OVERVIEW

CONSIDERATIONS FOR MODERNIZING YOUR SAP ENVIRONMENT

MIGRATION TO SAP HANA IS MANDATORY

Migrating your SAP environment presents an opportunity to modernize your underlying IT infrastructure with cloud technologies to reduce costs, streamline operations and maintenance, and increase business agility. Choosing the right foundation is critical. When evaluating your options, be sure to consider:

- Linux and cloud platform features and optimizations.
- Management and automation.
- Security and compliance.
- Performance and scalability.
- Availability and stability.
- Flexibility and choice.
- Support.

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MIGRATION PRESENTS AN OPPORTUNITY FOR MODERNIZATION

Your business relies on your SAP® environment for critical processes and data. However, organizations must migrate their underlying databases to SAP HANA® by 2027. SAP HANA is supported only on Linux® operating systems, so many organizations must also choose and deploy a new Linux foundation in their datacenter.

This presents an opportunity to modernize and optimize your IT to prepare for the future. Open source platforms and cloud-based technologies can help you reduce operational costs, streamline operations and maintenance, and increase business agility and innovation.

Even so, migration and modernization can be daunting tasks. Moving to SAP HANA involves both system upgrades and database migrations. Common concerns and frustrations include:

- Integrating with legacy systems and getting the most value from technology investments.
- Selecting a reliable cloud provider that provides advanced security.
- Ensuring adequate capacity, performance, and scalability.
- Moving critical applications and workloads with less risk and downtime.
- Establishing new management procedures and automation strategies.

Red Hat and Amazon Web Services (AWS) offer modern, optimized solutions for SAP HANA that help you overcome these challenges, migrate more easily, and build a foundation for success.

MODERNIZE MORE EASILY WITH RED HAT AND AWS

Through long-standing cooperation, Red Hat, AWS, and SAP work together to certify Red Hat® and AWS products for production deployments of SAP applications, platforms, and databases. This collaboration results in faster time to value, improved operational efficiencies, and high levels of security for cloud-based deployments.

Red Hat and AWS deliver a proven foundation for SAP HANA that improves datacenter innovation, efficiency, and agility. Based on Red Hat Enterprise Linux and Amazon Elastic Compute Cloud (Amazon EC2), these validated, prearranged Red Hat and AWS solution configurations make building a stable, efficient environment easier and faster. An integrated support model lets you contact Red Hat, AWS, or SAP regarding issues, streamlining resolution and reducing hassles.

Red Hat provides two Red Hat Enterprise Linux offerings that are optimized for SAP environments: Red Hat Enterprise Linux for SAP Solutions and Red Hat Enterprise Linux for SAP with High Availability and Update Services. Both offerings include SAP-specific features

RED HAT ENTERPRISE LINUX OFFERINGS FOR SAP HANA

Red Hat provides two optimized Red Hat Enterprise Linux offerings for SAP environments.

- **Red Hat Enterprise Linux for SAP with High Availability and Update Services** is available directly through the AWS Marketplace. It includes the High Availability, Update Services, and Extended Update Support components.
- **Red Hat Enterprise Linux for SAP Solutions** is available on AWS through the **Red Hat Cloud Access** program. It includes the High Availability, Update Services, and Extended Update Support components, as well as **Red Hat Smart Management** and **Red Hat Insights**.

Read more about these offerings at **access.redhat.com/articles/3751271**.

and optimizations to meet the demands of complex SAP environments. High availability and update support options provide the reliability and support your organization needs for critical business applications.

Amazon EC2 delivers cloud-based compute capacity with advanced security for your workloads. Flexible sizing and scaling options let you deploy only the resources you need now and expand as your needs grow. A suite of SAP-specific **Amazon EC2 instances**, including high-memory instances, lets you optimize your environment according to the needs of your workloads.

CONSIDERATIONS FOR DEPLOYING SAP HANA

An in-memory data platform with transactional and analytical capabilities, SAP HANA provides a foundation to conduct real-time data analytics, optimize performance, and simplify business operations—in a single system. Transactions and analytics are processed on a single data copy to deliver insight from live data many times faster than disk-based relational databases. SAP HANA also incorporates databases, advanced analytic processing, applications, and integration services into a single platform that can run all of your SAP enterprise applications, including SAP S/4HANA®. These new capabilities increase the demands on your infrastructure and require optimized performance, scalability, and reliability.

The following sections discuss requirements and considerations for migrating and modernizing your SAP environment.

LINUX PLATFORM

Your underlying operating system can greatly impact how well your SAP applications perform. Standardizing on a single operating system can ease migration to SAP HANA while improving stability for critical applications and workloads.

SAP has chosen two enterprise distributions of Linux as the operating system for SAP HANA and SAP S/4HANA. As a leading operating system for servers and other large-scale systems, Linux provides the power, flexibility, and reliability needed for critical applications. In fact, 100% of today's 500 fastest supercomputers run a Linux distribution.[1]

Open, flexible, and security-focused, Red Hat Enterprise Linux for SAP with High Availability and Update Services and Red Hat Enterprise Linux for SAP Solutions combine the reliability, scalability, and performance of Red Hat Enterprise Linux with additional content specific to operating SAP landscapes, making it easier to manage your SAP environment. A single subscription model and operating system provide a cost-effective, consistent platform that streamlines operations and increases stability. Red Hat provides SAP-specific repositories that contain additional packages for running SAP applications. It also includes specific features and optimizations for SAP environments to provide better performance and stability. Finally, standardizing your SAP environment on Red Hat Enterprise Linux simplifies management and consistency, allowing you to derive more value from your investments.

CLOUD PLATFORM

Migrating your SAP environment to the cloud can provide increased performance and scalability while helping you control costs. With the right cloud foundation, you can speed deployment of new resources, transform operational economics, and deliver elastic scalability to meet ever-changing levels of demand.

1 *TOP500, "Operating system family/Linux," May 2018.* **top500.org/statistics/details/osfam/1**.

GET STARTED FASTER

Take advantage of the SAP HANA Quick Start to begin your migration. In less that an hour, this reference deployment:

- Automatically provisions and configures AWS resources.
- Sets up Red Hat Enterprise Linux for SAP with High Availability and Update Services.
- Installs SAP HANA software.

Based on best practices from AWS and SAP, this quick start helps you deploy fully functional SAP HANA systems in AWS. You can use either a single-node architecture with multiple availability zones or a multi-node architecture with a single availability zone, depending on your needs.

Amazon EC2 provides cloud-based, security-focused, resizable compute capacity for workloads and applications. A suite of Amazon ECS instances, supported by both SAP and Red Hat platforms, lets you select the right configuration for your applications. For example, Amazon EC2 High Memory Instances are purpose-built to run large in-memory databases and can contain up to 12TB of memory in a single instance. You can also start with smaller instance sizes and easily transition to larger instances as your data grows.

The AWS Marketplace lets you purchase Red Hat Enterprise Linux for SAP with High Availability and Update Services subscriptions on demand and pay only for the time you use, allowing you to scale elastically and cost-effectively. You can also easily move your Red Hat Enterprise Linux for SAP Solutions subscription between on-premise and AWS environments through the Red Hat Cloud Access program.

AWS continually deploys the latest hardware innovations, allowing you to take advantage of computing advances without needing to research, procure, integrate, and refresh hardware yourself. Additionally, all Red Hat platforms and tools work consistently across both on-site and AWS infrastructure, allowing you to create a standardized hybrid environment.

MANAGEMENT AND AUTOMATION

To be most effective, all systems in your SAP landscape must be up-to-date and in compliance with security and regulatory policies. Consistent management and configuration across development, test, and production environments are key. Visibility and insight into your environment and operations help to optimize administration and processes.

To streamline operations, Red Hat includes intelligent management tools in SAP-optimized Red Hat Enterprise Linux offerings. Both offerings contain Red Hat Insights, a Software-as-a-Service (SaaS) solution that delivers predictive operating system analytics and helps you rapidly identify and remediate threats to availability, security, stability, and performance. Proactive, automated, targeted issue resolution helps to ensure that your environment is operating optimally to avoid problems and unplanned downtime. Red Hat Insights includes more than 600 rules—including many specific to SAP system configuration requirements and best practices—to identify vulnerabilities before they impact critical operations. If a system contains a known vulnerability, Red Hat Insights automatically alerts you and provides instructions—including Red Hat Ansible® Automation playbooks—for fixing the problem.

Red Hat Enterprise Linux for SAP Solutions also includes Red Hat Smart Management, which combines Red Hat Satellite with cloud management services. A scalable life-cycle administration platform, Red Hat Satellite lets you provision, patch, configure, and fully control all of your Red Hat infrastructure, including development, test, and production systems. Automation and monitoring features help you ensure that systems have the latest security patches and quickly remediate configuration drift. Complete auditing capabilities record and report the historical state of your systems at any point in time. Red Hat Satellite also provides subscription management capabilities, so you can optimize subscription use across your organization.

SECURITY AND COMPLIANCE

Your critical systems must be secure and up-to-date at all times. Many issues within SAP environments arise because services do not have the most current security patches and updates. Control of security updates and system patches is essential as you move to SAP HANA. Automated detection and notification capabilities can alert you of systems and software that require updates, improving system security and compliance.

Red Hat and AWS provide advanced security features to protect your environment. Red Hat's integrated software stack allows you to implement a **continuous security approach** to protect your business and infrastructure from operating system to application. Integration between Red Hat Enterprise Linux, Red Hat Satellite, and Red Hat Insights delivers increased monitoring and remediation capabilities and proactive compliance controls. Plus, Red Hat Product Security continually scans for and responds to emerging threats and rapidly providing patches for vulnerabilities.[2]

AWS policies, architecture, and operational processes are built to the stringent requirements of the most **security-sensitive** AWS customers. The company manages the security of its underlying cloud infrastructure and provides security guidance and expertise for your workloads and configurations through online resources, personnel, and partners. AWS also maintains many **compliance programs and certifications** from accreditation bodies across geographies and industries, reducing your compliance burden. AWS environments are continuously audited to ensure continuous compliance.

Additionally, Red Hat and AWS provide security advisories for current issues and can work with you to resolve security problems when needed.

PERFORMANCE

A high-performance foundation is required for SAP applications to provide the most value to your business. Migration provides you with an opportunity to optimize your environment to achieve the best possible performance. SAP HANA requires massive amounts of data to be held in-memory. Accordingly, the settings and parameters of the underlying operating system must be appropriately tuned for maximum performance.

Red Hat and AWS provide a high-performance foundation for SAP environments. Developed by Red Hat and SAP engineers, Red Hat Enterprise Linux offerings for SAP include specialized features and optimizations for running SAP workloads. Red Hat and SAP engineers work together in the SAP Linux Lab to ensure that SAP applications running on Red Hat Enterprise Linux achieve high levels of performance across hardware platforms.

AWS provides a selection of purpose-built, SAP-certified instances to optimize the performance of SAP workloads. **Amazon EC2 Bare Metal Instances** let you run Red Hat Enterprise Linux directly on the underlying hardware while still providing cloud service, flexibility, and optimizations. **Amazon EC2 High Memory Instances** provide up to 12TB of memory for SAP HANA databases and up to 48TB of memory for scale-out SAP S/4HANA workloads.

SCALABILITY

In addition to high performance, database scalability is required to support large datasets. SAP HANA can handle several hundred terabytes of data, and its performance depends on the scalability and performance of both the operating system and the underlying infrastructure.

Red Hat and AWS solutions streamline scaling, so you can start with only the resources you need now and rapidly expand as needs change. On-demand availability and scaling up and out of resources ensures your environment is never constrained. The **AWS Trusted Advisor** tool monitors your applications and reports capacity use to help maintain steady, predictable performance at the lowest possible cost. New **predictive scaling capabilities** use data collected from your actual Amazon EC2 usage, billions of data points drawn from Amazon's own observations, and well-trained machine learning models to forecast expected traffic and EC2 usage on a daily and weekly basis.

2 *Learn more about Red Hat Product Security at* **access.redhat.com/security/overview**.

Further, Amazon's global footprint lets you choose where to place workloads to support new markets, customer demands, and regional regulations.

AVAILABILITY AND STABILITY

SAP workloads are critical for your business and downtime is unacceptable.

Together, Red Hat and AWS provide:

- Continuous availability for SAP applications through integration with highly available SAP offerings like SAP HANA, SAP NetWeaver, and S/4HANA.
- Your choice of SAP applications for use with Red Hat and AWS high availability solutions. Choose from automated SAP HANA System Replication, SAP NetWeaver ASCS (ABAP SAP Central Services)and ERS (Enqueue Replication Server), and SAP S/4HANA ASCS/ERS based on Standalone Enqueue Server 2 (ENSA2).

Additionally, Red Hat Enterprise Linux provides a reliable, stable operating environment for your SAP landscape. The Red Hat Enterprise Linux High Availability Add-On – included with both Red Hat Enterprise Linux for SAP offerings – provides failover orchestration across your environment to keep your SAP workloads up and running at all times. Using Pacemaker and specialized Amazon EC2 and SAP resource agents, Red Hat Enterprise Linux offers a standards-based approach for high-availability operations.

Red Hat Update Services provides up to four years of support – including security patches and critical fixes – for select minor releases of Red Hat Enterprise Linux. When you upgrade to a new minor release, binary compatibility and kernel stability ensure that your system remains stable and that both SAP and custom applications continue to execute smoothly.

FLEXIBILITY AND CHOICE

Every organization has different requirements. You need technology partners that allow you to tailor your environment with the technologies, services, and products that meet your organization's needs today and in the future.

Red Hat and AWS give you an extensive choice of services and third-party products to customize your environment. Red Hat Enterprise Linux runs consistently across both on-premise and cloud infrastructure, allowing you to move applications and workloads without changing them. A suite of Amazon EC2 instances – supported by both SAP and Red Hat platforms – lets you select the right configuration for your applications. You can choose to purchase Red Hat Enterprise Linux with High Availability and Update Support directly from the AWS Marketplace, or move your Red Hat Enterprise Linux for SAP Solutions subscription to AWS through Red Hat Cloud Access. The AWS Marketplace also offers a variety of independent software vendor (ISV) solutions that are validated to run on Red Hat Enterprise Linux, so you can easily add the products your require. Plus, Red Hat, AWS, and SAP partner with systems integrators to ease your migration to SAP HANA, Red Hat Enterprise Linux, and AWS.

Additionally, Red Hat and AWS work together to help you take advantage of the latest technology without disrupting your business. Tight integration between Red Hat products and AWS services ensures that all new products, features, and services are available and supported by both companies soon after launch. Joint development ensures reliable interoperability to support business continuity. Support for multiple processor models lets you use the appropriate platform at all times.

SUPPORT

Issues in your SAP environment can cause costly downtime. To ensure the best business continuity, you need technology partners that provide ongoing, easy-to-access, enterprise-grade support.

With Red Hat and AWS, support is simple and hassle-free. Red Hat and AWS work with SAP and certified hardware and cloud providers to deliver support for your SAP environment. An integrated support model gives you a single point of contact for issues. Call AWS, Red Hat, or SAP, and the companies work together internally to pinpoint and resolve issues quickly, minimizing downtime for your environment. Subscriptions purchased through the AWS Marketplace require business-level support, which includes level 1 and 2 support from AWS and level 3 escalation to Red Hat and SAP.

You can also engage a Red Hat Technical Account Manager (TAM) to provide specialized product knowledge and industry expertise and help you plan and execute your migration.

LEARN MORE

SAP HANA migration presents an opportunity to modernize your underlying IT infrastructure and realign with digital business needs. Red Hat and AWS provide validated solutions for SAP HANA that improve datacenter innovation, efficiency, and flexibility. Get started quickly and easily using the SAP HANA Quick Start.

Learn more about Red Hat and AWS solutions for SAP at access.redhat.com/articles/3671571 and amzn.to/2XdTylv.

ABOUT AMAZON WEB SERVICES

For almost 13 years, Amazon Web Services has been the world's most comprehensive and broadly adopted cloud platform. AWS offers over 165 fully featured services for compute, storage, databases, networking, analytics, robotics, machine learning and artificial intelligence (AI), Internet of Things (IoT), mobile, security, hybrid, virtual and augmented reality (VR and AR), media, and application development, deployment, and management from 61 Availability Zones (AZs) within 20 geographic regions, spanning the U.S., Australia, Brazil, Canada, China, France, Germany, India, Ireland, Japan, Korea, Singapore, Sweden, and the UK. Millions of customers including the fastest-growing startups, largest enterprises, and leading government agencies—trust AWS to power their infrastructure, become more agile, and lower costs.

ABOUT RED HAT

Red Hat is the world's leading provider of enterprise open source software solutions, using a community-powered approach to deliver reliable and high-performing Linux, hybrid cloud, container, and Kubernetes technologies. Red Hat helps customers integrate new and existing IT applications, develop cloud-native applications, standardize on our industry-leading operating system, and automate, secure, and manage complex environments. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500. As a strategic partner to cloud providers, system integrators, application vendors, customers, and open source communities, Red Hat can help organizations prepare for the digital future.

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