of the project to replace a State employee. The State shall exercise all reasonable discretion in making this determination.

Unauthorized Removal of Key Personnel

It is critical to the overall success of the ASIS project that a party not remove or reassign, without the other party's prior written approval, which approval shall not be unreasonably withheld, any of the key personnel until such time as the key personnel have completed all of their planned and assigned responsibilities in connection with performance of their respective obligations under the contract. Such removal does not include death, employee termination, or employee termination for breaches of company or State policy. The unauthorized removal of key personnel may be considered as a material breach of contract and grounds for termination, pursuant to Section 11.

8 Billing and Charges

8.1   Basis for Reimbursement and Method of Payment

SAP shall provide implementation services to the State as detailed in the Statement of Work, attached hereto as Exhibit 1 and incorporated herein by reference, at a firm fixed price. Change orders accepted by both parties as specified in Section 10, below, and Exhibit 3 to the SOW shall be executed at specified fully-loaded fixed hourly rates, as set forth in Schedule 1 hereto.

8.2   Contract Limits

Compensation to SAP for implementation services provided to the State in connection with this contract shall not exceed $17,436,300 except as may be revised by formal amendment and/or change order to this contract. Payment for each Deliverable is contingent upon the State's Acceptance of each Deliverable in accord with Section 3 of the SOW.

8.3   Fully Loaded Hourly Rates

SAP acknowledges that all out-of-pocket expenses it incurs in performing the services under the contract (such as, but not limited to travel, lodging, document reproduction, shipping, and long distance telephone) are included in the fixed price for implementation services specified in Section 8.1.1. Accordingly, SAP's out-of-pocket expenses are not separately reimbursable by the State unless such expenses are attributable to non-local travel performed at the State's request, or, on a case-by-case basis for unusual expenses, the State has agreed in advance in writing to reimburse SAP for the expense.

8.4 Invoice

SAP shall invoice State upon State's Acceptance, in accord with Section 3 of the SOW, of a Deliverable. The invoice amount for each Deliverable shall be as set forth in Exhibit 2 to the SOW. All invoices shall be paid net thirty days after receipt of invoice.

8.5 Retainage

To provide the State assurance that SAP performs as promised, the State shall withhold 10% of payments due under the contract for implementation services provided. Retainage shall be paid to SAP within 45 days after State's Acceptance of the final Deliverable.

8.6 Invoice Submission

Invoices will be submitted to the State's Administrator, Office of Accounting designated in Section 1 of this contract Addendum.

8.7 Taxes

The fees set forth in this contract Addendum do not include federal, state or local sales, use, property, excise, services or other taxes now or hereafter levied. State shall remit such taxes directly to the applicable taxing authorities. Any taxes or amounts in lieu thereof paid or payable by SAP in respect of any such taxes or the fees invoiced in accordance with this contract Addendum (excepting only taxes on net income) shall be for the State's account.

9. Deliverable Assumptions

In addition to the Assumptions as set forth in the SOW, the following additional assumptions shall also apply:

9.1 Risk Management Plan

The Independent Project Manager will coordinate the preparation of a Risk Management Plan with SAP. The Plan will identify risks with potential impact on costs, schedule, or quality of the planned new system. It will estimate exposure as a factor of probability and impact of each risk, and propose mitigation strategies for high priority risks.

9.2 Installed Baseline Application Software and Documented Installation Procedures

SAP will provide assistance such that the proposed server software product is successfully installed.

9.3 ASAP Deliverable Account Code Classification Plan

SAP shall provide a recommended Account Code Classification Plan. The recommended Plan shall include, at a minimum:

- A crosswalk from the State's current coding block to the new coding block.

- A plan to meet CAFR reporting requirements with the new chart of accounts, State defined rollup codes, specific system files, and/or existing reports.

- Report designs as required to perform CAFR reporting.

9.4 Reports Analysis and Design Documentation

SAP shall co-produce with the State a Report Needs Analysis and design documentation for any required report modifications or custom reports. Procedures for using any reporting tools provided with the software solution should be included.

9.5 Interface Analysis and Plan

SAP shall co-produce with the State with a needs assessment, design documentation and procedures to support system interface requirements.

9.6 Data Conversion Plan

SAP shall co-produce with the State a comprehensive data conversion plan.

9.7 Training Plans and Curricula

SAP is to develop detailed training plans and curricula for the following groups of users:

Functional end users in DFA and State agencies;

Trainers responsible for delivering ASIS training;

Help desk/user support specialists;

ASIS project team members; and

Agency executives, managers and ASIS agency liaisons.

9.8 End User Support Plan

SAP shall provide a detailed end user support plan and related documentation.

10. Contract Modifications and Change Orders

Either party may, from time to time, request a modification to contract terms or request changes in the scope of SAP's services to be performed under the contract. Such modifications or changes, which are mutually agreed upon by and between the State and SAP, shall be incorporated in written amendment or change order to the contract.

11. Term and Termination

11.1 Term

This contract Addendum shall become effective upon the execution by both parties.

11.2 Termination for Cause

Either party shall have the right to terminate the contract for cause, the State's right being in whole or in part, in the event the other party:
1. Breaches any of its material duties or obligations under this contract, which breach is not addressed with a remedy plan within the time period specified in a written notice of breach from the non-breaching party to the breaching party, such time period to be at least ten business days;
2. Breaches any particular material duty or obligation under this contract on more than one occasion, provided that on the first occasion, the breaching party has had the opportunity to cure the breach under Section 1 above; or
3. The failure of the State to make payment of any undisputed amounts when due and the expiration of thirty (30) calendar days from receipt of notice thereof; or
4. Breaches any material duty under this contract Addendum which is not capable of being cured, including, without limitation, its confidentiality obligations set forth above.

If the State chooses to terminate this contract Addendum in part, the amounts payable under this contract Addendum shall be equitably adjusted to reflect those services that are terminated.

In the event this contract is terminated for cause pursuant to this section, and it is thereafter determined for any reason that SAP was not in default under the provisions of this section, such termination for cause shall be deemed to have been a termination for convenience effective as of the same date, and the rights and obligations of the parties shall be limited to those determined in accordance with this Section.

11.3 Termination for Lack of Funding

The term of this contract extends for several fiscal years. Continuation of this contract is subject to appropriation of funds for ASIS. If funds to effect continued payment are not appropriated or otherwise made available by law, the State shall have the right to terminate this contract without penalty at the end of the period for which funds have been appropriated or otherwise made available by law by giving written notice of termination to SAP. Notwithstanding, the State shall be obligated to pay SAP in accord with Section 11.5.1, below.

If funding for ASIS is reduced by law or funds to pay for the agreed level of services to be provided by SAP are not appropriated or otherwise made available

by law, the State may, upon thirty days written notice to SAP, reduce such level of services in such manner and for such periods of time as agreed to by the State and SAP in a change order.

In connection with this contract, the State agrees to make reasonable efforts to obtain funding and all necessary authorizations, and to notify SAP promptly when such funding and authorizations have been obtained or when it appears certain they shall not be obtained. If partial funding sufficient for a clearly separate task or tasks should be made available, the parties may agree to perform their respective obligations relative to such tasks, and this contract shall be amended accordingly in accord with the change order procedure.

11.4 Termination for Convenience

The State may terminate the contract for implementation services, in whole or in part, at any time and for any reason without penalty upon at least thirty days prior written notice of termination to SAP. If the State chooses to terminate this contract in part, the State shall be obligated to pay SAP in accord with Section 11.5.1, below.

11.5 Rights upon Termination

In the event of contract termination the rights of the State and SAP upon termination of the contract shall be governed by the sections which follow:

11.5.1 Payment Upon Termination

In the event the State terminates the contract prior to its expiration, the State shall pay SAP for completed Deliverables in full. The State shall pay SAP for any partially completed Deliverables on a percentage of completion basis; provided, however, that if such termination is for cause, the State shall have the right to offset against any amounts due to SAP by the amounts of any damages for which SAP is liable to the State. In no event shall the State be obligated to pay or otherwise compensate SAP for any lost expected future profits, or costs or expenses incurred with respect to, services not actually performed or Deliverables not actually provided to the State.

11.5.2 Delivery of Partial Work Product

SAP shall promptly deliver to the State in a manner reasonably specified by the State all documents and other tangible items furnished by or owned, leased or licensed by the State.

11.6 Reservation of Rights

Any termination of the contract by a party shall be with full reservation of, and without prejudice to, any rights or remedies otherwise available to such party in accord with this contract Addendum with respect to any claims arising prior to or as a result of such termination.

12   Other Terms and Conditions

12.1 Force Majeure

Any delay or non-performance of any provision of this contract Addendum (other than for payment of amounts due hereunder) caused by conditions beyond the reasonable control of SAP or the State, shall not constitute a breach of this contract Addendum, and the time for performance of such provision, if any, shall be deemed to be extended for a period equal to the duration of the conditions preventing such performance.

12.2 News Releases

SAP will not make any news releases, public announcements or public disclosures, nor will it have any conversations with representatives of the news media, pertaining to this contract, or the services, study, data or project to which it relates, without the prior written approval of the State, and then only in accordance with explicit written instructions from the State.

12.3 No Third Party Beneficiaries

It is expressly understood and agreed by the parties that the contract and the services provided under the contract are not intended to inure to the benefit or detriment of any third party.

12.4 Captions and Headings

Captions and headings presented throughout this contract are for information and organization purposes. Captions and headings, including inaccurate references, do not, in any way, define or limit the requirements or terms and conditions of the contract.

12.5 Survival

The following provisions shall survive any termination of this contract Addendum: Sections 2, 4, 5, 6.1.3 and 12.6.

12.6 Employee Non-Solicitation

During the term of the contract and for a period of twelve (12) months thereafter, neither party, either directly or indirectly, will offer employment to or employ or solicit for employment any employee of the other party who was involved in the performance of the party's obligations under the contract unless the hiring party obtains the written consent of the other party.

12.7 Background Check

The State reserves the right to conduct background checks of SAP, its officers and of those employees or agents of SAP who would perform the required services to determine suitability for performing this contract.

12.8 Waiver

The waiver by either party of a breach or default in any of the provisions of this Agreement by the other party shall not be construed as a waiver of any succeeding breach of the same or other provisions; nor shall any delay or omission on the part of either party to exercise or avail itself of any right, power or privilege that it has or may have hereunder operated as a waiver of any breach or default by the other party.

12.9 Independent Contractor

The relationship of SAP and the State established by this contract is that of an independent contractor.

13. Entire Agreement and Order of Precedence

The Professional Services Contract, this contract Addendum, including the Statement of Work ("SOW") and Exhibits thereto, constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements between the parties, whether written or oral, relating to the same subject matter. No modifications, amendments, or supplements to this Addendum shall be effective for any purpose unless in writing and signed by the parties.

In the event of any inconsistencies between the Professional Services Contract, this contract Addendum, the SOW, and the Exhibits to the SOW, the following order of precedence, in descending order, shall apply:

Exhibit 4 to SOW, Proposal
Exhibit 5 to SOW, Demo Videotapes, with the understanding that these shall be used only to clarify Exhibit 4, Proposal and not to add additional requirements
SOW, including Exhibits 1, 2 and 3
Contract Addendum
Schedule 1 to Addendum, Fully Burdened Labor Rate Schedule
Professional Services Contract

Any purchase order or other document issued by State is for administrative convenience only. In the event of any conflict between the provisions of this contract Addendum, and any purchase order, the provisions of this contract Addendum shall prevail and govern and any additional terms in the purchase order or other document shall be inapplicable.

IN WITNESS WHEREOF, the parties have so agreed as of February 18, 2000.

Acceptance:

SAP Public Sector and Education, Inc.

Signature: *Robert M Salvucci*

Print Name: ROBERT M SALVUCCI

Title: PRESIDENT

Date: 2/16/00

Acceptance:

State of Arkansas

Signature: _____

Print Name: _____

Title: Director

Date: 2/16/2000

Schedule 1
To
Addendum
To
Professional Services Contract
Between
The State of Arkansas
And
SAP Public Sector and Education, Inc.
Dated
February 18, 2000

Rates. The following categories have been defined for SAP consultants:

K1 = Junior Consultant
K2 = Consultant I
K3 = Consultant II
K4 = Senior Consultant
K5 = Senior System Consultant/Management Consultant
K6 = Client Manager or Lead Consultant
K7 = Developer or Global Support Manager or Consulting Manager or Platinum Consultant
K8 = Senior Developer or Consulting Director

The rates applicable to each category in US dollars are as follows:

	K1	K2	K3	K4	K5	K6	K7	K8
Daily rate (1) (up to 8 hrs.)	$1,240	$1,512	$1,744	$1,992	$2,368	$2,752	$3,112	$3,720
Half day rate (1) (up to 4 hrs.)	$620	$756	$872	$996	$1,184	$1,376	$1,556	$1,860
Hourly rate of overtime (1)	$155	$189	$218	$249	$296	$344	$389	$465
Off hours (2) (up to 8 hrs.)	$1,860	$2,232	$2,604	$2,976	$3,534	$4,154	$4,650	
On-call service (3) (up to 8 hrs.)	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
On-call rates (3) (up to 8 hrs.)	$1,500	$1,800	$2,100	$2,400	$2,850	$3,350	$3,750	
Remote Consulting (4) (hourly rate)	$270	$270	$270	$270	$270	$270	$270	$270

(1) Regardless of the above rate schedule, Training Managers and ABAP Development Resources shall be billed at $120/hour, inclusive of all expenses such as travel, living, meals, and office supplies.

(2) Daily and half day and overtime rates are applied to consulting services provided from Monday 6:00 a.m. until Friday 8:00 p.m., excluding holidays as observed by SAP.

(3)   The following constitutes off hours:
- SAP observed Holidays
- Weekends: 8:00 p.m. Friday until 6:00 a.m. Monday
- Weekdays: 8:00 p.m. until 6:00 a.m.

(2) and (3) Rates are inclusive of all expenses such as travel, living, meals, and office supplies.

(4)   On-call service is a pre-arranged service by which Licensee places a request to have a consultant available for remote technical assistance accessible by pager for a specified time period. If service is required it will be billed at the on call rates (see above). This service will be provided remotely via a telecommunications link.

(5)   Remote consulting is an hourly rate for consulting services provided via a telecommunications link during business hours (Monday 6:00 a.m. through Friday 8:00 p.m.).

The following notes apply to all categories:

(6)   If Licensee specific customizations are carried out in SAP's computer center, a machine time surcharge of $500 per day will be added to the above rates. If a separate test system is required to carry out Modifications and Extensions, an additional fee will be charged, based on resources required.

(7)   If services are pre-arranged and Licensee cancels with less than two business days notice, Licensee will be billed for one consulting day at the applicable K-Rate.

(8)   SAP is willing to negotiate a maximum annual percentage increase to the above rates, tied to key economic indicators for 3 additional years.

SAP Appendix 8 – Employee Diversity and Inclusion at SAP

EMPLOYEE DIVERSITY AND INCLUSION AT SAP

An Employer of Choice Throughout North America

Fortune "100 Best Companies to Work For" 2017, "Best Workplaces for Diversity" 2016, "Best Workplaces for Parents" 2016, "Best Workplaces for Technology" 2017; People's "Companies that Care" 2017; Glassdoor "Best Places to Work Employees' Choice Award" 2017, "Highest-Paying Companies" 2016, "Highest Rated CEOs" 2017, 2016; Forbes U.S. "Best Large Employers" 2017, 2016, 2015; Human Rights Campaign Foundation "Best Place to Work for LGBT Equality" 2017-2014; Civic 50 "Most Community Minded Companies" 2016; Anita Borg Institute "Top Companies for Women Technologists" 2016; EDGE Certification "Gender Equality Certification" 2016; AON "Platinum Best Employer in Canada" 2017; Media Corp Canada "Canada's Top Employers" 2017-2015, "Top Employers for Young People" 2016, 2015;

At SAP, we nurture and support an environment that values differences in culture, race, ethnicity, age, gender, sexual orientation, gender identity or expression, physical or mental ability, and work-life situations. We actively promote an environment that values differences, and we are equally committed to all employees.

> "At SAP, our commitment to diversity and inclusion – and building a business beyond bias – fuels innovation and allows us to better serve our customers, keep our employees engaged, and outperform the competition. By embracing our differences, reaching out to those who are under-represented, and using our resources and technology to reduce bias, we are not just imagining the kind of inclusive organization we want to be, but making it a reality."

Anka Wittenberg, SAP Chief Diversity and Inclusion Officer

Figure 1. Key Facts about Diversity and Inclusion at SAP

We regard diversity and inclusion – in senior management and at all levels – as critical to innovation, customer satisfaction and employee engagement. We aspire to help uncover and to nurture the qualities that each person brings to the company in appreciation of their unique competencies.

87%	**5**	**150+**	**25%**	**32.9%**	**120**
Of SAP employees embrace workplace diversity	Generations of workers creating a new dynamic	Nationalities of SAP employees	Women in management	Women in the workforce	SAP colleagues employed via the Autism at Work program

Our diversity and inclusion strategy focuses on four key areas:

1. **Gender intelligence:** Ensuring awareness of the benefits of gender diversity and helping women and men work more effectively together. Details available online.
2. **Cross-generational intelligence:** Creating rich collaboration through different life stages and perspectives. Details available online.
3. **Culture and identity:** Honoring the many voices at SAP who inspire our innovation, regardless of race, religion, culture, gender identity or sexual orientation. Details available online.
4. **Differently-abled people:** Valuing the unique potential and contributions of everyone, regardless of physical or mental ability. Details available online.

Women in the Workplace

One prime focus in recent years has been women in management, given the reality that women are significantly underrepresented in engineering, science, and information technology. The IT industry struggles with gender equality, especially in management. We have made it a priority to recruit, retain, and promote the best women. **Overall, 32.9% of our employees are women (2016: 32.6%), and the percentage of women in management increased to 25.4% in 2017 from 24.5% in 2016.** We pay attention to the percentage of women in management as a key measure of our success. We had set a voluntary target of increasing the percentage of positions in leadership on a global level held by women to 25% by the end of 2017, which we achieved successfully. From 2018 onwards, we voluntarily seek to further increase this percentage by one percentage point annually to reach 28% by the end of 2020.

SAP is EDGE-certified

We are the first multinational technology company to be awarded the Economic Dividends for Gender Equality (EDGE) certificate for our global commitment to workplace gender equality. [Read the press release for details](#).

Diversity and Inclusion Initiatives

The following activities help sustain our focus on diversity and build an inclusive environment:

- **Focus on Insight – Diversity and Inclusion training program:** Our global learning curriculum contributes to a shared understanding of the importance and benefits of a diverse workplace.
- **Business Beyond Bias:** The initiative includes significant investment in programs and technology that support greater diversity. This helps eliminate bias not only at SAP, but also in customer and partner organizations.
- **Autism at Work program:** 120 employees with autism currently work at SAP.
- **Global Pride@SAP employee network:** This network has grown to more than 8,000 members, sponsoring numerous activities and initiatives that support lesbian, gay, bisexual, and transgender people and their allies.
- **Cross-generational mentoring:** This program connects SAP employees from different generations to form networks, share knowledge, and learn from each other.
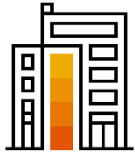
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