

Transforming SAP® Applications

through AWS Adoption

Executive Summary

Businesses are increasingly tapping into the transformational power of AWS for business-critical SAP® applications. By leveraging licensing efficiencies, automated infrastructure management and elastic pricing, organizations achieve greater agility, enhanced performance and lower total cost of ownership (TCO) through AWS.

In this white paper, we explore some of the opportunities for organizations transitioning to AWS and highlight some of the key considerations when deploying SAP environments to the AWS Cloud, including:

- Primary drivers of AWS adoption for SAP users.
- Patterns for adoption.
- Managing the complexity of monitoring and reporting.
- Unifying SLA management across environments.
- Specific AWS use-case scenarios.

SAP® Certified
in Hosting Services



SAP® Certified
in Cloud Services



What is Driving AWS Adoption for SAP Users?

Businesses are starting to take advantage of the opportunity for increased agility and flexibility with AWS Cloud services. They view AWS as a way to reduce TCO, increase agility and optimize capacity, and want to incorporate their SAP environments into this strategy.

Reduced TCO continues to be the primary driver for businesses adopting AWS for their SAP estates. With pay-as-you-go (PAYG) pricing and no upfront capital investment, cost savings opportunities become immediately available when moving SAP environments to AWS. Using infrastructure automation principles, transient environments such as Development, Test, QA and Staging environments can be terminated when not in use to further optimize costs. However, without a well-devised governance strategy or [sufficient AWS expertise](#), cost overruns can quickly become a legitimate risk.

As end-users demand richer customer experiences, businesses experiencing pressure on solution delivery are moving SAP workloads to AWS to increase agility. With the ability to provision compute, storage and networking infrastructure in minutes compared to weeks, users can respond to market demands, execute projects, and develop new products and services significantly faster. Transient environments can also be quickly provisioned and run in parallel with production environments for quicker solution development and delivery, meaning even greater cost optimization through shorter project cycles and more efficient resource utilization.

The ability to optimize SAP system capacity with fluctuations in demand is another leading force for continued adoption. The scaling capabilities of AWS enable higher performance and availability of environments, as well as reduced maintenance and added cost savings, through rapid capacity management not attainable in traditional, on-premise execution venues. Additionally, the need for enterprise flexibility is met through dynamic integrations with Windows Server, SUSE Linux Enterprise Server and Red Hat Enterprise Linux, with the opportunity for businesses to retain their SAP licenses through bring-your-own-license (BYOL) modeling.

No matter the sector or geography, organizations globally are evaluating ways to evolve their IT operation from on-premise applications to integrated distribution across public clouds. Harnessing the power of AWS includes the potential for optimized costs, increased agility, simplified operations and streamlined processes. But the move is not without the challenges and risks of ensuring application availability and performance.

The challenges of moving enterprise environments to AWS are most obvious when it comes to integrating platforms that have traditionally been used for

Reduced TCO is the primary driver for adopting AWS for SAP estates.

on-premise solutions, where significant investments have already been made. Organizations looking to transition SAP infrastructure to AWS want to maximize these investments by putting together a seamless data model. The benefits of running at least some part of the application estate in AWS are leading to the transition of SAP applications to AWS at a suitable time within their lifecycle.

Later, we'll look at some of the specific SAP use-case examples where AWS can be adopted to offer significant business and operational benefits.

The Challenge for the Enterprise

SAP design requirements—combined with the need for high availability and resiliency, system capacity and performance demands—have led businesses to make substantial investments in their SAP landscapes. This has resulted in large SAP estates containing numerous environments (Development, QA, Production, etc.) for multiple applications (ECC, CRM, BI, PI, SRM and more). They have typically spent large budgets to implement, globally deploy, consolidate and optimize their SAP systems, building teams to operate and maintain them. The complexity is further increased by integration with other business applications, including large on-premise systems, such as manufacturing and distribution systems.

Cost challenges are being compounded by the increased need to implement and support new technologies such as HANA and mobile. This places a strain on organizations while they balance resources and budgets between continuing to invest in maintaining business as usual (BAU) and supporting new strategic developments.

Competition, combined with the arrival of cloud, is increasing pressure and expectation on IT departments to deliver a flexible and agile SAP service. Not surprisingly, businesses are seeking opportunities not only to lower costs, but also, perhaps more importantly, to make their SAP landscapes sufficiently agile to meet the increasing pace of business change.

Every organization has the potential to derive immense value from leveraging AWS in some shape or form for its SAP applications estate. However, enterprises cannot simply rip out what they have today and start again.

Every organization has the potential to derive immense value from leveraging AWS.

SAP Deployment Considerations

There are several key patterns that are commonly used for AWS adoption: cloud hosted, cloud transformed, and cloud native, which are covered below.

With the cloud hosted pattern, applications look very much the same as on-premise solutions, mirroring early virtualization projects or even facing their second transition from physical to virtual and then onto AWS.

With this pattern, servers are lifted and then shifted onto virtual machines—either physical-to-virtual or virtual-to-virtual consolidations. Applications taking this route will capitalize very little from the key advantages of AWS.

The cloud transformation route is better suited to applications like SAP that can adopt and take advantage of cloud features such as IaaS and PaaS within the AWS Cloud. Public cloud can deliver significant value just by [providing increased availability of core components](#), as well as increasing application performance over cost.

Finally, cloud native applications (software that natively utilizes services and infrastructure provided by cloud computing providers) by their nature and design can take full advantage of the scale, availability and cost advantages of native AWS technologies.

INSIGHT AND REPORTING

When it comes to monitoring and reporting, having some applications and systems in AWS and others on-premise can introduce significant complexity, if not done correctly. Creating a toolset that can comprehensively cover existing on-premise environments in co-existence with AWS infrastructure is not a straightforward task; it is critical to strike the correct balance.

As a first approach, try to extend what you already have before reaching for a replacement toolset. Solution Manager is the standard tool to monitor and manage SAP environments, including systems deployed on AWS. However, if you don't already have a solid base in monitoring and management tools, then a replacement approach will be required. Cloud native tools can also be extended back into the enterprise.

AWS has some great technology that can accelerate monitoring solutions. Our approach is to activate detailed monitoring (CloudWatch) and specific SAP-enhanced monitoring agents for SAP instances running on AWS, thus maintaining compliance with SAP and AWS best practices.

If you use AWS cloud native technologies, such as Auto Scaling or RDS, then expect to face a few new challenges around monitoring, logging and security—for example, you can't put agents on Elastic Load Balancer (ELB) or RDS instances, and monitoring of Auto Scaling events is a foreign task to most enterprises used to long-running environments.

Cloud native tools can sometimes be the only way to solve these problems. Think about the problem of scaling up additional instances and giving your operational teams visibility into what is happening. Ensono's solution, integrated with SAP® Solution Manager, automatically updates our operations manual, CMDB and ticketing system with concurrent information on what has been scaled up or down.

From our experience, you need to build in end-to-end visibility of your solution from the start. Don't leave this for the end of the project; you may need to compromise between the cloud native approach of building instrumentation into the application code and the more traditional approach of measuring availability using traditional agents.

An enterprise solution that appropriately balances AWS and on-premise monitoring and reporting will provide consistent visibility at all levels to support your business, up to and including a business transaction level, but give you the insight into cloud-specific technologies such as Auto Scaling where they are used.

SECURITY AND COMPLIANCE

Cloud security can be difficult to fit into a traditional enterprise model. Most enterprises have spent considerable time defining their privately hosted security policies, and want to ensure these policies can remain in place within AWS deployments.

[AWS provides an in-depth portfolio of security controls](#), from AWS Security Groups and Network Access Control Lists (NACLs) through to Identity and Access Management (IAM). However, the task of making these fit into an existing security policy and implementing these controls on a day-by-day basis remains a problem to solve.

Other standard security controls such as network vulnerability detection, security scanning, logging and forensics all change with the fluid nature of cloud native and cloud transformed applications, and appropriate controls need to be put in place to account for these changes.

Using Qualys appliances within each AWS Virtual Private Cloud (VPC), combined with Nessus or Qualys for non-cloud solutions, provides a consistent security stance across hybrid solutions as a key part of ongoing ISO compliance.

Simple enterprise security controls are different in AWS. Security Groups are not the same as a tiered firewall security policy, but if designed in the same way, they can meet the same security requirements. As a service provider, we have solved some problems that are unique to service providers, as well as some that are common to the enterprise. This includes a privilege access management system which provides role-based access control and compliance across both AWS and hosted solutions.

The task of matching advanced security controls across AWS and on-premise solutions, for example Security Information and Event Management (SIEM) or Intrusion Prevention Systems (IPS), and making sure they are working in the right way, can be complex and costly for the enterprise and leave internal security teams over-stretched.

AWS provides an in-depth portfolio of security controls.

One common oversight is the simple question of, “Where is your data, and how will you get it back if the cloud solution is compromised or you decide to move locations?” At the start of any transition or transformation project, you must ask if there is a clear policy or data classification standard regarding the storing of confidential or personal data in the cloud. It is also important to determine who decides on this policy within the organization.

OPERATIONAL GOVERNANCE

Translating the Amazon Web Services Service Level Agreement (SLA) into enterprise terms can be a complicated task, since not every service has a direct line of sight from the written contract into the AWS Management Console. Additionally, AWS SLAs do not necessarily translate in a way that many enterprises are accustomed to contracting for services.

Our approach to overcoming this challenge is to provide unified reporting and SLA management across AWS and on-premise solutions to offer an SLA at a business transaction level.

The complexity of cloud solutions will be with us for many years, so it is important not to build in silos. If you have sufficient resources, then setting up a specific cloud overlay team, [or AWS competency center](#), can work best, keeping your teams tightly aligned on your cloud journey.

Configuration management tools are only part of the answer. Demands for speed of deployment, as well as consistency across environments, means that multiple tools and approaches are required, including use of Ansible to drive consistent change across operational disciplines.

If you do adopt the AWS competency center approach, this is the ideal team to manage the changing landscape of AWS services. New instance types and additional services can continue to deliver incremental improvements throughout the complete lifecycle of an application. Gone are the long-running environments that undergo little substantive change over many years. Today, change is continually being driven across all your application estates, including, if not especially, your SAP applications.

AWS Use-Case Scenarios

There are many examples where increased agility can be achieved with AWS. Utilizing the attributes of public cloud as part of your SAP strategy will enhance the agility and economic efficiency of the overall landscape.

In this section, we look at some specific use-case examples where SAP environments can take advantage of AWS public cloud infrastructure. These examples incorporate some of the following features and benefits:

Quicker provisioning—the provisioning of new infrastructure and SAP systems in AWS can take minutes, compared to waiting weeks or months to procure and deploy traditional infrastructure.

Capacity planning—eliminating the guesswork in planning SAP infrastructure capacity needs.

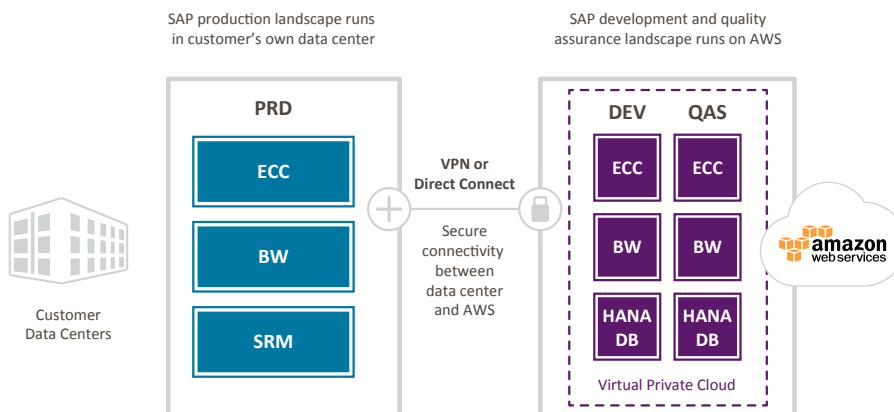
Lower TCO—benefiting from the economies of scale and efficiencies provided by paying only for the compute, storage and other resources you use.

Lower cost to start up projects—starting new SAP implementation or projects without any upfront cost or commitment for compute, storage or network infrastructure.

CLONING NON-PRODUCTION WORKLOADS

The ability to clone non-production SAP workloads, for example, QA and pre-production system refreshes on AWS, can deliver immediate benefits as described in the diagram below.

Hybrid Deployment - Customer Data Center & AWS



MANAGING MULTIPLE PROJECTS

Organizations embarking on significant SAP projects, such as end-to-end business process changes, will touch many aspects of the SAP landscape.

As an example, a manufacturer streamlining its supply chain will impact the production line, inventory management and pricing structures.

The project plan will have multiple work streams, each needing access to systems for development and testing. Infrastructure availability can cause a bottleneck, reducing the ability to run parallel work streams. The process of creating and refreshing project environments for different tracks is also time-consuming and requires a high degree of advanced planning.

Development environments deployed on AWS can enable multiple clone copies to be created within minutes. Additionally, auto scaling can be incorporated should specific tracks require increased resources. This approach allows work streams to progress in parallel, reducing the risk of project overrun. Project planning is simplified and AWS pay-as-you-go costs can be directly aligned to the project budget.



Tip: Infrastructure availability can reduce the ability to run parallel work streams. Auto Scaling can be incorporated to allow work streams to progress in parallel and reduce the risk of project overrun.

EXPANDING BUSINESS OPERATIONS

AWS can provide specific benefit to strategic projects that are:

1. Linked to an expansion of an organization's business.
2. Those which require almost instantaneous availability of infrastructure.

Organizations that are developing their business into new global regions, or creating new subsidiaries, will typically need to deploy a golden template. This provides a standardized corporate SAP platform which may consist of multiple SAP systems. The environment will then require further development and adaptation with the potential need for additional resources prior to go-live in the new entity.

Cloning the golden template on AWS is a simple and immediate process enabling servers to scale to match requirements. Additionally, AWS environments can be created in different AWS regions, thus providing compliance with local data protection laws.

DEPLOYMENT OF PRE-BUILT SAP ENGINES

There are many examples where integration projects require the deployment of SAP engines to integrate SAP to non-SAP processes.

For instance, integrating SAP with a rollout of client devices requires a gateway to enable SAP systems and external applications to communicate. Connecting SAP systems to the Internet is another example, requiring SAP web dispatcher for load balancing and security.

Typically, these are small projects which need to be completed quickly, requiring available systems and time to configure.

Creating a library of pre-built engines on AWS overcomes the problem of a lack of in-house resources, combined with the flexibility of a pay-as-you-go model, which aligns with project costs.

MAINTENANCE

Large, complex SAP environments can have over 100 instances, so applying patching and SAP notes on these large operational systems can often cause problems. This can impact security, consistency and user experience if they are not successful, compounded by emergency patches which often require immediate action.

While SAP itself releases patches for standard code, the risk in patching typically arises due to the effect on custom code implemented by the client. Testing patches on quickly cloned SAP systems on AWS significantly reduces risk while avoiding impact on BAU operation during the testing phase.

The pay-as-you-go model reduces risk and costs, leading to faster implementation and greater returns for the business.

PROOF OF CONCEPT

Organizations often struggle with the availability of infrastructure to run POCs, and provisioning of resources for POCs which have not been planned and budgeted in advance.

This can have an impact on business agility, making it difficult to quickly determine the benefits of any desired new features.

Running POCs on AWS ensures that full control is retained with no disruption to the BAU environment. Organizations can run POCs when needed through cost-effective discreet development, thus quickly identifying the potential benefits of new features. The pay-as-you-go model reduces risk and costs for POCs, with quicker decision making leading to faster production implementation and greater returns for the business.

DEMAND MANAGEMENT FOR NON-PRODUCTION WORKLOADS

Organizations face the continual need for temporary SAP environments that do not have any impact on BAU environments, for example:

- Isolated test systems for crash and burn testing.
- Technical sandbox enabling technical teams to familiarize themselves with a new application.
- Dedicated training systems, enabling the training of users without impacting other project resources or BAU.

Using AWS for these scenarios provides immediate access to production clones on a pay-as-you-go basis with the benefit that:

- Delays are avoided in the availability of systems for dev/test.
- Risks relating to integrating multiple components are immediately addressed and resolved.
- CapEx spend is avoided.

SCALABLE DISASTER RECOVERY SOLUTIONS

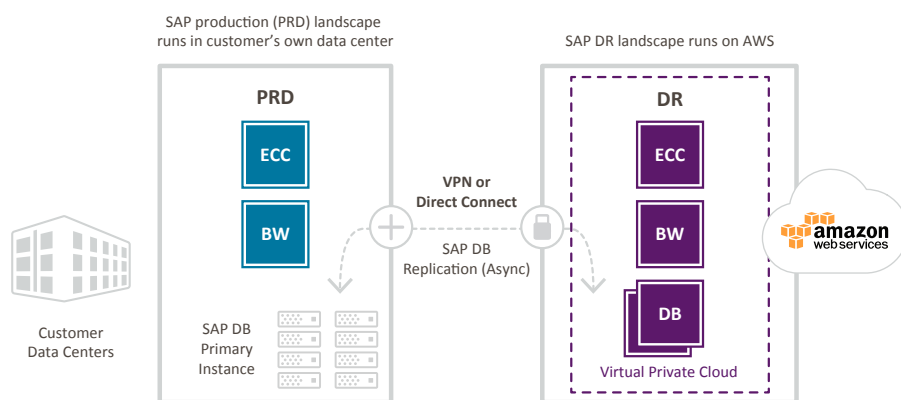
Traditional SAP DR solutions can result in sizable investments to deliver on RTOs and RPOs across a complex and distributed landscape.

Many organizations invest in environments which are under-utilized, with the result that they seek to reduce their investment, potentially compromising the recovery process and leading to errors and failures during testing.

With a synchronized standby SAP database on AWS, it is possible to replicate the production SAP environment to create a secondary DR solution. Initially, this can be a small, single SAP instance, thus keeping DR costs to a minimum while enabling additional instances to be created within minutes.

This provides a flexible approach to full DR, or specific instances which can be turned on and scaled up during testing and invocation, resulting in DR testing procedures which take hours instead of days.

SAP Disaster Recovery (DR) on AWS

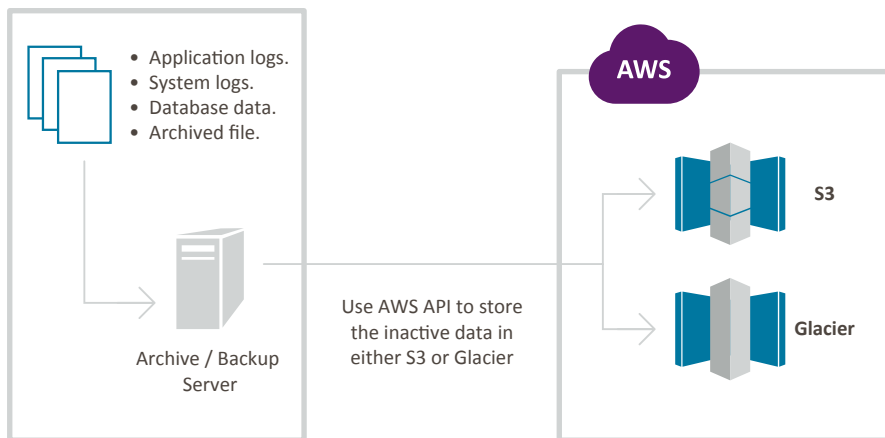


LONG-TERM DATA ARCHIVE

SAP applications generate enormous volumes of data, with long term storage of data requiring planning and investment. Organizations are seeing their data volumes continually increasing, but hardware incompatibility can result in future data access issues with increasing costs for maintaining archive storage and retrieval systems.

Long-term data archiving on either Amazon S3 or Amazon Glacier allows the business to store data with the confidence that it can be accessed when required, thus reducing the risk of data retrieval bottlenecks. Long-term AWS storage costs are continually reducing and can therefore result in costs that are typically lower than maintaining physical hardware.

This approach allows IT teams to focus on managing the data rather than managing tape infrastructure and archive tools.



DEMAND MANAGEMENT FOR PRODUCTION WORKLOADS

Many organizations are starting to consider AWS for deployment of new SAP applications or extensions to existing workloads. AWS can also form part of a strategy to address the challenge of aligning capacity of production environments with user demand.

These demands can fluctuate due to several factors:

- Seasonal demand fluctuation.
- Short-term workload variability.
- Reporting cycles, e.g., payroll and accounting.
- Irregular usage, e.g., training environments.

SAP® BUSINESS SUITE 7 SUPPORT AND SAP® S4 MIGRATION

With the end of Business Suite support in 2025 and the migration to SAP® S4, many organizations are starting to consider AWS for deployment of new SAP® HANA databases and applications workloads for both production and non-production environments.

AWS can provide flexible landscape and migration options such as:

- Staged migration of on-premise SAP® workload to AWS.
- Scalable solution for S4 migrations.
- Scalable template for SAP® HANA devices.
- Flexible capacity for core and period-specific workloads.

SUMMING UP

With SAP® applications offering a rapidly evolving, broader and more complex set of software and supporting technology, organizations have a host of new options to support innovation, enhance service levels and reduce TCO. But with these options comes increased pressure on agility, performance and economic efficiency. Effectively leveraging AWS as part of a hybrid integration can deliver agile testing and proof of concept facilities for SAP workloads, with on-demand development environments and increased project efficiency, leading to significant cost savings, quicker solution delivery and accelerated time to value.

Insight and reporting, security and compliance, and operational governance can all be complex, even when limited to a privately hosted environment. When you bring AWS into the mix, it is important to consider how to tackle these areas within the context of both cloud and on-premise environments. Splitting workloads and retaining existing practices around security and data management, while still maximizing the benefits of AWS, adds a further layer of complexity to the task.

However, there are now real-life use-case examples where significant cost and operational benefits can be gained through migration of parts of the SAP estate to AWS.

The importance of [getting the right people or partners in place](#), with specific SAP and AWS expertise and resources that can create successful coexistence between development and operations, must be emphasized. Relying on existing teams adopting brand new skillsets can prolong the exercise and reduce the control you have over the project.

SAP is the registered trademark of SAP SE in Germany and in several other countries.

Ensono delivers complete hybrid IT services and governance from cloud to mainframe. Let us help you operate for today and optimize for tomorrow. **To learn more, visit www.ensono.com.**



OPERATE FOR TODAY.
OPTIMIZE FOR TOMORROW.

ensono.com

© 2017 SAP SE or an affiliate company. All rights reserved.

WP-010-US-083117