ASSESSMENT REPORT

FlexBridge Technical Discovery

for Forward Thinking Co HANA Migration

on 04/05/2018

Planning for a sustainable, supportable, and flexible SAP landscape future

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1. Executive Summary

Since its debut, SAP HANA has become the most important product ever released by SAP. Going forward, it is poised to become the core foundation of every SAP product as customers transition to the HANA platform, or as new HANA offerings come to market. According to the Wall Street Journal, half of all SAP customers surveyed cited budget, timing and complexity issues as impediments to HANA adoption. The Protera FlexBridge migration product incorporates years of Protera's migration experience and best practices into an automated tool that streamlines your path to SAP HANA. The FlexBridge product consists of the following key components:

- *Built in migration best practices & experiences*
- *Machine learning to continuously improve and provide automated error correction*
- *Built on standard and certified SAP tools and processes*
- *Built in project management capabilities*

These features help take the time, cost and risk out of SAP HANA migrations. Migrations performed with Protera FlexBridge services typically realize up to a 45% reduction in the project timeline, data quality increases by up to 50% and project cost reductions of more than 50%.

The FlexBridge engagement begins with an Assessment Report of your SAP environment. In this report, FlexBridge evaluates your current landscape and provides a clear path on how to move your SAP landscape to a HANA platform in the cloud. The report will provide a detailed evaluation of your current landscape and outline dependencies that need to be met prior to starting your migration. It will describe our best in class migration methodology and our recommended target cloud architecture. It will contain estimated project timelines and downtimes so you can plan your business accordingly. Protera FlexBridge's proven assessment methodology focuses on identifying risks and providing actionable recommendations to mitigate those risks in support of your critical business objectives.

The following items will be part of the Protera FlexBridge Assessment Report:

- *Executive summary*
- *A comprehensive listing of issues identified that may prevent, delay or otherwise pose a risk to your migration to SAP HANA*
- *Description of the Protera FlexBridge methodology, planning and project phases*
- *Detailed recommendations for your end-state SAP environment, including suggested architecture and costs*
- *The Protera FlexBridge migration services costs for the entire project (project management office, migration architect / engineering teams and the FlexBridge tool which automates the entire migration)*
- *Protera corporate overview, FlexBridge product detail, a Cloud transition benefits overview and Destination cloud overview.*

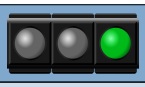
We have performed a FlexBridge Assessment of the Forward Thinking Co's SAP environment and the following is a high-level overview of your landscape. This assessment provides a baseline estimate for timelines, costs, target landscape sizing and pre-requisites required to migrate to HANA. The assessment is a tool to start more detailed technical and business discussions about your existing SAP configuration to arrive at the best migration solution for your enterprise.

The systems assessed are as follows:

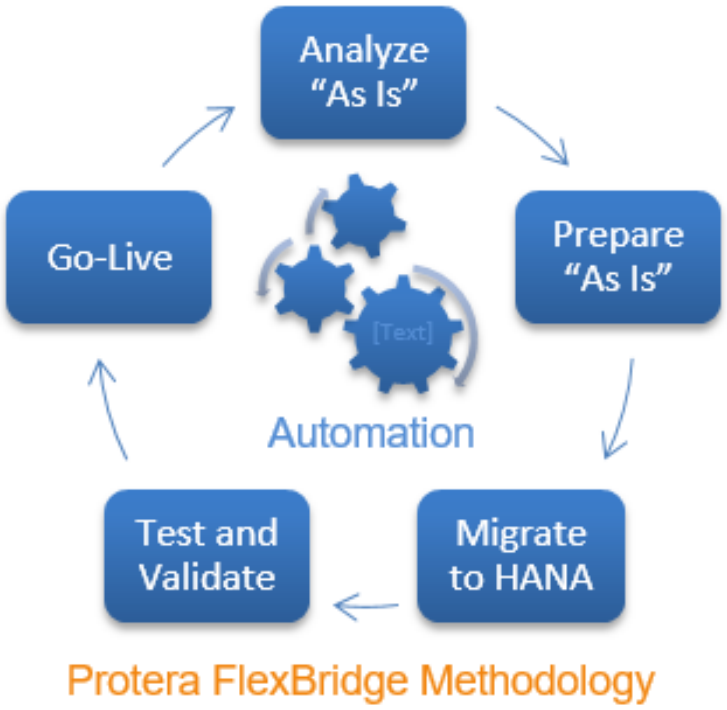
System SID	SAP Solution	System Role	Assessment Date
ZED	**SAP ECC 6.0**	**Development**	**03/04/2018 13:59:40**
ZEQ	**SAP ECC 6.0**	**Quality Assurance**	**03/04/2018 14:01:37**
ZEP	**SAP ECC 6.0**	**Production**	**03/04/2018 15:22:27**

The following areas of your SAP environments were assessed and an overall rating of the severity of the issues found are listed below. Section 2 goes into further details on these issues and corrective actions proposed either before, during or after the migration project.

Item	Migration Issue Identified	Severity
1	**Operating System**	
2	**Database**	
3	**SAP Versions**	

4	**Accelerated Downtime Capabilities (ADC) Compatibility**	
5	**Unicode**	
6	**Dual Stack Architecture**	
7	**Central Instance Migration**	
8	**Add-On Components**	

The Protera FlexBridge methodology can be summarized as follows:



FlexBridge is able to automate and migrate your SAP landscapes to the following cloud offerings configured as public, private or hybrid clouds:

- *Microsoft Azure*
- *Protera Cloud*
- *On-Premise Infrastructures*

A Protera FlexBridge migration project for a standard 3-system SAP ERP landscape can typically be accomplished in 20 weeks or less as shown in the following project timeline.

Tasks		Week								
S/4 HANA 1709Migration Timeline	**Responsible**	1	2	3	4	5	6	7	8	9
Project Planning	SI, PR. CU									
Project Kick Off	SI, PR, CU									
Develop overall Project Plan	SI, PR, CU									
Architecture & Landscape Design	PR, CU									
Develop Testing Plan	SI, PR, CU									
Develop Remediation Plan	SI, PR, CU									
Planning, Architecture and timeline sign-off	CU	*								
Project Landscape Activities	SI, PR, CU									
Project Landscape Build out	PR, CU									
Project Landscape Validation & Sign off	SI, CU									
POC S/4 HANA Conversion	SI, PR, CU									
Prepare Phase	SI, PR, CU									
S/4 Basis Pre-Conversion Requirements review and remediation	PR, CU									
S/4 Application Pre-Conversion Requirements review and remediation	SI, CU									
Cross Application and Application specific Prep activities	SI, PR, CU									
Realize Phase	SI, PR, CU									
SUM Execution and Data conversion (Uptime/Downtime phases)	PR, CU									
Cross Application and Application specific post activities	SI, CU									
Remediation & Testing - Technical	PR, CU									
Remediation & Testing - Functional	SI, CU									
Remediation & Testing - Integration	SI, CU									
Remediation & Testing - Security	SI, CU									
Conversion sign-off	CU									*

The uptime phase of the production migration will run for approximately two weeks. During this time, the following activities will be performed:

- *Cutover planning and communications finalization*
- *Migration related preparatory activities*
- *The Production environment will always be available during this phase until we enter the downtime window*
- *The Production system downtime window is estimated to be around 48 hours. During this time, no users, jobs or interfaces will be able to access the Production system*

In order to reduce the downtime window for your Production environment the following actions will shorten the total out of service downtime:

- *Increased compute resources on the source systems*
- *Moving the source systems to SSD storage*
- *Increased bandwidth between primary datacenter and the target cloud environment*

- *Custom code remediation prior to migration and upgrade*
- *Uptime table conversions*
- *Automated SAP testing tools/processes to minimize post migration testing*

Section 4 of this report contains additional details about your recommended target landscapes / architecture, HANA sizing and forecasted monthly operational costs.

Based on the assessment performed, we have estimated the following configuration and monthly costs:

System SID	SAP Solution	Role	Target Hana Memory Sizing (GB)	IaaS Charges/mo	Managed Services Charges/mo	IAAS + Managed Svcs Charges/mo
ZED	SAP ECC 6.0	Development	224	$5,567.00	$7,384.00	$12,951.00
ZEQ	SAP ECC 6.0	Quality Assurance	768	$5,215.00	$6,984.00	$12,199.00
ZEP	SAP ECC 6.0	Production	1500	$7,067.00	$3,332.00	$10,399.00
			Total :	$17,849.00	$17,700.00	$35,549.00

For the three systems, the monthly IAAS charges is $17,849.00. And, the monthly Managed Services charges is $17,700.00.

The combined monthly IAAS and Managed Services charges is 35,549.00.

The Migration Cost will be a one-time cost of $45,000.00 for these three systems.

Note: This assessment report provides a baseline budgetary and planning estimate for the timeline, costs, target landscape sizing and pre-requisites required to migrate your SAP environment to HANA in the cloud. Planning timelines, sizing, costs and downtime estimates can vary significantly based on: your existing SAP configuration; how aggressive your data volume management strategy is; custom development and tables; complexity of your SAP environment and associated interfaces; and a variety of other factors. One of our SAP Migration professionals will be contacting you in the coming weeks to schedule time with you and your team to review this report in its entirety and discuss options to help arrive at more precise time and cost estimate for your migration.

We hope you will consider Protera Technologies as a partner in your journey to SAP HANA. Protera is a global business critical managed enterprise cloud and hosting services provider. We were formed in the mid-90s and have capitalized on our strong expertise with SAP solutions to evolve into a pioneer of end-to-end managed enterprise cloud and hosting solutions that cover all IT needs of an organization. Protera has built an on-demand operations platform -- AppCare -- to deliver total IT outsourcing services. The Protera AppCare platform brings together the comprehensiveness of a total IT solution along with the flexibility, robustness and cost effectiveness of on-demand cloud innovations. We pride ourselves on putting our customers first and ensuring a first-class experience for you both during the migration project and beyond.

2. Source System Assessment for Forward Thinking Co

The Protera FlexBridge tool has conducted a detailed assessment of your SAP environment. This section provides detail with respect to migration related issues identified in the assessment and how they can be remediated prior to or during your migration to SAP HANA.

The following systems in your SAP Landscape have been analyzed and an overall rating has been assigned to each system.

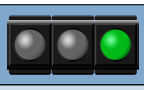
SID	SAP Solution	Role	Overall Rating
ZED	SAP ECC 6.0	Development	
ZEQ	SAP ECC 6.0	Quality Assurance	
ZEP	SAP ECC 6.0	Production	

The next section of the report lists migration related issues uncovered and the recommended approaches to remediate these issues. We also provide guidance on recommended timelines for remedial actions for each issue.

2.1. Operating System

The Protera FlexBridge tool has evaluated the underlying operating system versions and patch levels installed in your current SAP environment.

SID	SAP Solution	Role	Operating System	End of Life	Severity
ZED	SAP ECC 6.0	Development	WINDOWS SRV 2008 R2/X64 64BIT	14.01.2020	

ZEQ	SAP ECC 6.0	Quality Assurance	WINDOWS SRV 2008 R2/X64 64BIT	14.01.2020	
ZEP	SAP ECC 6.0	Production	WINDOWS SRV 2008 R2/X64 64BIT	14.01.2020	

No issues were found in the environment that would affect your FlexBridge Migration to SAP HANA project.

2.2. Database

The Protera FlexBridge tool has evaluated the underlying database versions and patch levels installed in your current SAP environment.

SID	SAP Solution	Role	Database Version	End of Life	Severity
ZED	SAP ECC 6.0	Development	MS SQL SERVER 2012/X86_64	12.07.2022	
ZEQ	SAP ECC 6.0	Quality Assurance	MS SQL SERVER 2012/X86_64	12.07.2022	
ZEP	SAP ECC 6.0	Production	MS SQL SERVER 2012/X86_64	12.07.2022	

No issues were found in the environment that would affect your FlexBridge Migration to SAP HANA project.

2.3. SAP Release, Patch levels & Kernel versions

The Protera FlexBridge tool has evaluated the Enhancement Packages, Support Packages and Kernel levels of your current SAP environment.

SID	SAP Solution	Role	Kernel Version	Kernel Patch Level	Severity
ZED	SAP ECC 6.0	Development	721	600	
ZEQ	SAP ECC 6.0	Quality Assurance	721	600	
ZEP	SAP ECC 6.0	Production	721	600	

No issues were found in the environment that would affect your FlexBridge Migration to SAP HANA project

2.4. Accelerated Downtime Capabilities (ADC) Compatibility

The Protera FlexBridge tool has evaluated the operating systems of your SAP environment to determine compatibility with Protera's Accelerated Downtime Capabilities (ADC). This toolset provides many advanced migration features including combined Migration and Upgrades, reduced downtimes and migration to SAP HANA.

SID	SAP Solution	Role	Severity
ZED	SAP ECC 6.0	Development	
ZEQ	SAP ECC 6.0	Quality Assurance	
ZEP	SAP ECC 6.0	Production	

The ADC toolset is completely supported for your to run in your environment.

2.5. Unicode

The Protera FlexBridge tool has evaluated if your current SAP environment is running Unicode.

SID	SAP Solution	Role	Unicode	Severity
ZED	SAP ECC 6.0	Development	Yes	
ZEQ	SAP ECC 6.0	Quality Assurance	Yes	
ZEP	SAP ECC 6.0	Production	Yes	

No issues were found in the environment that would affect your FlexBridge Migration to SAP HANA project

2.6. Architecture: Java/Dual Stack system

The Protera FlexBridge tool has evaluated your current SAP Landscape for running a dual stack environment.

SID	SAP Solution	Role	Dual Stack?	Supported?	Severity

SID	SAP Solution	Role	Dual Stack?	Supported?	Severity
ZED	SAP ECC 6.0	Development	No	Yes	
ZEQ	SAP ECC 6.0	Quality Assurance	No	Yes	
ZEP	SAP ECC 6.0	Production	No	Yes	

No issues were found in the environment that would affect your FlexBridge Migration to SAP HANA project

2.7. Central Instance

The Protera FlexBridge tool has evaluated your current SAP Landscape and has identified the following issue with your SAP Central Instances which will need to be addressed during your migration project.

SID	SAP Solution	Role	CI Migration	CI and DB	Severity
ZED	SAP ECC 6.0	Development	Yes	Same Server	
ZEQ	SAP ECC 6.0	Quality Assurance	Yes	Same Server	
ZEP	SAP ECC 6.0	Production	Yes	Same Server	

Severity: Medium

Observations: As part of the migration to SAP HANA in the cloud, the Central Instance of each of your SAP environments will be migrated to the cloud which will be co-located with your HANA database per SAP Best Practices. While this may have minimal impact on your Non-Production landscapes (as they are generally only used by internal teams), adequate planning and testing needs to be conducted for the migration of the Production Central Instance in the following areas:

- *Production users, SAPGUI, URL connectivity*
- *External interfaces/connectivity to vendors, partners and other service providers*
- *Connectivity to other internal SAP or non-SAP systems*
- *Output management – Printing, Email, Fax and others.*
- *Scheduling – SAP Batch and external tools or scripts*

Supported Release(s): N/A.

Remediation: A comprehensive effort needs to be undertaken to ensure that all connectivity (both internal and external) to the Central Instances of each of the systems prior to the migration to the cloud. This list will then serve as the basis for the changes required post migration. Adequate communication and change planning will need to be performed with both internal and external teams to ensure that the changes can be made and validate quickly post-migration to prevent any unforeseen issues.

Timeline: Short term effort to document all potential impact from the migration of the Central Instances to the cloud. Remediation will be performed immediately after the migration to the cloud and tested thoroughly prior to declaring the migration complete.

2.8. Data Volume Management

SAP Data Volume Management (DVM) is a framework that helps the solution operations team of an SAP-centric solution to balance the need of business access to a wealth of data and IT efforts to maintain storage, databases, and applications.The methodology provided within the DVM framework consists of best practices, tools, and SAP partner services.

The methodology provided within the DVM framework consists of best practices, tools, and SAP partner services.

It is essential for companies to exercise Information Lifecycle Management (ILM) so that they can meet their data retention, data destruction, system decommissioning requirements and stay in compliance with legal and regulatory mandates.
There are four basic strategies that may be employed to ensure adherence to DVM and ILM Best Practices:

- *Data Prevention/Data Avoidance*
- *Data Aggregation/Summarization*
- *Deletion/Cleanup*
- *Archiving*

Protera FlexBridge has evaluated your Production system for the largest tables. The table below identifies what strategy can be applied to reduce data volumes in the environment prior to your migration. Custom tables (starting with "Z") need to be evaluated separately with your application team to arrive at an appropriate strategy to control data growth.

Table Name	Component	DVM Strategy	Size (GB)
FAGLFLEXA	ERP	Avoidance, Summarization, Archiving	343.5
GLPCA	ERP	Avoidance, Summarization, Deletion, Archiving	104.4
BSIS	ERP	Avoidance, Deletion, Archiving	66.9
FAGL_SPLINFO	ERP	Avoidance, Summarization, Archiving	55.8
CMFP	ERP	Avoidance, Deletion, Archiving	53.4
NAST	ERP	Avoidance, Deletion, Archiving	47.5
RFBLG	ERP	Avoidance, Deletion, Archiving	46.7
SOFFCONT1	NW	Avoidance,Deletion,Archiving	46.6
BKPF	ERP	Avoidance, Deletion, Archiving	43.8
COEP	ERP	Summarization, Archiving	41.5
DBTABLOG	NW	Avoidance, Deletion, Archiving	40.8
STXH	NW	Avoidance, Deletion, Archiving	34.2
ACCTIT	ERP	Avoidance, Deletion, Archiving	34.0
CDCLS	NW	Avoidance, Deletion, Archiving	28.4
S033	ERP	Avoidance, Summarization, Deletion, Archiving	28.0
VBFA	ERP	Avoidance, Archiving	27.8

Severity: Medium

Observations: The size of the key tables in your source systems has significant bearing in two aspects of your migration to SAP HANA.

- *Size and costs of the target HANA system and landscape*
- *Downtime to your business during the system migration to HANA.*

It is therefore, strongly recommended that you attempt to reduce the size of your source system

as much as possible prior to starting migration project. Your SAP application support teams can begin the necessary actions to reduce the size of your environment based on business, legal and compliance requirements.

If your SAP team chooses to embark on a Data Volume Management strategy, it is highly recommended to re-run this assessment before any final sizing, timeline or pricing decisions are made.

Supported Release(s): N/A.

Remediation: Review the proposed Data Volume Management strategy proposed above and proceed to categorize and reduce source system table sizes across your SAP landscape. Adequate testing should be performed in your non-Prod landscapes and business sign-off must be obtained prior to implementation in your Productive landscape.

Timeline: Medium term effort, should be pursued prior to beginning your SAP HANA project. If significant volume reductions are obtained, it would be beneficial to re-run this report prior to re-assess your environment.

2.9. Add-On Components

The Protera FlexBridge tool has evaluated the SAP and 3rd party Add-Ons installed in your environment.

SID	SAP Solution	Role	Severity
ZED	**SAP ECC 6.0**	**Development**	
ZEQ	**SAP ECC 6.0**	**Quality Assurance**	
ZEP	**SAP ECC 6.0**	**Production**	

No issues were found in the environment that would affect your FlexBridge Migration to SAP HANA project. More details can be found on Add-On Components in the Protera FlexBridge HANA Prepare Assessment.

3. Migration Overview

3.1. Migration Methodology

All FlexBridge Migration Projects typically includes the following roles to ensure the successful planning, execution and completion of the migration project.

Org	Role	Responsibilities	Level of Involvement
Protera	Project Manager	Overall responsibility of the project - resources, timelines, reporting and management	High
Protera	FlexBridge Migration Architect	Performs assessment, migration planning and solution architecture. Oversees migration progress and serves as the FlexBridge Center of Excellence	Medium
Protera	Infrastructure Build Team	Provisions the target infrastructure and provides infrastructure support for the duration of the project	Low
Protera	FlexBridge Migration Engineer(s)	SAP NetWeaver and FlexBridge migration consultants that perform the FlexBridge migrations	High
Customer	Executive Stakeholder	Project sponsor, keeps abreast of major project activities and a key decision maker for the project	Low
Customer	Project Coordinator	Responsible for tracking / managing customer specific aspects of the project, identifying key resources and ensuring they meet defined objectives	Medium
Customer	SAP Functional Team	A combination of functional SMEs and end users that will collectively review, configure / customize and validate project deliverables	Medium

Customer	Infrastructure and Basis teams	It is expected that Protera will perform the end-to-end migration of the customer's SAP landscapes. Existing infrastructure and Basis support team members will work with Protera to establish connectivity and credentials to ensure the migration activities can be carried out without issues	Low

Project Management

Every FlexBridge project includes full Project Management and technical direction of Protera project personnel. We establish strong project governance as a framework for planning, communications, and managing all activities.

The FlexBridge PM will:

- *Maintain project communications through the Customer Project Manager.*
- *Administer the Project Change Control Procedure with the Customer Project Manager.*
- *Coordinate and manage the technical activities of Protera project personnel.*
- *Conduct internal project planning meetings for Protera owned tasks.*
- *Conduct project status meetings with Customer and provide status updates.*
- *Provide issue and resolution management of delivery of tasks within Project Plan.*
- *Identify major risks to the project and develop a risk mitigation strategy and action plan.*

Quality Assurance

The FlexBridge Project Manager ensures that all project management tools are in place for the migration and assists the FlexBridge migration team in following Protera best practices. The FlexBridge Project Manager will also review the following tasks for completion prior to "go- live".

As required by the Protera FlexBridge methodology the FlexBridge PM will:

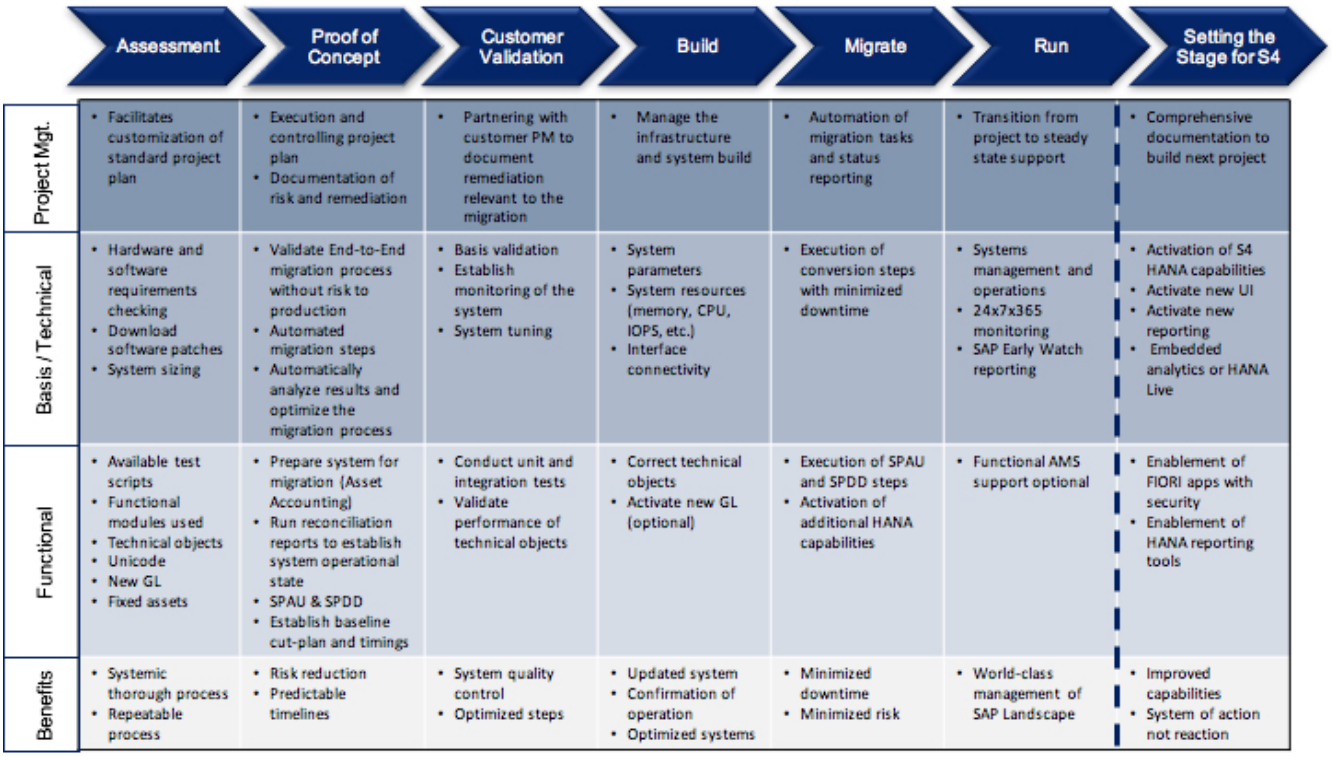
- *Validate the rollout plan and clarify roles / responsibilities.*
- *Clarify support processes and work with your team on approval/sign-off of the overall technical solution and plan.*
- *Validate and approve the configuration for all non-production and production SAP environments.*
- *Validate software configuration for the test and production environment.*
- *Coordinate the provisioning of all cloud infrastructure & network configuration activities and test the end-to-end network connectivity as per solution design.*
- *Work with the technical teams to validate and QC technical documentation as appropriate.*
- *Define and document the support and management processes related to the contracted*

services and specified roles and responsibilities.

- *Define a specific issue tracking and escalation process together with your team.*
- *Ensure appropriate Technical knowledge transfer to ensure proper supportability of the migrated environments.*
- *Become familiar with your help desk processes as applicable.*

3.2. Your Migration Project

The FlexBridge migration project for your SAP environment will consist of the following phases:



	Assessment	Proof of Concept	Customer Validation	Build	Migrate	Run	Setting the Stage for S4
Project Mgt.	• Facilitates customization of standard project plan	• Execution and controlling project plan • Documentation of risk and remediation	• Partnering with customer PM to document remediation relevant to the migration	• Manage the infrastructure and system build	• Automation of migration tasks and status reporting	• Transition from project to steady state support	• Comprehensive documentation to build next project
Basis / Technical	• Hardware and software requirements checking • Download software patches • System sizing	• Validate End-to-End migration process without risk to production • Automated migration steps • Automatically analyze results and optimize the migration process	• Basis validation • Establish monitoring of the system • System tuning	• System parameters • System resources (memory, CPU, IOPS, etc.) • Interface connectivity	• Execution of conversion steps with minimized downtime	• Systems management and operations • 24x7x365 monitoring • SAP Early Watch reporting	• Activation of S4 HANA capabilities • Activate new UI • Activate new reporting • Embedded analytics or HANA Live
Functional	• Available test scripts • Functional modules used • Technical objects • Unicode • New GL • Fixed assets	• Prepare system for migration (Asset Accounting) • Run reconciliation reports to establish system operational state • SPAU & SPDD • Establish baseline cut-plan and timings	• Conduct unit and integration tests • Validate performance of technical objects	• Correct technical objects • Activate new GL (optional)	• Execution of SPAU and SPDD steps • Activation of additional HANA capabilities	• Functional AMS support optional	• Enablement of FIORI apps with security • Enablement of HANA reporting tools
Benefits	• Systemic thorough process • Repeatable process	• Risk reduction • Predictable timelines	• System quality control • Optimized steps	• Updated system • Confirmation of operation • Optimized systems	• Minimized downtime • Minimized risk	• World-class management of SAP Landscape	• Improved capabilities • System of action not reaction

Assessment

A Protera FlexBridge migration typically begins with conducting an assessment of your current SAP environment. This assessment report gives you a holistic view of the various pre-requisites, timelines and target landscape architecture required to ensure a smooth and successful migration for your SAP environment to running SAP HANA in the cloud.

Test Run

In the initial Test Run migration, one migration run will be performed on a copy of your SAP Production system.

Primary focus of the Test Run migration will be to establish timing baselines for all aspects of the technical migration, including, but not limited to the migration activities, any other combined technical steps (such as EHP upgrades, Unicode migrations and others). In addition to these objectives, it is also essential for you to define key goals that will confirm the Test Run test is a success. Examples of valid Test Run goals may include specific transactions, reports or business process performance improvements, activation of new functionality on HANA and others.

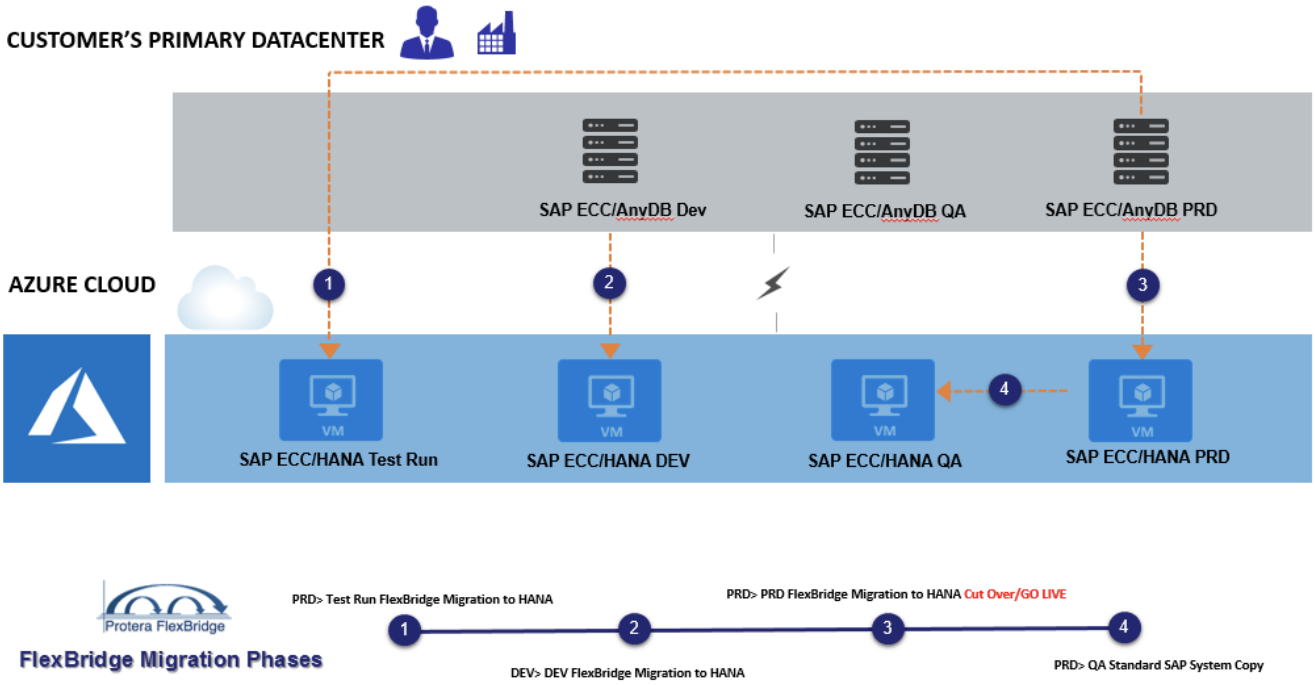
Test Run Validation

In order to proceed to the Development Landscape Migration, the Test Run migration must be signed off by both the Customer and Protera to be completed successfully.

Build

During this phase of the project, the remainder of the target SAP environments are provisioned as per customer approved architecture and design. Network connectivity is also provisioned and testing is conducted to ensure optimal stability and bandwidth are in place to begin migration activities.

Migrate



In this phase, the FlexBridge toolset will be utilized to migrate the necessary source environments to the target SAP environments in the cloud.

In order to proceed to the Final Production Migration and Cutover, the Development Landscape migration and any other optional test migration runs must be signed off by both the Customer and Protera.

In the Final Production Migration, your SAP Production environment will be migrated using the FlexBridge migration toolset. The cutover will be managed around the clock and all previously tested procedures and optimizations will be utilized to ensure minimal downtime during the final cutover.

In order to proceed to Post Live Support the Production Landscape Migration and Cutover must be signed off by both the Customer and Protera.

Run

The Protera FlexBridge Project team shall provide continuous post-migration technical support after the Go-Live date. This support will commence the day of the cutover and will continue until transition and sign-off. The scheduling of post-live support shall be determined as part of the project plan, prior to the go-live date.

Move to S/4

SAP Business Suite 4 SAP HANA, in short: SAP S/4HANA, is SAP's next generation business suite and the company's biggest innovation since SAP R/3. It was unveiled in New York on February 3, 2015.

SAP S/4HANA is fully architected for the most advanced in-memory platform, SAP HANA, and is designed on the most modern design principles with the SAP Fiori user experience (UX).It will be offered as a cloud, on-premise, and hybrid deployment option to provide maximum choice to customers.

SAP S/4HANA is designed to drive business innovation with simplicity by connecting people, devices, and business networks in real time to support the development of new business models. It will also help accelerate the on-ramp to Internet of Things and Big Data. The simplified data model allows customers to reimagine their IT, helping to drive lower costs and deliver IT efficiency.

The Protera FlexBridge Migration to SAP HANA positions your company to begin planning your move to S/4HANA as the next step in the digital transformation of your enterprise.

4. Proposed Customer Solution for Forward Thinking Co

The Protera FlexBridge tool has completed a detailed assessment of your current SAP environment.

In this section, we will discuss the following:

- *Introduction to the Microsoft Azure Cloud*
- *End-state Architecture for your SAP landscape*
- *Proposed Instance types*
- *Target OS, DB and SAP Releases*
- *Detailed cost breakdown*
- *Estimated Migration downtimes*

4.1.Microsoft Azure Cloud

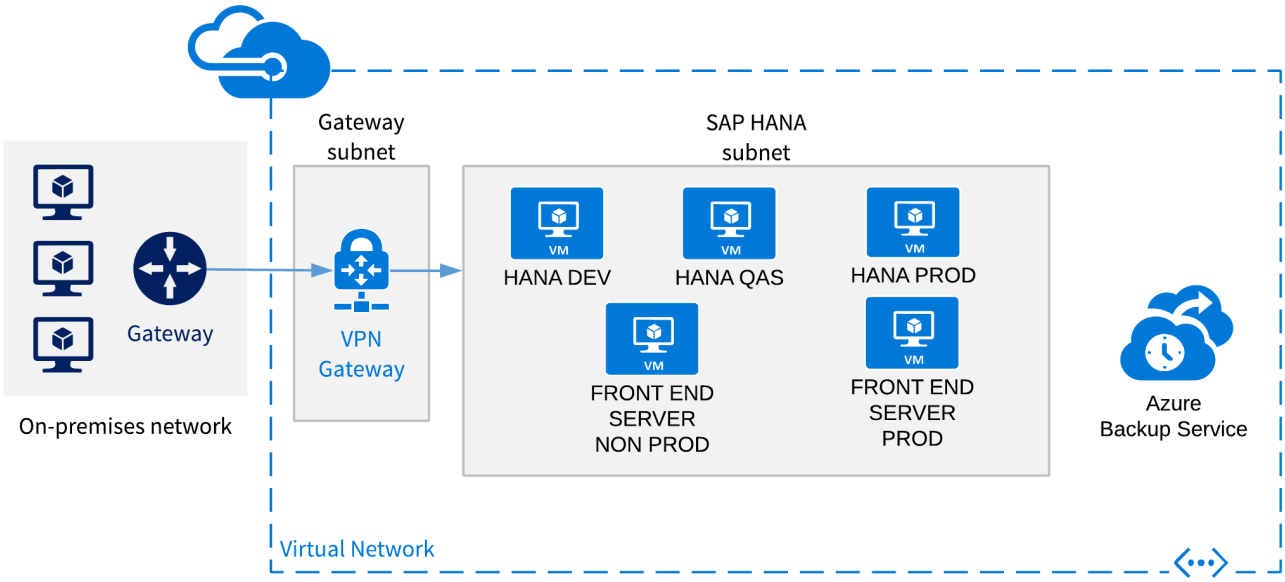
Microsoft Azure is Microsoft's application platform for the public cloud providing Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). It is a growing collection of integrated cloud services—analytics, computing, database, mobile, networking, storage, and web— for moving faster, achieving more, and saving money. SAP HANA on Azure is provided as a IaaS solution providing a SAP certified and optimized infrastructure on which the client can deploy their own landscape. The optimized infrastructure integrates virtualized and bare metal components to achieve the best of both worlds.

Key features of the Microsoft Azure Cloud:

- *Enterprise Grade – Trusted, Recognized leader, Industry leading security & compliance*
- *Hyper-scale – Run your SAP solution in 30+ regions, open & flexible, Scale/Pay as you go*
- *Hybrid – Extend your On-premise IT solutions, move SAP workloads transparently between your DC & Azure, tiered workloads to optimize ROI*

For a detailed look into the Azure environment, please refer to Appendix B.

4.2. End-State Architecture for Forward Thinking Co



In the proposed solution, the following Azure components are used:

- *Connectivity – Express Route, Virtual Network, VPN*
- *Compute – Virtual Machines*
- *Storage – Standard & Premium Storage (SAP HANA)*
- *Backup – Enterprise grade backup services*
- *Services – Management, Directory, Monitor*

For a detailed look into the Azure environment, please refer to Appendix B.

4.3. Proposed Instance Types for Forward Thinking Co

Based on the size of the source systems, the Protera FlexBridge tool has determined the following instance type(s) to be adequate for your target SAP environment:

SID	Instance Type	VPU	Memory (GB)
ZED	GS4	32	224
ZEQ	S72	72	768
ZEP	S192	192	1500

4.4. Target Releases for Forward Thinking Co

Your new SAP environment will be built using the following OS, Database and HANA versions, which is fully certified and supported by SAP:

SID	SAP Solution	Role	Operating System
ZED	SAP ECC 6.0	Development	SUSE Linux 12
ZEQ	SAP ECC 6.0	Quality Assurance	SUSE Linux 12
ZEP	SAP ECC 6.0	Production	SUSE Linux 12

Operating System

SUSE Linux Enterprise Server 12 offers the following benefits to enterprise customers running mission-critical, SAP solution-based workloads:

•Full operating system rollback—This provides improved resilience by allowing users to take snapshots of the system, including the kernel files, and roll back to that point.

•Ready for SUSE Linux Enterprise Live Patching—SUSE Linux Enterprise Server 12 includes infrastructure for live kernel patching technology delivered through SUSE Linux Enterprise Live Patching. With it, customers can update security patches without rebooting machines or waiting for the next service window.

•Extensions for clustering—SUSE Linux Enterprise High Availability Extension provides a mature, industry-leading solution to enhance business continuity and provide disaster recovery capabilities for SAP solutions.

•Hardware enablement—SUSE Linux Enterprise Server 12 for SAP Applications takes advantage

of the hardware enablement of SUSE Linux Enterprise Server 12 to allow customers to run SAP solutions on the latest hardware.
•Installation Wizard automation and enablement of n-tier installations of SAP solutions—Installation Wizard can automate installations without requiring manual interaction. Enablement of n-tier allows distributed installations of SAP solution-based systems across a customer's IT landscape, fulfilling customer and partner requests for a full landscape installation of SAP solutions following the traditional n-tier approach.

Database

SAP HANA 2.0 SPS 2 provides the latest technology available for in memory computing. SPS 12 contributes further hardened security, enhanced availability, unified the development and administration experience, and expanded advanced analytic capabilities. Additionally, many features have been introduced around operational capabilities including: Disaster Recovery, High Availability, Backup and Recovery, System Administration, Platform and Application Lifecycle Management.

More details on the SAP HANA 2.0 SPS 2 release can be found here: http://help.sap.com/hana/Whats_New_SAP_HANA_Platform_Release_Notes_en.pdf

SAP Release

SAP ECC 6.0 Enhancement Pack 7 brings about several new features and benefits:

•More than 100 new application functions
•Optimized for running on SAP HANA
•Mainstream maintenance of SAP Business Suite extended till end of 2020
•Built-in 25 role-based productivity apps in SAP Fiori
•Faster MRP and HANA Live to check material and inventory availability
•Data aging functionality, Real-time access to ERP data

4.5. Migration, Hosting and Support Charges for Forward Thinking Co

Based on the assessment performed, we have estimated the following configuration and monthly costs:

System SID	SAP Solution	Role	Target Hana Memory Sizing (GB)	IaaS Charges/mo	Managed Services Charges/mo	IAAS + Managed Svcs Charges/mo
ZED	SAP ECC 6.0	Development	224	$5,567.00	$7,384.00	$12,951.00
ZEQ	SAP ECC 6.0	Quality Assurance	768	$5,215.00	$6,984.00	$12,199.00
ZEP	SAP ECC 6.0	Production	1500	$7,067.00	$3,332.00	$10,399.00
			Total :	$17,849.00	$17,700.00	$35,549.00

For the three systems, the monthly IAAS charges is $17,849.00. And, the monthly Managed Services charges is $17,700.00.

The combined monthly IAAS and Managed Services charges is 35,549.00.

The Migration Cost will be a one-time cost of $45,000.00 for these three systems.

4.6. Project timelines & downtime estimates for Forward Thinking Co

As part of this FlexBridge project, the following technical activities have been planned for each of your source systems:

- *Migration to SAP HANA in the Cloud*
- *EHP3 to EHP7 Upgrade*

The overall project can be represented by the following Gantt chart.

Tasks		Week								
S/4 HANA 1709Migration Timeline	**Responsible**	1	2	3	4	5	6	7	8	9
Project Planning	SI, PR. CU									
Project Kick Off	SI, PR, CU									
Develop overall Project Plan	SI, PR, CU									
Architecture & Landscape Design	PR, CU									
Develop Testing Plan	SI, PR, CU									
Develop Remediation Plan	SI, PR, CU									
Planning, Architecture and timeline sign-off	CU	*								
Project Landscape Activities	SI, PR, CU									
Project Landscape Build out	PR, CU									
Project Landscape Validation & Sign off	SI, CU									
POC S/4 HANA Conversion	SI, PR, CU									
Prepare Phase	SI, PR, CU									
S/4 Basis Pre-Conversion Requirements review and remediation	PR, CU									
S/4 Application Pre-Conversion Requirements review and remediation	SI, CU									
Cross Application and Application specific Prep activities	SI, PR, CU									
Realize Phase	SI, PR, CU									
SUM Execution and Data conversion (Uptime/Downtime phases)	PR, CU									
Cross Application and Application specific post activities	SI, CU									
Remediation & Testing - Technical	PR, CU									
Remediation & Testing - Functional	SI, CU									
Remediation & Testing - Integration	SI, CU									
Remediation & Testing - Security	SI, CU									
Conversion sign-off	CU									*

Key Project Timelines:

- *Overall Project Duration: 23 weeks*
  - *Prep & Provisioning: 3 weeks*
  - *Migrations & Sign-off:*
    - *Test Run: 11 weeks(includes functional retrofit & customer testing)*
    - *DEV: 4 weeks*
    - *PRD: 2.5 weeks*
    - *QA: 1 weeks*
  - *Transition to Steady State Operations: 1 week*
  - *Finalization & Project Sign-off: 1 week*

The following table finally illustrates the SAP releases, sizes and estimated downtimes for the migration of your SAP environment:

SID	SAP Source System	Source DB Size (GB)	SAP Target System	Target DB Size (GB)	Estimated Downtimes
ZED	SAP ECC 6.0	465.8	Azure GS4	224	6 hours
ZEQ	SAP ECC 6.0	1050	Azure S72	695	10 hours
ZEP	SAP ECC 6.0	1610	Azure S192	1100	12 hours

We hope you consider Protera as a partner in your journey to SAP HANA. Protera FlexBridge has been built from the ground up by incorporating years of Protera's migration experience and best practices to provide an automated tool that streamlines your path to SAP HANA. Our industry leading process and experts take the time, cost and risk out of SAP HANA migrations. Migrations performed with Protera FlexBridge typically realize up to a 45% reduction in the project timeline, data quality increases by up to 50% and project cost reductions of more than 50%. Thank you for your consideration.

Appendix A: Benefits of the Cloud

IT Modernization

According to Gartner (http://www.gartner.com/newsroom/id/3443517), IT modernization is currently the top driver of public cloud adoption, followed by cost savings, innovation, agility and other benefits. The focus on IT modernization indicates a more sophisticated and strategic use of public cloud services. Not only are public cloud services being used to recognize the tactical benefits of cost savings and innovation, but they are also being used to establish a more modern IT environment — an environment that can serve as a strategic foundation for future applications and digital business processes.

Pay as You Use

Cloud computing provides a modern alternative to the traditional on-premises datacenter. A public cloud vendor is completely responsible for hardware purchase and maintenance and provides a wide variety of platform services that you can use. You lease whatever hardware and software services you require on an as-needed basis, thereby converting what had been a capital expense for hardware purchase into an operational expense. It also allows you to lease access to hardware and software resources that would be too expensive to purchase. Although you are limited to the hardware provided by the cloud vendor, you only have to pay for it when you use it.

Improved Deployment

Cloud environments provide an online portal experience, making it easy for users to manage compute, storage, network, and application resources. For example, a user can create a virtual machine (VM) configuration specifying the following: the VM size (with regard to CPU, RAM, and local disks), the operating system, any predeployed software, the network configuration, and the location of the VM. The user then can deploy the VM based on that configuration and within a few minutes access the deployed VM. This quick deployment compares favorably with the previous mechanism for deploying a physical machine, which could take weeks just for the procurement cycle.

Scalability

Further build out:

- *Network can burst to 100 gbps for when your application goes viral*
- *Large compute resources for HANA systems is available 24/7 around the global*

Elasticity

Further build out:

- *Scale system resources up / down with SAP application instances*
- *Non-production systems can be stopped during weekend and weekday nights when not used*

Continuous Innovation at lowering costs

Compute instances providing more power become cheaper. A cloud consumer can use the lower cost more powerful resources by stopping their systems, reassigning the compute type and starting them up.

Automation

All parts of a system's lifecycle build, go-live, operations and decommissioning can be automated with a cloud provider's or third-party tools. These tools provide standardization which provides secure computing environment, tremendous cost savings and simplification of management.

Appendix B: Microsoft Azure Cloud

Overview

Microsoft provides support for public, private, and hybrid clouds. Microsoft Azure is a public cloud. Microsoft Azure Stack is an add-on to Windows Server 2016 that allows you to deploy many core Azure services in your own datacenter and provides a self-service portal experience to your users. You can integrate these into a hybrid cloud using a virtual private network.

Global Reach

Microsoft has deployed Azure datacenters in over 22 regions around the globe from Melbourne to Amsterdam and Sao Paulo to Singapore. Additionally, Microsoft has announced the deployment of Azure to another eight regions. Only the largest global enterprises can deploy datacenters in this manner, so using Azure makes it easy for enterprises of any size to deploy their services close to their customers, wherever they are in the world.

Azure Resource Manager

Azure Resource Manager enables you to work with the resources in your solution as a group. You can deploy, update, or delete all the resources for your solution in a single, coordinated operation. You use a template for deployment and that template can work for different environments such as testing, staging, and production. Resource Manager provides security, auditing, and tagging features to help you manage your resources after deployment.

Security

Role-Based Access Control (RBAC) provisions access to the resources in the group. For example, you can assign the Owner role to a user, giving that user full administrative privileges to those resources in the group but not to other resources in the subscription. Other roles include Reader (you can read anything except secrets) and Contributor (you can do most anything except add or revoke access).

Billing

ARM organizes all the resources in a subscription for billing purposes, tags can be assigned to each resource which are used to categorize service usage. This enables detailed descriptive charges.

For example, if one department owns a web application and several related components, you can assign the same tag to all the department's resources. Then, you can retrieve the billing for that department by retrieving the billing for that tag.

Azure Services

There are many services within the Azure Cloud. A few of the most important services pertinent to SAP HANA system are shown here.

Compute Services

Azure Virtual Machines are available for both Windows and Linux systems. Many virtual machines, with various types of size and CPU chipset, are available to best fit your HANA systems requirements. We will detail the SAP HANA certified Azure virtual machine in the Azure Virtual Machine section below.

Data Services

Azure Data Services provide various storage options. Premium SSD-based storage is recommended for SAP HANA systems. Standard storage can be utilized for non-HANA development or test workloads, which are not often sensitive to performance variations and are not I/O sensitive.

Network Services

Azure Network Services includes features such as Virtual Networks used to segregate and secure customer systems, Express Route for dedicated connections with guaranteed SLA's, Azure DNS for name services and Virtual Network Gateway to provide site to site VPN tunnels.

Application Services

Azure Application Services features Azure Active Directory (AD) which can be used to help build and integrate your on premise and hybrid cloud applications.

Azure Instance Types

The SAP Certified Azure instances for SAP HANA

VM Instance Type	vCPU	Memory (GiB)	Suggested Use (OLAP/OLTP)
S72	72	768	OLAP
S72M	72	1536	OLTP
S144	144	1536	OLAP
S192	192	2048	OLAP
S144M	144	3072	OLTP
S192M	12	4096	OLTP
S768	768	16384	OLTP
S960M	960	20480	OLTP

* based on the Intel EX E7 Haswell CPU architecture