RED HAT SOLUTIONS FOR SAP

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Red Hat, Inc.

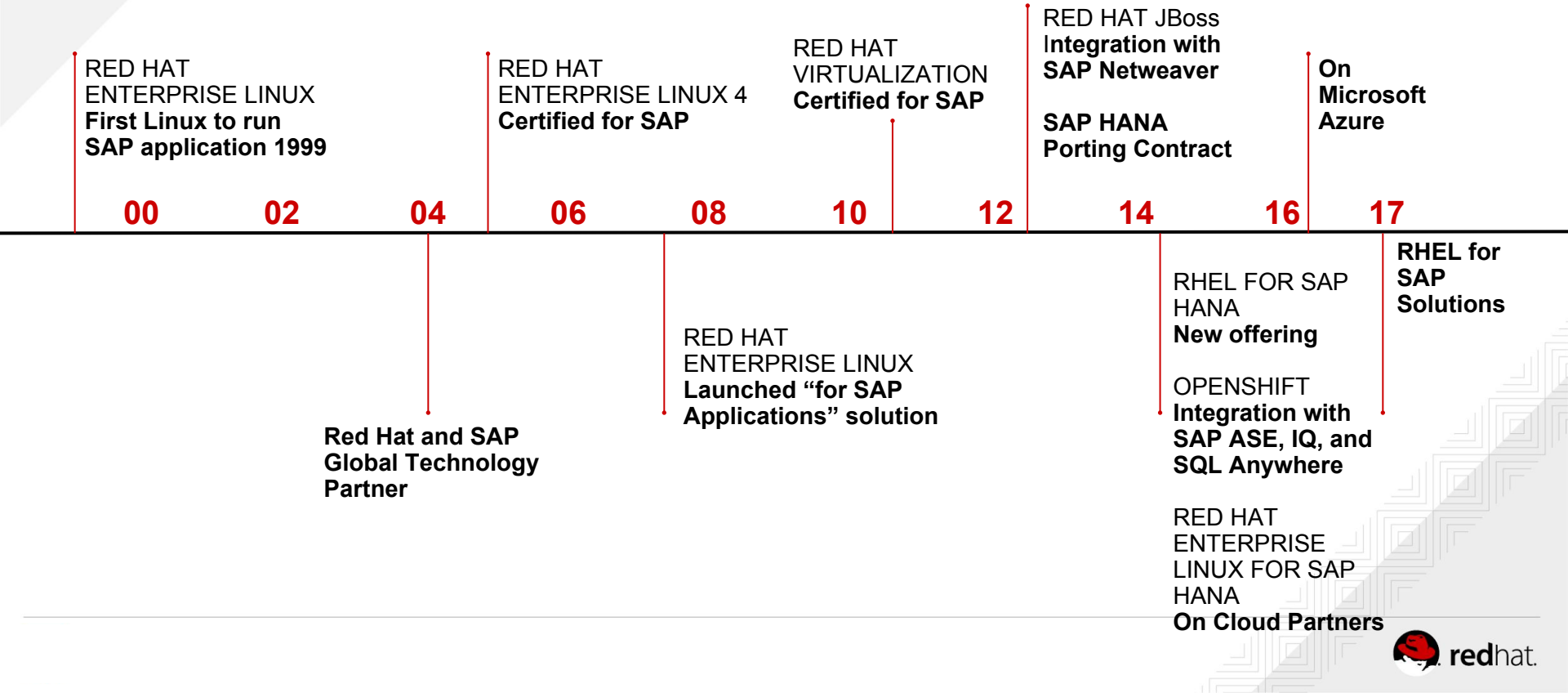
AGENDA

- Why Red Hat
- RHEL for SAP Solutions
- Contents/Solutions
- Reseller Price List
- How to Subscribe
- Resources
- Q & A

Red Hat Investment in SAP

- Dedicated Global SAP Team at Red Hat (lead out of WDF)
- Trained SAP Support Staff at Red Hat
- Trained SAP Tech. Account Managers at Red Hat
- Co-development – RHEL, RHV and JBOSS product teams work with SAP developers
- RHEL is the development platform for SAP Hybris, BusinessObjects, Sybase ASE, IQ and SAP Vora
- Member of SAP Benchmark Council
- Continued partnering around emerging technology (Containers, IoT, etc.)
- Integrated support process

Red Hat and SAP:
A Track Record of Innovation



Why Red Hat?

Facts (Corporate Viability):

- 90% of the Fortune 500 trust Red Hat
- 70% Paid Linux market share
- 2.9 B$ revenue
- Development Powerhouse: #1 Openstack, #2 Linux (after Intel), #3 Dockers and #2 Kubernetes

Scalability:

- Very large (500TB) SAP HANA installation
- OEMs prefer to run benchmarks on RHEL

Realize more VALUE while reducing costs

- RHEL for SAP Solutions delivers more capabilities
- Standard support versions available for QA, pre-production & testing to reduce spend
- Introducing state-of-the-art management and automation into your SAP landscape

Meet the SLAs:

- Stable kernel interfaces for the life of a major release
- Application Compatibility Guide
- **ONE RHEL** for SAP and Non-SAP applications
- Predictive management

Completeness of the portfolio:

- Virtualization
- Management and Automation
- Application Integration
- OpenShift Container Platform
- JBoss Data Virtualization

Red Hat & SAP alignment

SAPs Key Offerings	Red Hat Value	… delivered by	Red Hat Offerings
SAP HANA	Making the **Datacenter** efficient	automate manual tasks and speed up deployment and changes. Avoid errors and downtime with predictive analytics	**RHEL** **Insights** **RHV** **Ansible** **Cloudforms** **Fuse** **Decision Manager** **Openshift**
SAP S/4 HANA	Making **Hybrid IT** simple	providing hybrid cloud management with governance and policy based control, enabling e.g. self-service functionalities, chargeback, etc.	
SAP Leonardo	Powering **Intelligent Edge**	integrating non-SAP solutions and sources and unlock the value of enterprise data	
SAP Data Hub	Enabling **new business insights** from Big Data	streamline development, modernization and delivery of SAP extensions with container technology and microservices	

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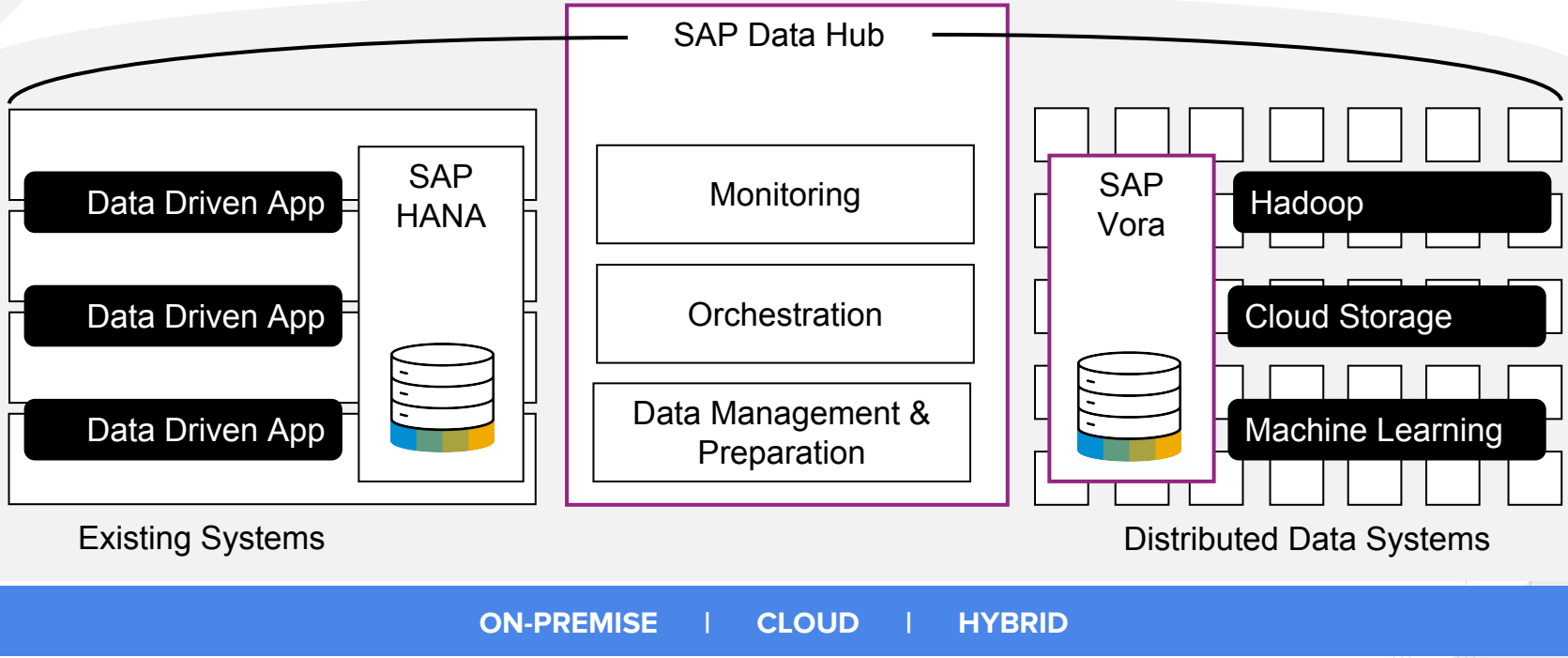
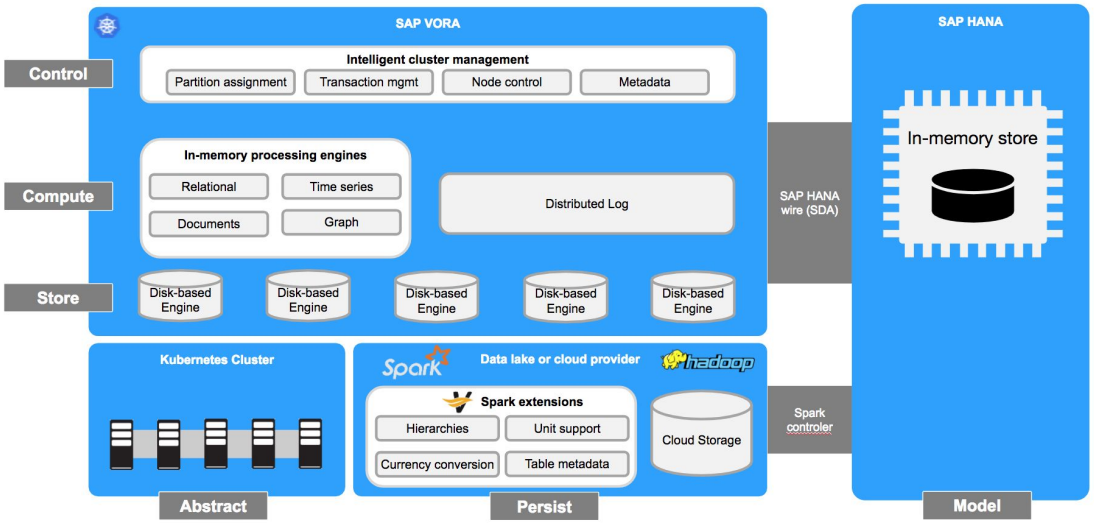
Integrate, Orchestrate and Manage Big Data Infrastructures



SAP Vora Overview

- In-memory, distributed computing solution for Big Data
- Part of SAP Data Hub
- There is no more public marketing for SAP Vora, but only SAP Data Hub
- SAP Vora 2.x is containerized and developed on Kubernetes
- Red Hat conducts SAP Vora 2.x validation on OpenShift Container Platform (OCP)



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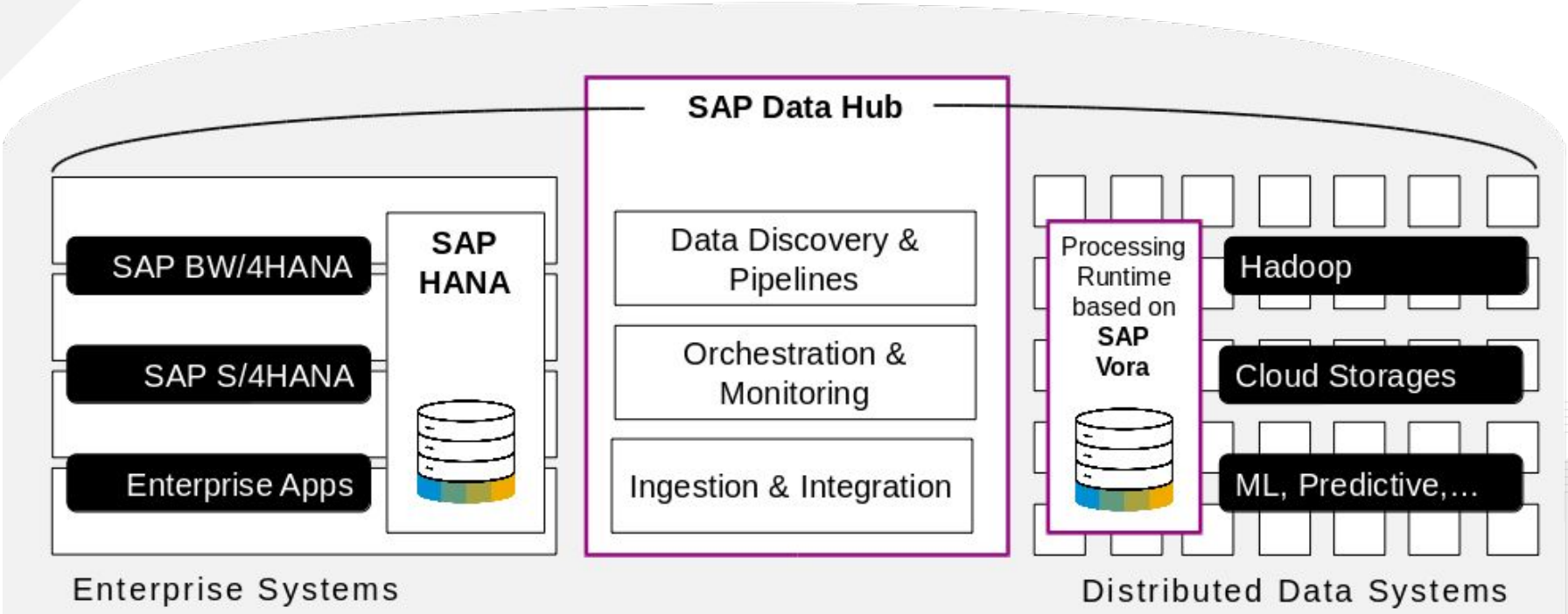
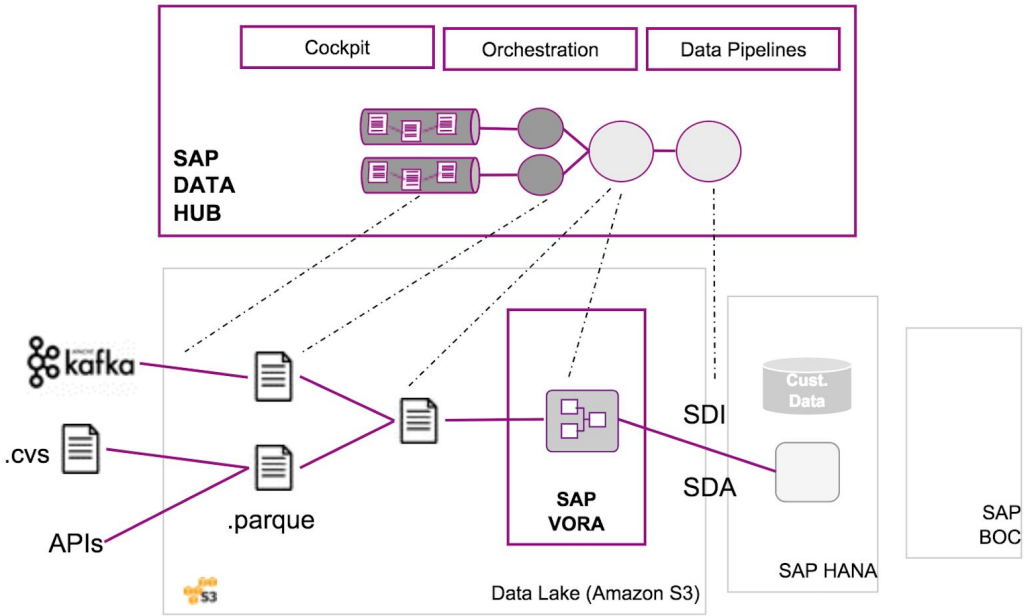
SAP Data Hub
Unifying Data Silos



Red Hat Enterprise Linux for SAP Solutions | Red Hat OpenShift Container Platform (OCP) | Red Hat Enterprise Linux

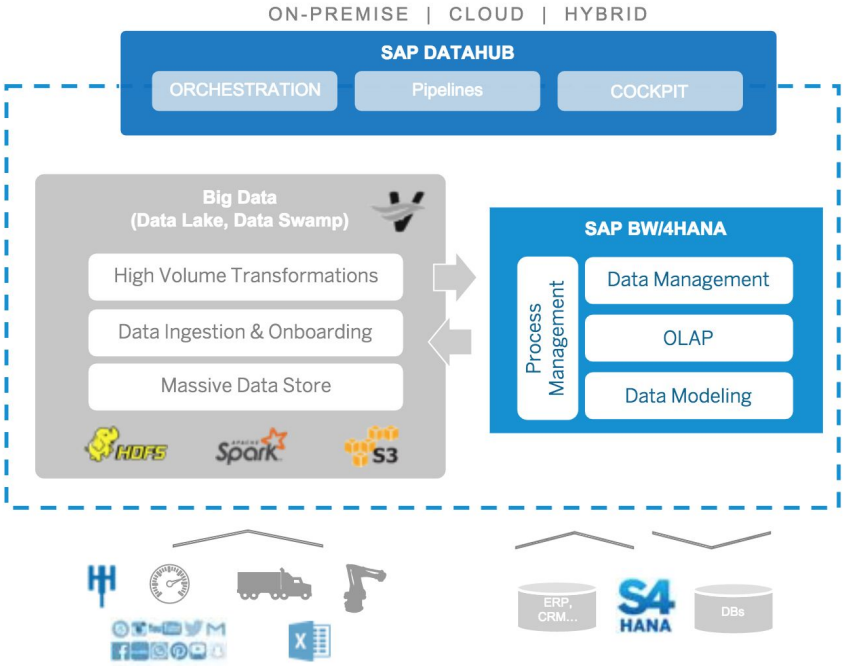
Use Case: Streaming and Processing IoT Data

- How to understand customer behavior and to drive insightful decisions?
- Solution with SAP Data Hub
  - Refine business value from data ingestion to enterprise applications
  - Visual modeling environment
  - Governance and Data Management
  - Orchestration and scheduling to define automated data driven processes



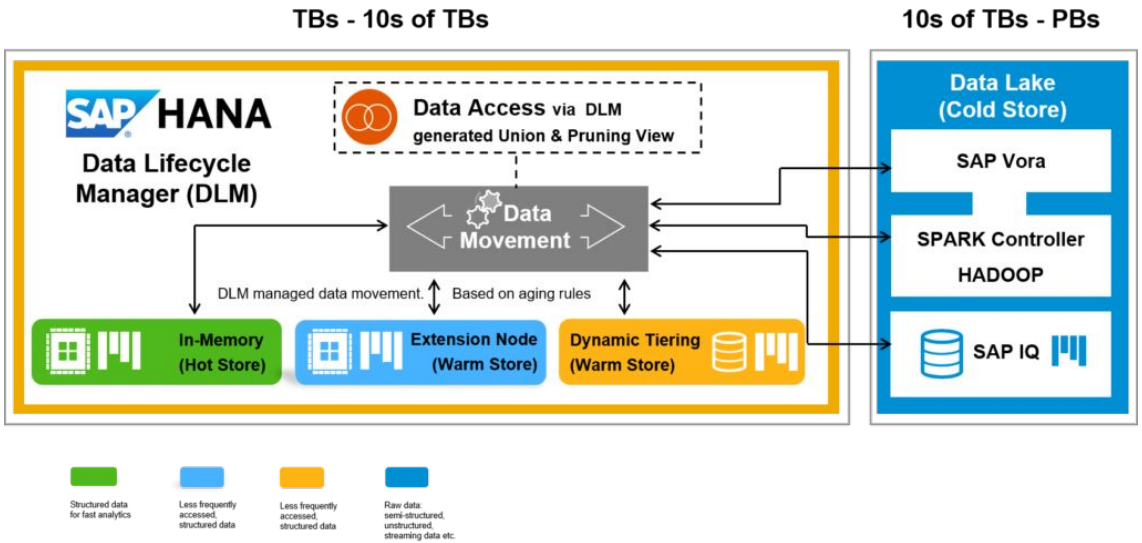
Use Case - Big Data Warehouse

- Build a modern, open, and hybrid DWH offering any data
- BW/4HANA as modern and simplified core data warehouse solution
- Implement and execute high volume transformations on Big Data Clusters Data Lake
- Leverage Big Data landscapes for data onboarding and ingestion
- Data Hub as orchestration and refinery application to address end to end processes

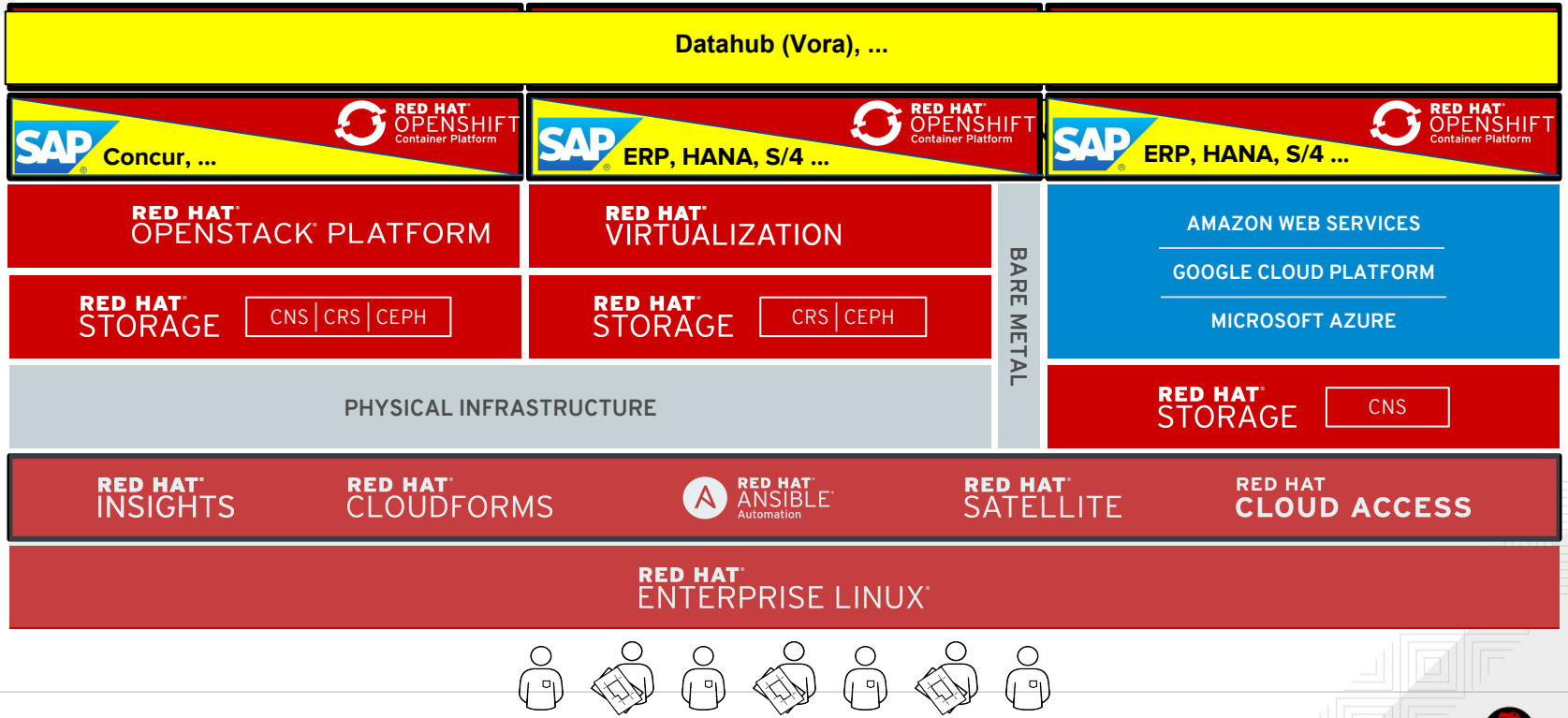


Use Case - Tiered HANA Management

- SAP HANA Dynamic Tiering
  - Utilize lower cost disk storage for historical data within a single SAP HANA database, or even a single multistore table.



RED HAT MULTICLOUD ARCHITECTURE



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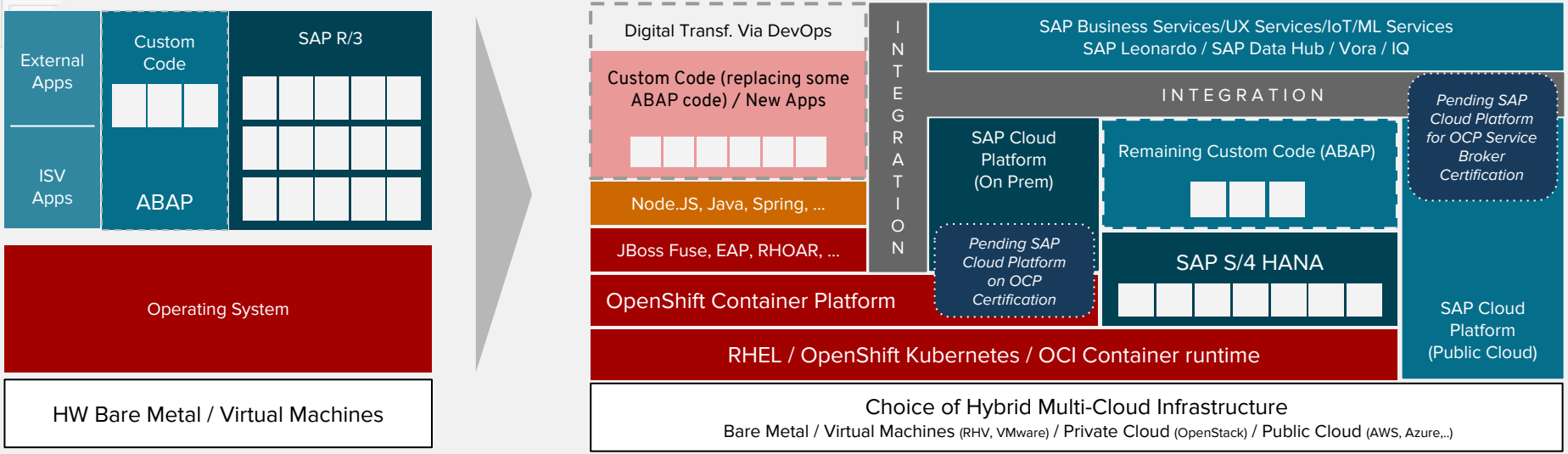
Red Hat Multicloud Architecture

Unlocking Digital Transformation Through Container Adoption



Key Business Outcomes

- Enable new ways of developing, delivering applications & services
- Agile Integration across apps, data, systems and services
- Deploy and manage apps across Hybrid Cloud Infrastructure
- Optimise processes across Dev, Ops & Line of Business

SIMPLIFIED DEVELOPMENT	STRATEGIC FLEXIBILITY	DEVOPS READY

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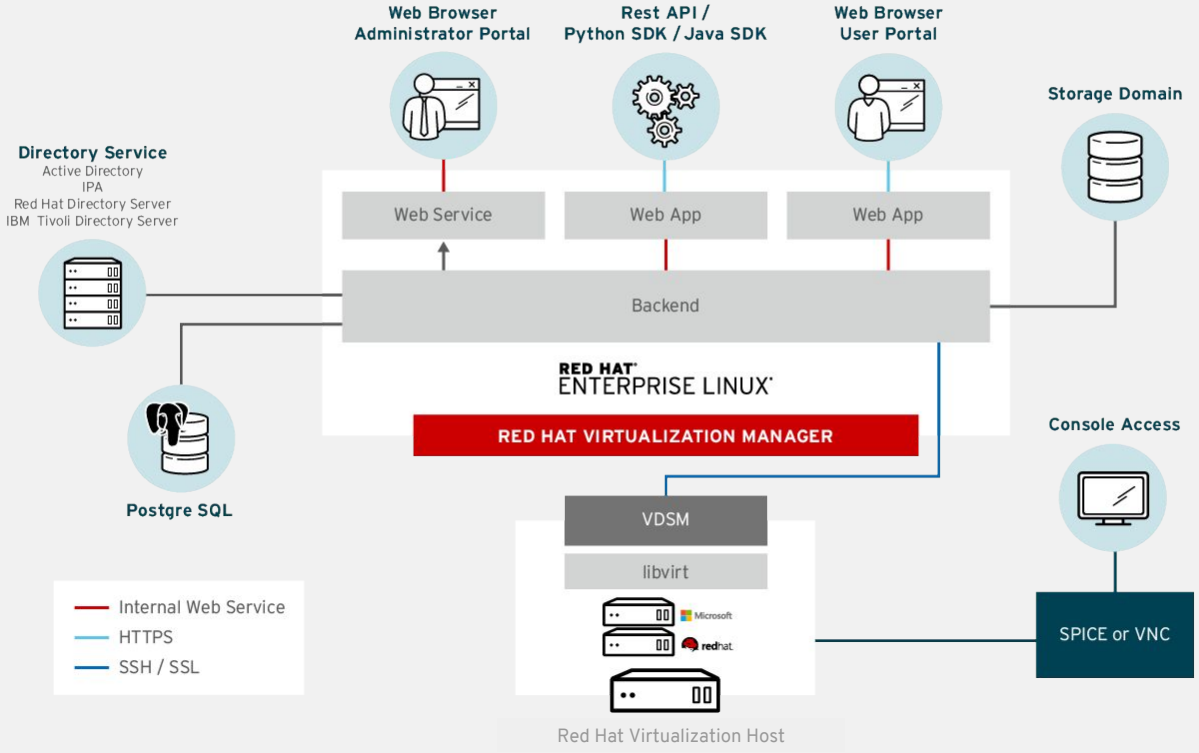
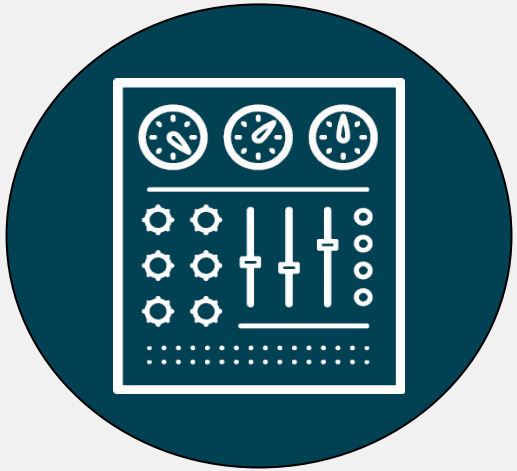
Infrastructure

RHV

RED HAT VIRTUALIZATION OVERVIEW

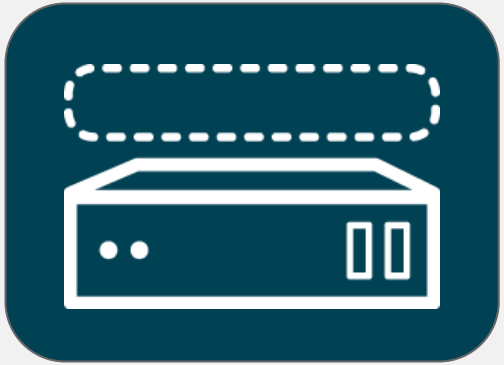


RED HAT VIRTUALIZATION MANAGER OVERVIEW



- Centralized management for virtual infrastructure and resources
- Designed for large scale (500+ hosts and 5,000+ VMs)
- REST API to integrate with Red Hat portfolio, third party applications, backup/recovery software
- Python, Ruby, and Java SDK's
- Intuitive dashboard with detailed information
- Can be integrated with existing infrastructure - Active Directory, CloudForms, OpenStack, etc

RED HAT VIRTUALIZATION HOST OVERVIEW

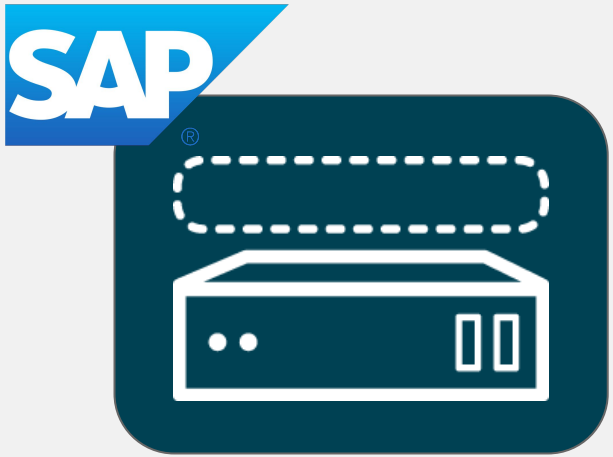


- **RHEL Co-Engineering** - inherits performance, scalability, security, and supportability of Red Hat Enterprise Linux
- **Ecosystem:** Shares Red Hat Enterprise Linux hardware and software ecosystem
- **Host:** 480 logical CPU (4,096 theoretical max), 6TB RAM (64TB theoretical max)
- **Guest:** 240 vCPU, 4TB RAM
- **Technology**: Supports latest silicon virtualization technology
- **Cross-Platform:** Microsoft certified for Windows guests

COCKPIT HOST ADMINISTRATION CONSOLE

- Included as part of Red Hat Virtualization Host image, can be added to RHEL host.
- Used to configure networking, storage, tuning, subscriptions, and other aspects of the host.
- Can be used to view metrics, ease troubleshooting, and provide command line access to the host.
- Can be used to deploy RHV in high availability
- Access via secure HTTP (HTTPS)

HANA ON RED HAT VIRTUALIZATION OVERVIEW



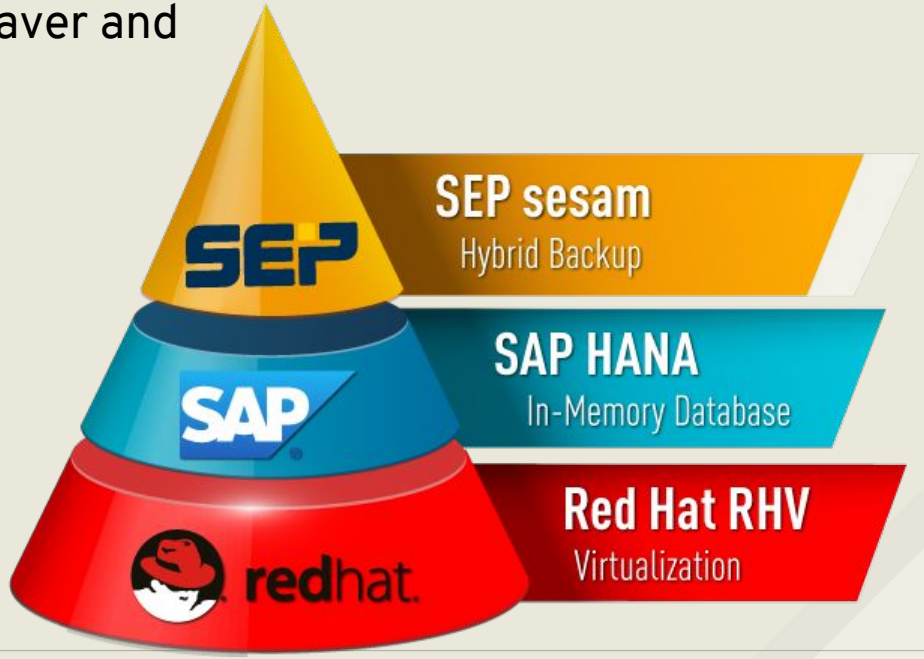
- non-prod support since SAP HANA 1.0 SPS 11
- production support since SAP HANA 1.0 SPS 12
- currently: single VM, 1.5TB
- SAP HANA certified 2 and 4 socket Intel E7 v3 Haswell EX or 2 socket Intel E5 v3 Haswell EP
- No LiveMigration
- CPU & NUMA pinning required
- Roadmap
  - Multi-VM
  - Skylake 3TB
- See also SAP Note #1788665 and SAP Note #2599726

WHERE RHV COMPETES BEST (USE CASES)

1. **Proprietary Virtualization Pain:** High-cost burdens of proprietary solutions. Looking for alternatives.
   a. Customers may like the tech they are using but not the company servicing them
2. **Not Fully Virtualized:** Relatively new to virtualization. Long-time users of RHEL on bare metal, looking for means to consolidate.
   a. Some geos are not highly virtualized
3. **Dev/Test:** Looking for low-cost, self-service solutions for developers to test both Windows and Linux applications.
4. **Performance Sensitive Workloads:**
   a. Customers looking to confidently virtualize their high-performing workloads without losing near bare-metal performance. (SPECvirt results)
   b. Looking to virtualize certain high-performance RHEL workstations using GPU Passthrough technology

… AND COMPLETE BACKUP

- Support of RHV and RHEL
- Disaster Recovery supported
- SAP certified SEP agents for NetWeaver and HANA (Linux Intel and ppc)
- Ready for S/4HANA



VIRTUALIZATION FOR SAP HANA

finanz **informatik**
technologie service

Christoph Theis, Head of SAP Services, Finanz Informatik Technologie Services:
"To deliver the absolute reliability and fast performance that our financial services and insurance custom expect for their critical enterprise transactions, we needed a robust virtualization platform. Choosing Red Hat Virtualization means that we can deliver a high-performing, cloud-based SAP HANA solution that meets our customers' requirements, and can do so in a cost-effective manner."

ADDITIONAL RESOURCES

SAP on RHV Best Practices Deployment Guide

- https://access.redhat.com/articles/2176051

Red Hat Virtualization evaluation:

- https://access.redhat.com/products/red-hat-virtualization/evaluation

Blogs:

- RHEL Blog
  - http://rhelblog.redhat.com
- Captain KVM
  - http://CaptainKVM.com

Product page:

- http://www.redhat.com/rhv

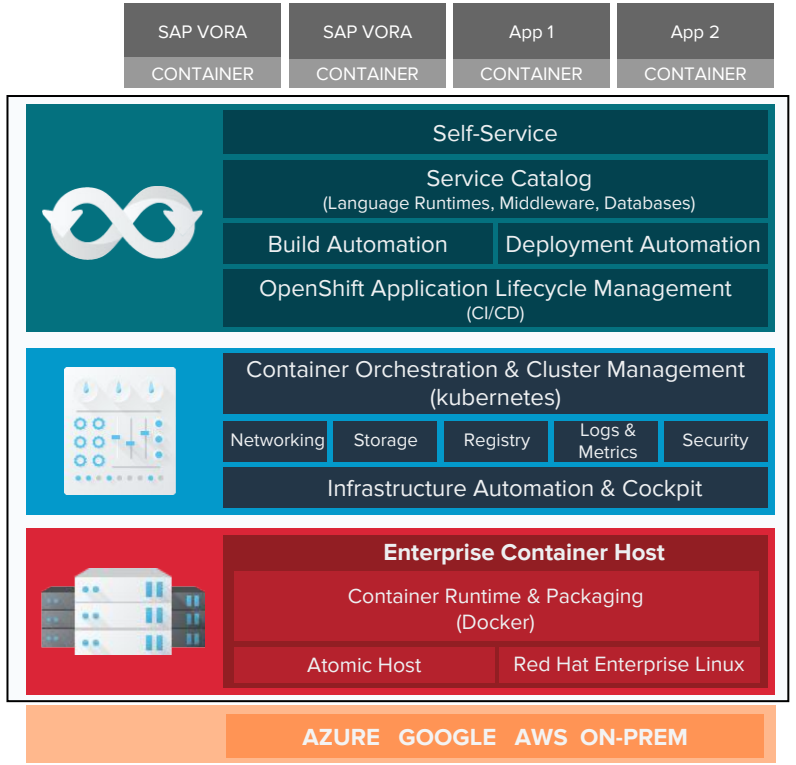
Documents:

- https://access.redhat.com/documentation/en/red-hat-virtualization

Infrastructure

OpenShift

What Else Does A “Containerised” SAP Data Hub System Need To Run?



APPLICATION

DEVELOPER & DEPLOYMENT TOOLCHAIN

APPLICATION CONTAINER PLATFORM

OPERATING SYSTEM

COMPUTE RESOURCES
(CPU, RAM, NETWORK, DISK)

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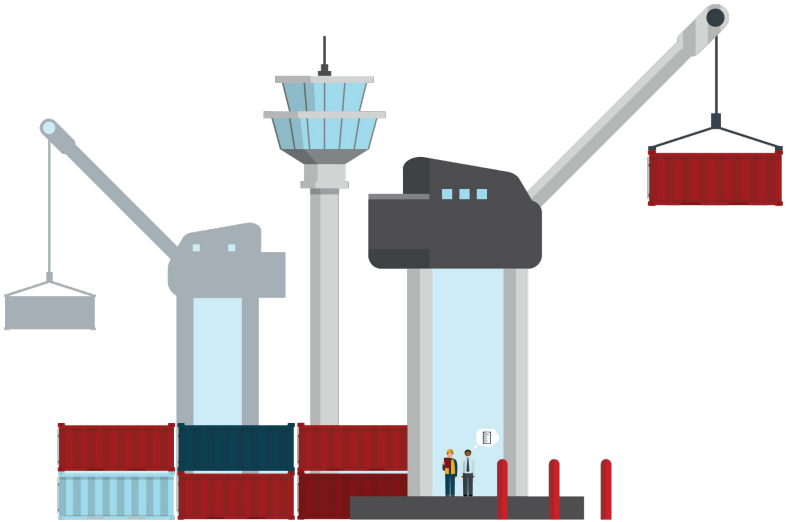
Build, Deploy, And Manage At Scale

WITH RED HAT OPENSHIFT CONTAINER PLATFORM

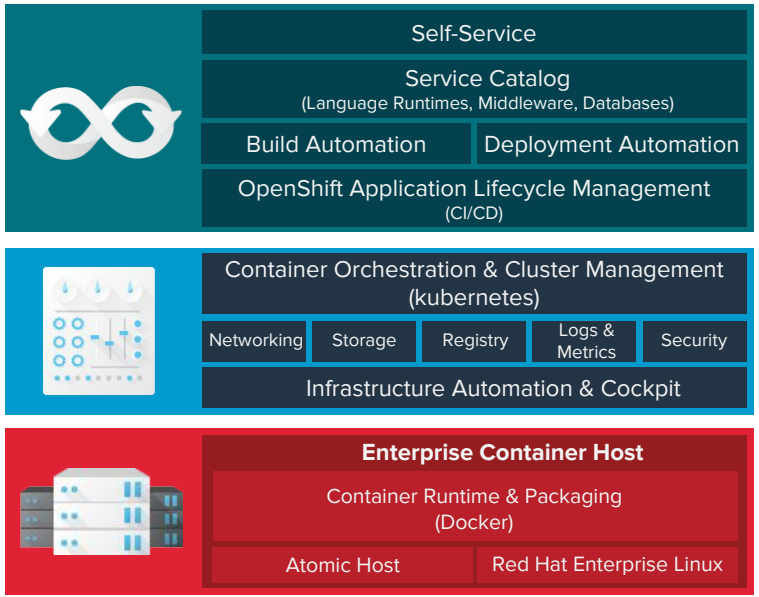


The industry's most secure and comprehensive enterprise-grade container platform based on industry standards, Docker, Kubernetes and Red Hat Enterprise Linux.

RED HAT® OPENSHIFT Container Platform

"Next Generation Hybrid Cloud Operating System"

Address InfoSec & DevOpsSec



1. Container Host & Multi-tenancy
2. Container Content
3. Container Registries
4. Building Containers
5. Deploying Containers
6. Container Platform
7. Network Isolation
8. Storage
9. API Management
10. Federated Clusters

[Ten Layers of Red Hat Container Security Whitepaper]

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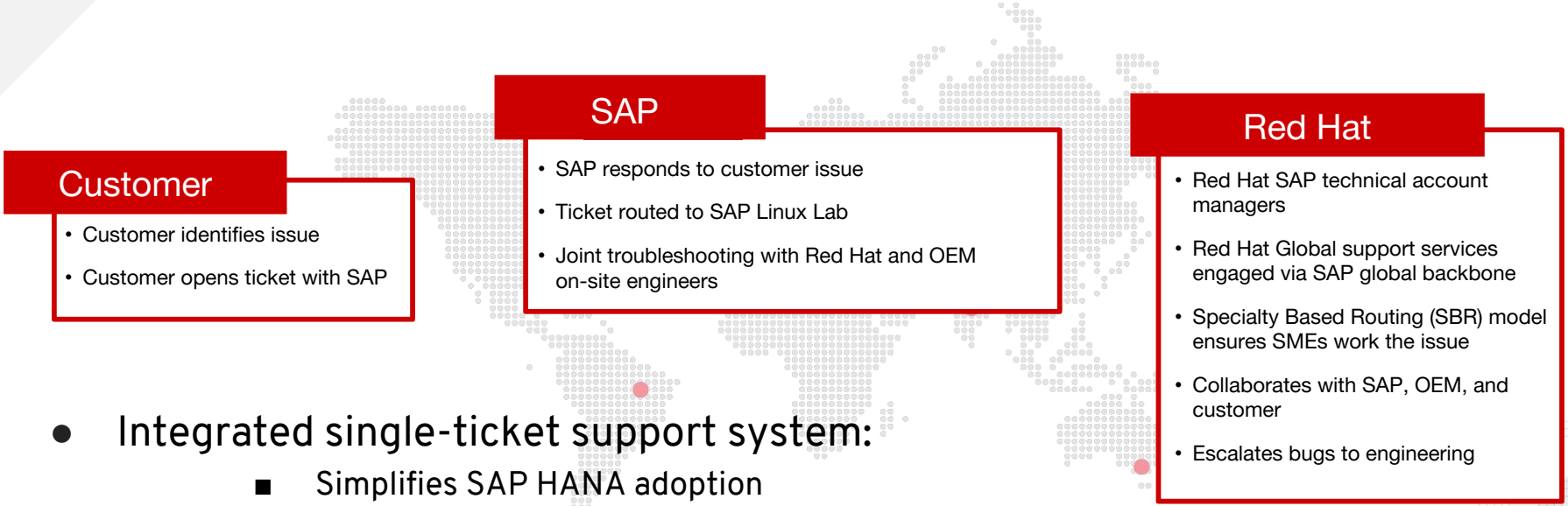
Resources

- SAP Vora Product Availability Matrix
  - https://support.sap.com/content/dam/launchpad/en_us/pam/pam-essentials/SAP_Vora_PAM.pdf
- SAP Note 2213226
  - Prerequisites for installing SAP Vora: Supported Infrastructure, Container, and Hadoop Platforms
  - https://launchpad.support.sap.com/#/notes/2213226
- SAP Vora Technical Documents - Generic
  - https://help.sap.com/viewer/p/SAP_VORA
- SAP Vora Installation Guide on OCP
  - https://access.redhat.com/articles/3494151#sap-vora-and-sap-d

Collaborative Support

Follow the Sun

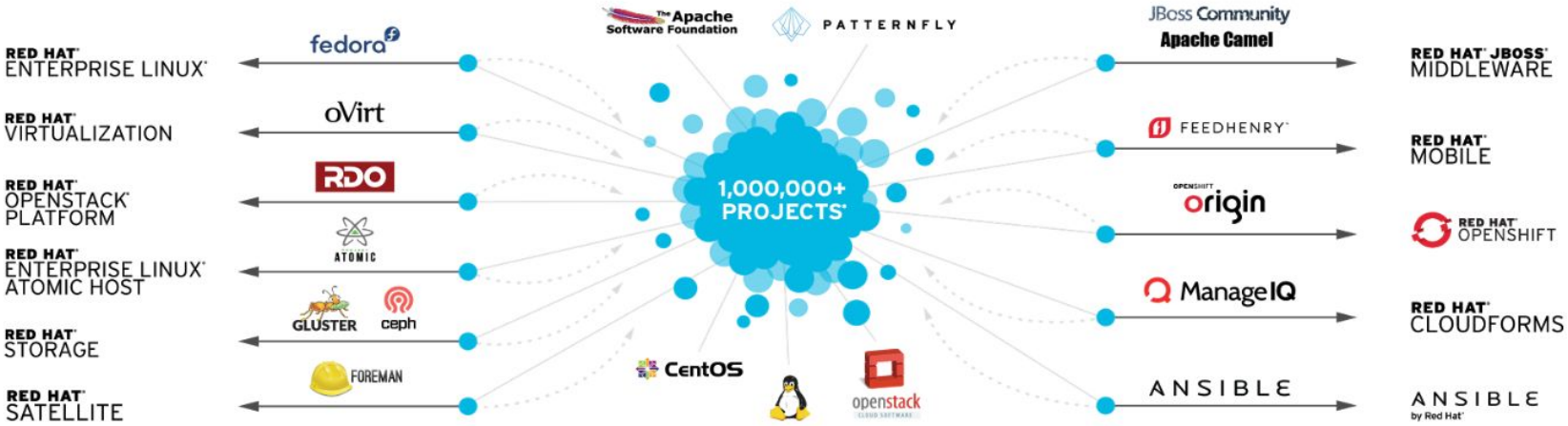


- Integrated single-ticket support system:
  - Simplifies SAP HANA adoption
  - Single support interface
- Red Hat offers SAP Technical Account Manager (TAM) service

The Basics

RHEL for SAP Solutions

Upstream Development Model



1993	FOUNDED
1999	IPO
2002	FIRST RELEASE OF ENTERPRISE LINUX
2006	JBOSS ACQUIRED
2009	RED HAT VIRTUALIZATION RELEASED
	RED HAT ADDED TO S&P 500 INDEX
2011	CLOUDFORMS & OPENSHIFT RELEASED
	$1 BILLION IN REVENUE
2012	RED HAT STORAGE RELEASED
	OPENSHIFT ENTERPRISE RELEASED
2013	RED HAT OPENSTACK PLATFORM RELEASED
2014	CENTOS JOINS RED HAT
	INKTANK (CEPH), ENOVANCE (OPENSTACK), & FEEDHENRY (MOBILE) ACQUIRED
2015	ANSIBLE ACQUIRED
2016	**$2 BILLION IN REVENUE**
	3SCALE ACQUIRED

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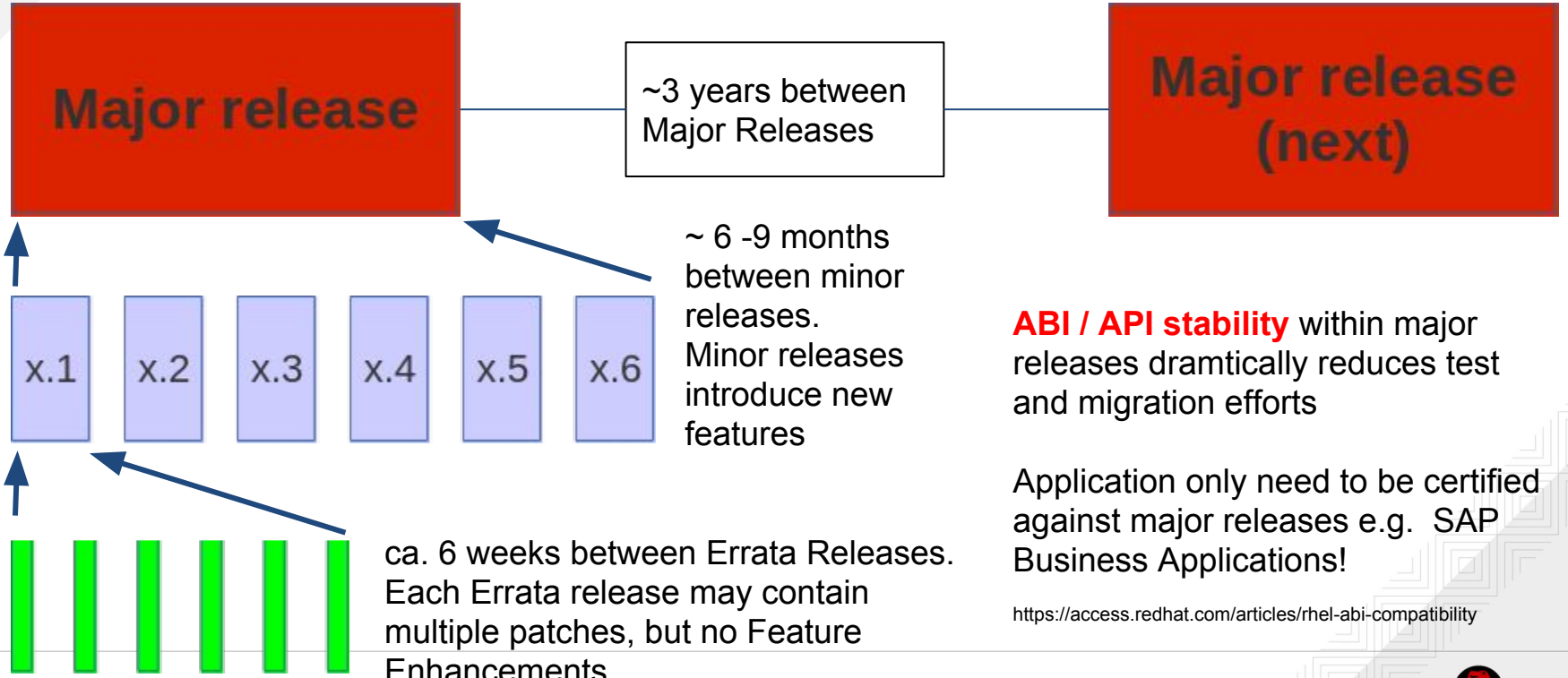
RHEL Release types: Major, Minor and Errata



ABI / API stability within major releases dramtically reduces test and migration efforts

Application only need to be certified against major releases e.g. SAP Business Applications!

https://access.redhat.com/articles/rhel-abi-compatibility

Red Hat Enterprise Linux – Life Cycle

Full Support (Prod 1) (~5 ½ years)	Maint 1 (Prod 2) (1 year)	Maint 2 (Prod 3) (~3 ½ years)	Extended Life Phase (ongoing)

10 years

Description				
Access to previously released content in Red Hat Network	yes	yes	yes	yes
Red Hat knowledge base, documentation, videos, ref arch's, etc.	yes	yes	yes	yes
Incidental technical support	unlimited	unlimited	unlimited	limited
Security errata	yes	yes	yes	no
Bug fix errata	yes	yes	yes	no
Minor releases	yes	yes	yes	no
Refreshed hardware enablement	native	limited native	through virtualization	no
Software enhancements	yes	no	no	no
Updated install images (provided with releases only)	yes	yes	yes	no

https://access.redhat.com/support/policy/updates/errata/

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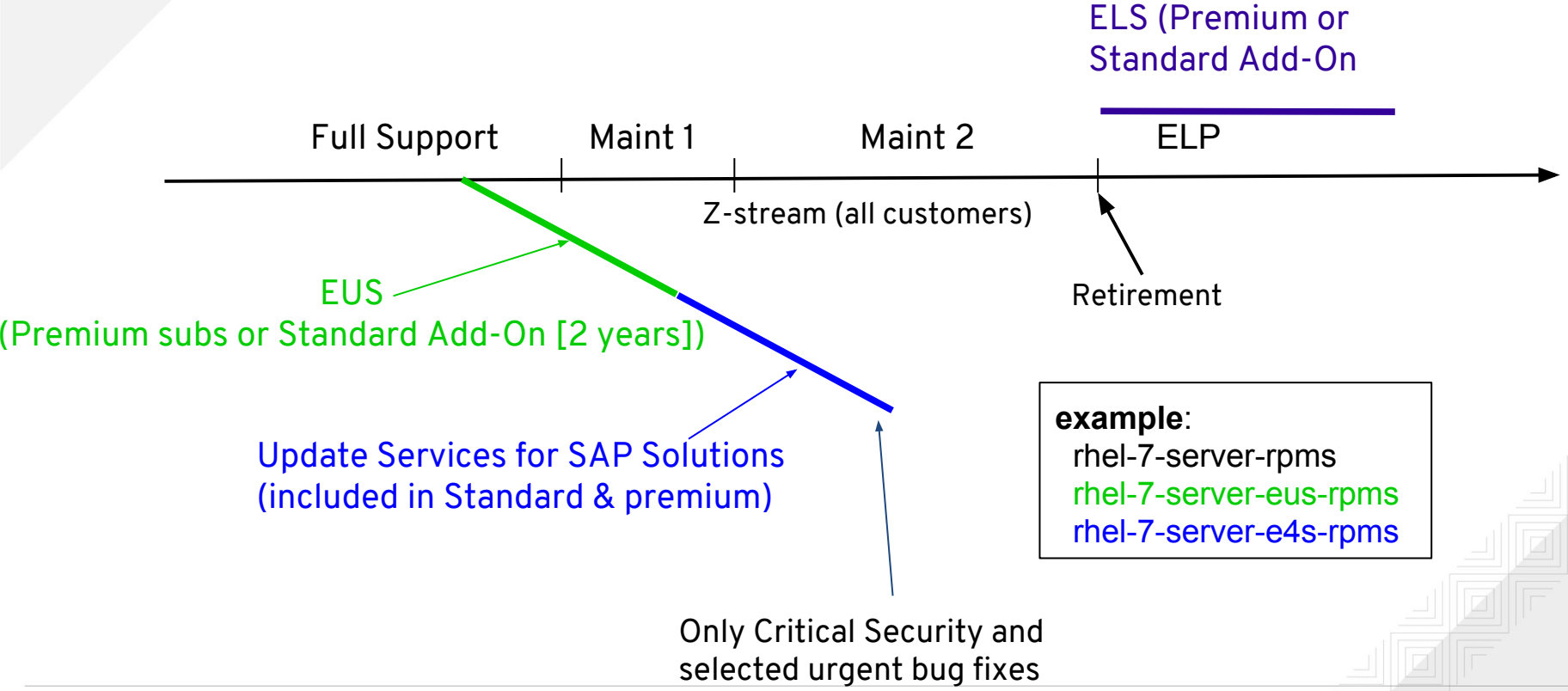
Certifications and Validations

- All SAP software is certified against RHEL major releases but HANA

- SAP validates RHEL minor releases for SAP HANA only
  - ready to use for entry-level Intel & Power LE servers
  - high-end Intel servers need to be certfied by OEM as appliance
  - Cloud vendors need t o certify as appliance
  - Up-to-date list of certified hardware configurations

- OEM Vendor Offerings
  - Vendors selling appliances built on Red Hat Enterprise Linux
  - Offer scale-out and scale-up configurations
  - Support SAP Business Suite powered by SAP HANA and S4HANA
  - Single Point of Contact for Support

Z-Stream, EUS and E4S



Red Hat Enterprise Linux for SAP Solutions

- RHEL for SAP HANA, S/4 HANA, and Business Apps workloads
- High Availability
- Smart Management for lifecycle management
- Red Hat Insights for proactive optimization
- 4 Y Update Services for SAP Solutions
- Integrated support process
- SAP specific contents (resource agents, tuned profiles, …)

RED HAT® VIRTUALIZATION

vmware vSphere

SAP certified Server Hardware

HUAWEI, DELL, VCE, Hewlett Packard Enterprise, cisco, FUJITSU, IBM, NEC, Bull atos technologies, Power Systems, HITACHI, Lenovo

SLA choices:

- Premium (7X24 production)
- Standard (5X12 non prod)

Per “socket pair” stackable models:

- 2 sockets **or** 2 virtual machines

Virtual Datacenter model

- 2 sockets/Hypervisor
- Unlimited guests

IBM Power:

- IFL SKU: 1 IFL, 4 LPARs.
- Linux-only SKU: 15 virtual entitlements / 2-sockets

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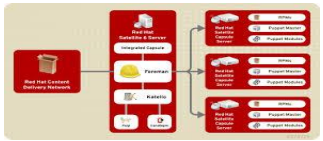
Red Hat offerings for SAP landscapes

Ansible Tower

Red Hat Satellite

Application and System Life-cycle Management and Automation



Red Hat Enterprise Linux for SAP Solutions

- RHEL for HANA, S/4 HANA and NetWeaver workloads
- High Availability
- Smart Management
- Red Hat Insights
- Update Services for SAP Solutions

SLA choices:

- Premium (7X24 production)
- Standard (5X12 non prod)

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SAP certified Server Hardware

cisco, FUJITSU, Bull atos technologies, DELL, VCE, Hewlett Packard Enterprise, NEC, HUAWEI, HITACHI, Lenovo, IBM

RED HAT® VIRTUALIZATION

Certified Cloud Service Providers

Microsoft Azure, CenturyLink™, amazon web services, BLACKBIRD

Red Hat Cloudforms

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SAP Specific Contents of “RHEL for SAP Solutions”

	RHEL for SAP Solutions	
RPM/Channel	**RHEL for SAP Applications**	**RHEL for SAP HANA**
compat-locales-sap	x	
compat-sap-c++	x	x
resource-agents-sap	x	
resource-agents-sap-hana		x
tuned-profiles-sap	x	
tuned-profiles-sap-hana		x
sapconf	x	
vhostmd/vm-dump-metrics	x	

SAP Specific Contents of “RHEL for SAP Solutions”

Red Hat Enterprise Linux for SAP HANA Child Channel

- Contains additional packages essential to HANA deployment:
  - compat-sap-c++-5.so
  - compat-sap-c++-6.so
  - Tuned profiles for bare-metal and virtualization-based deployments
  - Resource agents for managing SAP HANA instance in pacemaker cluster environment
  - Scalable file system (XFS) add-on (RHEL 6)
- Repository name on Red Hat Enterprise Linux Server 7: rhel-sap-hana-for-rhel-7-server-rpms

SAP Specific Contents of “RHEL for SAP Solutions”

compat-sap-c++-5 Package

- Additional runtime environment for GCC 5.x
  - Must install to run SAP HANA 2.0 on Red Hat Enterprise Linux 7
  - Minimum version: compat-sap-c++-5-5.3.1-10
- Reasons compat-sap-c++-5.so is required:
  - SAP HANA 2.0 releases built with different GCC compiler version from default included in Red Hat Enterprise Linux 7
  - Provides GCC 5.x libstdc++ rebuilt for Red Hat Enterprise Linux 7
- Installed as /opt/rh/SAP/lib64/compat-sap-c++-5.so

Reference

- SAP note 2338763 - Linux: Running SAP applications compiled with GCC 5.x

SAP Specific Contents of “RHEL for SAP Solutions”

compat-sap-c++-6 Package

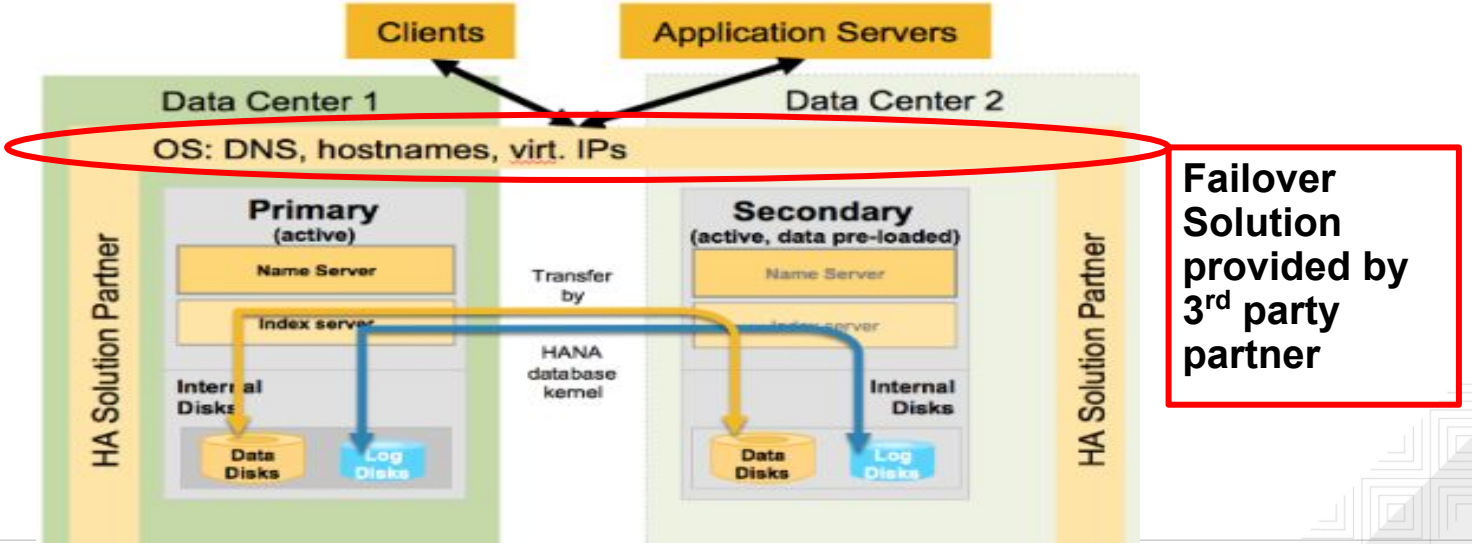
- Additional runtime environment for GCC 6.x
  - Must install to run SAP HANA 2.0 SP 3 on Red Hat Enterprise Linux 7
  - Minimum version: compat-sap-c++-6-6.3.1-1
- Reasons compat-sap-c++-6.so is required:
  - SAP HANA 2.0 SP3 releases built with different GCC compiler version from default included in Red Hat Enterprise Linux 7
  - Provides GCC 6.x libstdc++ rebuilt for Red Hat Enterprise Linux 7
- Installed as /opt/rh/SAP/lib64/compat-sap-c++-6.so

Reference

- SAP note 2455582 - Linux: Running SAP applications compiled with GCC 6.x

SAP HANA System Replication

- SAP HANA replicates all data to a secondary SAP HANA system (standard SAP HANA feature).
- Data is constantly pre-loaded on the secondary system to minimize recovery time objective (RTO)



Automated SAP HANA System Replication
Supported Configuration (as of Dec. 2018)

Currently the following scenarios and parameters are supported:

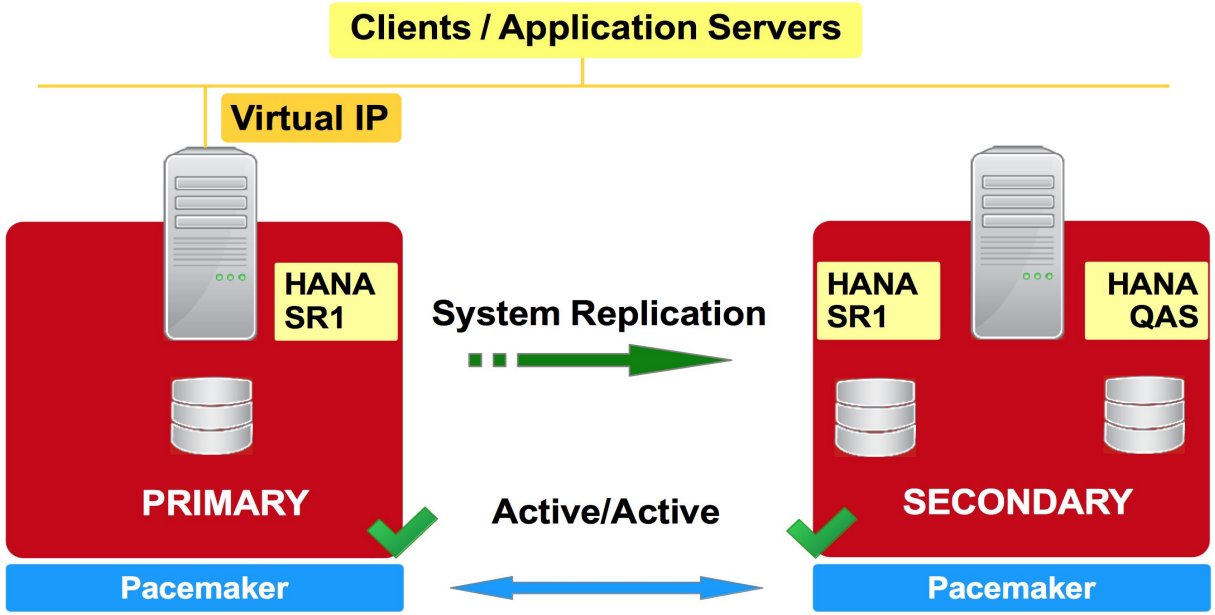
- Two-node clusters only, multi-tier replication supported
- SAP HANA Scale-Up (single-box to single-box) System Replication only
- Support HANA 1.0 and HANA 2.0
- Support "Multiple Components One Database" (MCOD) and "Multiple Database Containers" (MDC)
- "Multiple Components One System" (MCOS) is only supported if all databases running on the hosts are replicated and the replication is always to the same secondary node
- Supported on x86_64, Power LE (ppc64le) and cloud providers

Please check requirements regularily on https://access.redhat.com/articles/3397471

Automated SAP HANA System Replication

Supported Configuration - continued

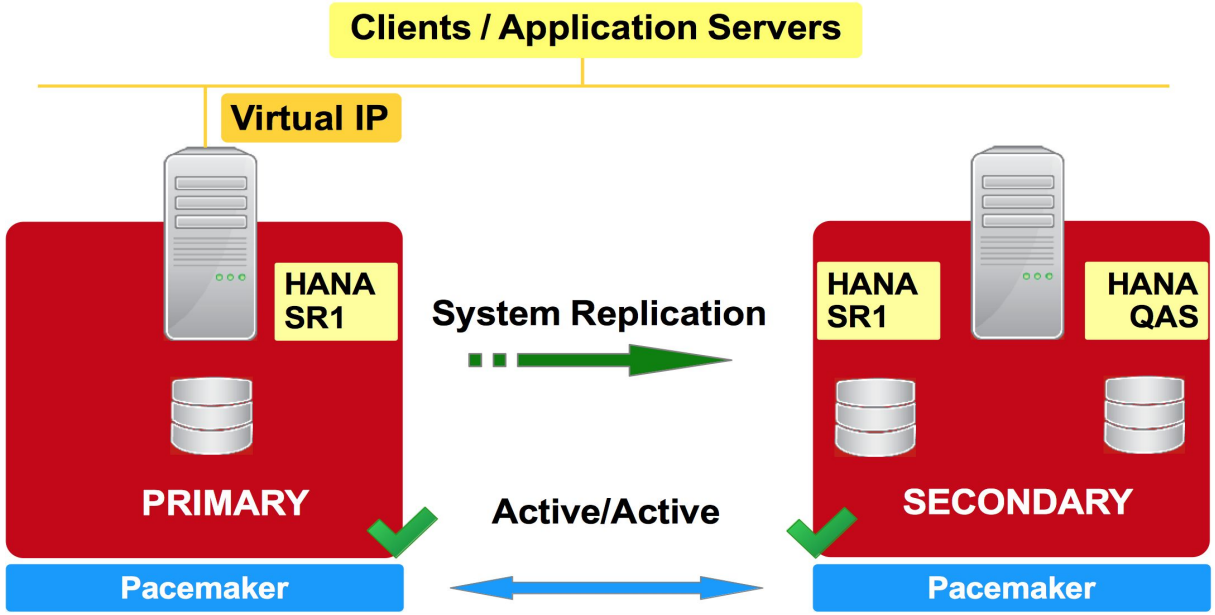
- Active-Active Read-Enabled: in HANA 2.0, the secondary instance can take Read-Only inquiries
- Support a second virtual IP on the secondary node



Automated SAP HANA System Replication

Supported Configuration - continued

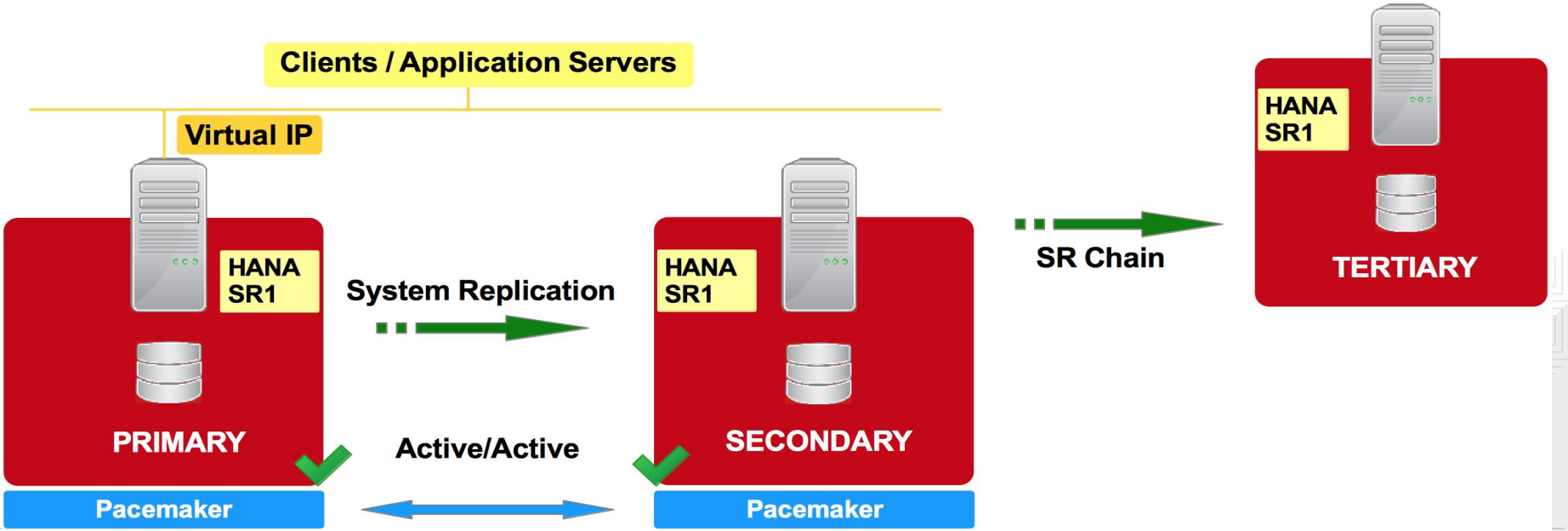
- Support a QA/Test instance running on the secondary node (Cost-Optimized)
- QA/Test instance will be shutdown first during failover



Automated SAP HANA System Replication

Supported Configuration - continued

- "Multi-tier System Replication"/"replication chains" are possible
- tertiary site is not managed by the cluster



Automated SAP HANA System Replication

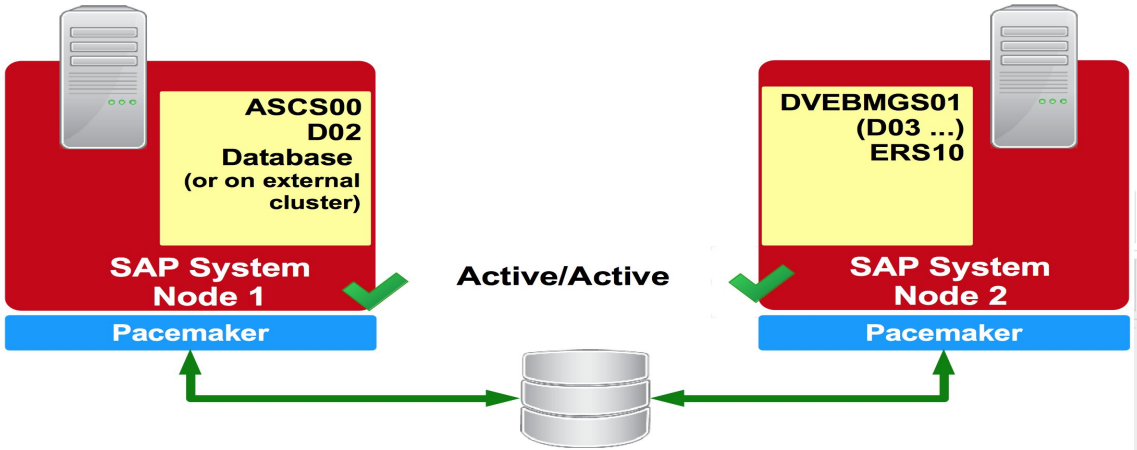
Supported Configuration - continued

- Using Full Sync Replication is possible *
- If the cluster nodes are installed in different data centers or data center areas, the environment must match both the requirements defined by SAP for HANA System Replication (see chapter "4.2 Distance between data centers" in the SAP "How to Perform System Replication for SAP HANA" guide) and also the RHEL HA add-on stretch cluster requirements, specifically the network latencies between the nodes and the recommended maximum distance

* : Please check details on https://access.redhat.com/articles/3004101

High Availability for SAP Business Applications

- Pacemaker based cluster resource agents
- Support available in RHEL 7 and RHEL 6.5+
- Supports SAP NetWeaver based SAP Solutions (ERP (aka ECC), CRM, SRM, Solution Manager, Portal, ...)
- Supported Databases:
  - Oracle
  - IBM DB2 LUW
  - SAP MaxDB
  - SAP ASE
- HA inside VM's
  - RHEL KVM
  - Red Hat Virtualization
  - VMware ESX/ESXi

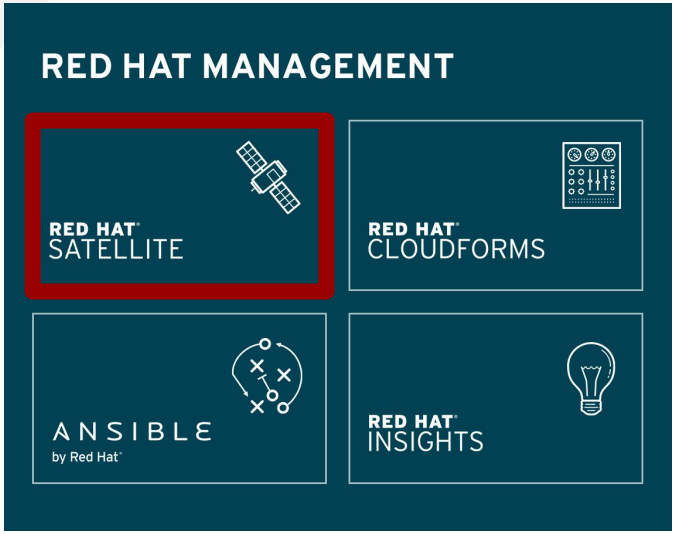


https://access.redhat.com/articles/3150081

Manageability

SAP Server management ... with automation

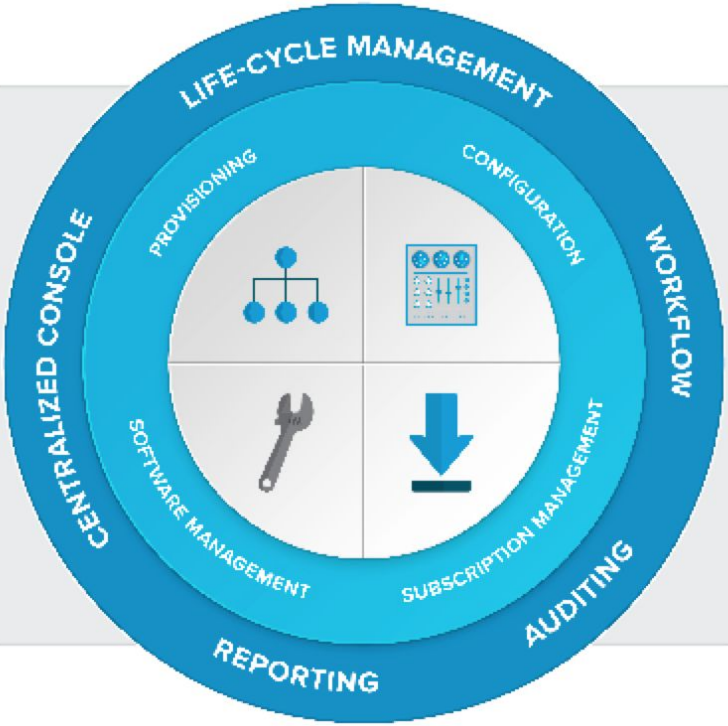
Satellite … the chassis frame



- Manage SAP System Lifecycle across Test/Dev, QA and Prod from a single UI
- Granular, consistent patching of dozens of systems with a single click
- Included in RHEL for SAP Solutions

NOW INCLUDED

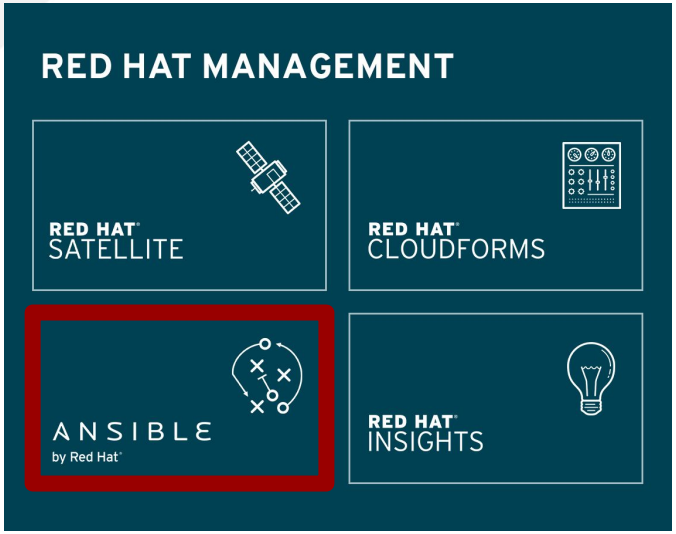
Smart Management



- Provides life-cycle management for Red Hat infrastructure
- Enables provisioning on bare metal, virtualized and cloud-based infrastructures
- Provides centralized configuration and drift management
- Simplifies management of content, including security errata
- Makes it easy to manage and track subscriptions

redhat.

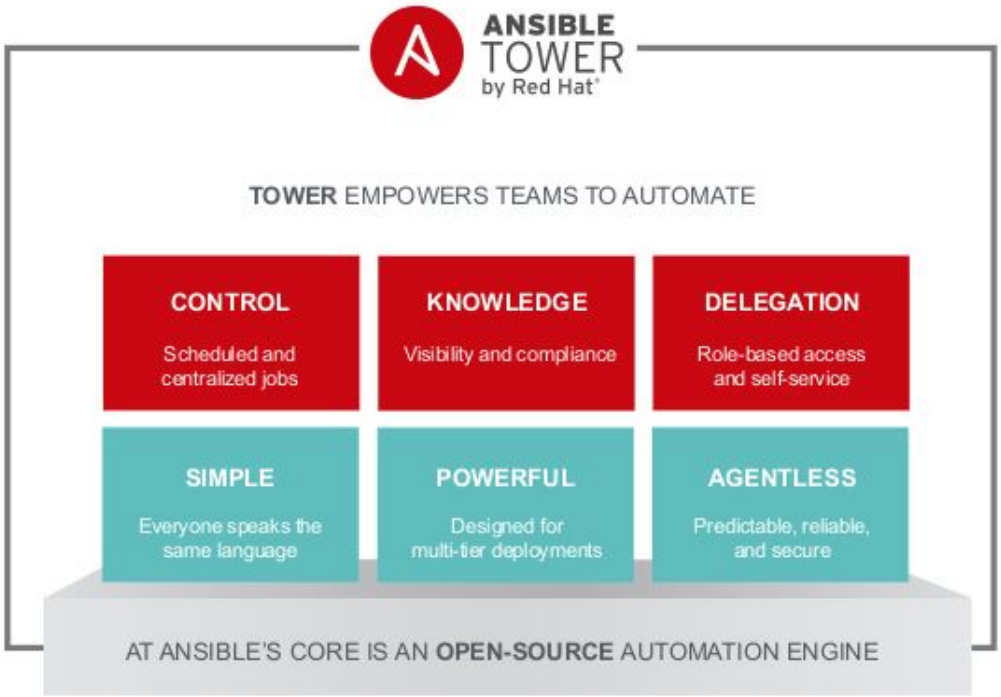
Ansible … the engine



- Automated system provisioning using configuration management
- Set up a SAP (HANA) instance including best practices and tuning within less than 15 min.
- Orchestration enables faster deployment of changes into the production landscape.
- CI/CD and SOE for SAP HANA Infrastructure enables regular security updates in production environment, identical staging / production environments, replace of manual DR strategies
- Bare-Metal-as-a-Service
- Ansible Playbooks: reduce implementation time e.g. for 6 node HANA scale-out environment from 7 to 3 days

https://access.redhat.com/articles/3050101
https://galaxy.ansible.com/mk-ansible-roles

Ansible - Powerful Automation Engine



SAP HANA standard installation process

HARDWARE > LINUX (OS) > SAP HANA > VALIDATION > MAINTENANCE

- On Site construction
- Installation & Configuration
- Installation & Configuration
- Validation & Customization
- Maintenance & Updates

Individually for each server and environment!

SAP HANA optimized installation process

- On Site construction
- Installation & Configuration
- Installation & Configuration
- Validation & Customization
- Maintenance & Updates

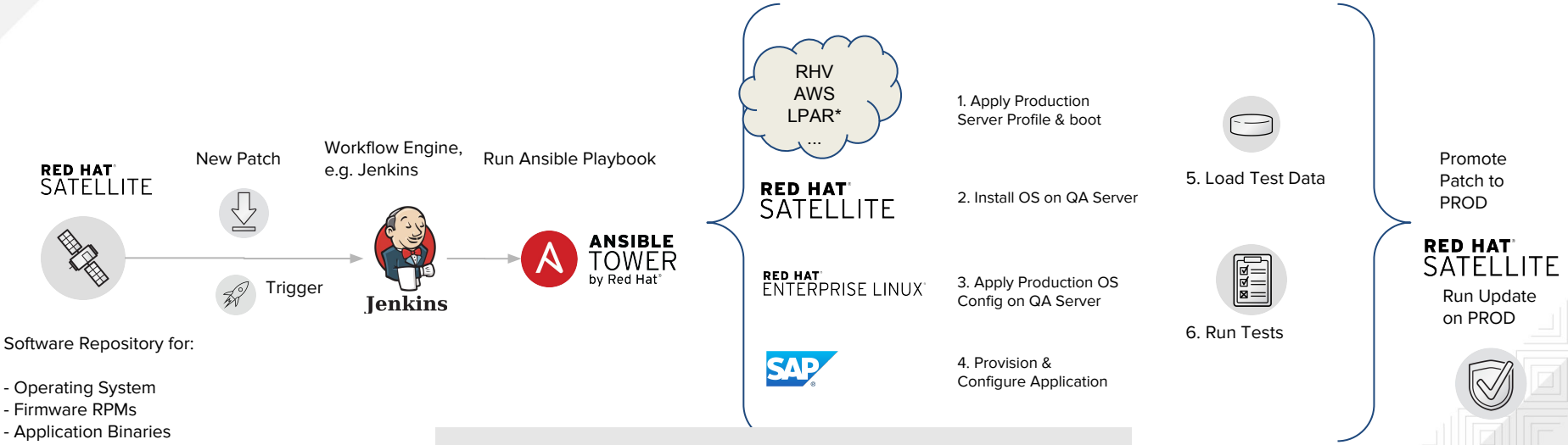
Automation for the whole environment

Ready to use ansible roles for automating your setups:

- https://access.redhat.com/articles/3050101
- https://galaxy.ansible.com/linux-system-roles
- https://galaxy.ansible.com/mk-ansible-role

Use Case: reduce risk of patching SAP landscapes

Automate your environment with Ansible



Software Repository for:

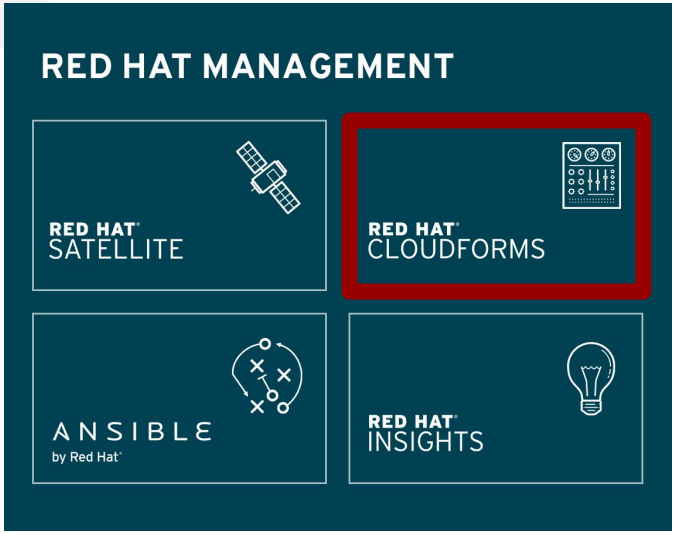
- Operating System
- Firmware RPMs
- Application Binaries

Ready to use ansible roles for automating your setups:

- https://access.redhat.com/articles/3050101
- https://galaxy.ansible.com/linux-system-roles
- https://galaxy.ansible.com/mk-ansible-role

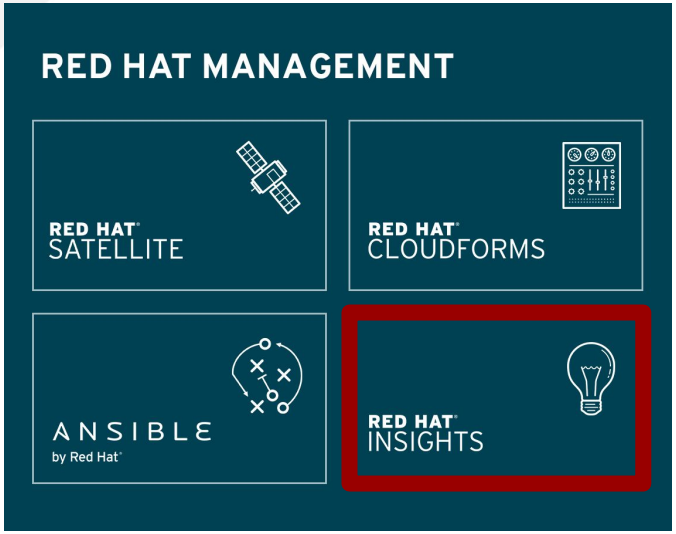
(*) https://www.ibm.com/developerworks/aix/library/au-aix-ibm-powervm/index.html

Cloudforms ... the dashboard



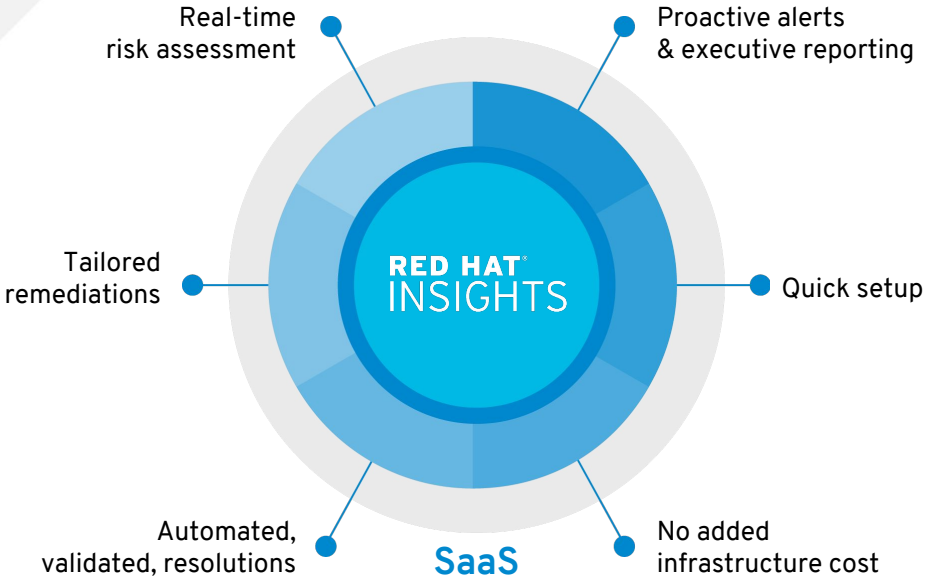
- Create a self-service catalog of standard SAP operations
- Automatically deploy workloads on-premise and in the cloud
- Seamless mgmt. of on-premise and cloud
- Migrate workload between on-premise / cloud
- DR scenarios from on-premise to Cloud
- Integrate with Billing solutions
- Resource Planning

Insights ... ground control



- In-depth analysis of the infrastructure enables proactive management
- Mitigate risk / ensure compliance (e.g. configuration drifts)
- Increase stability and performance
- Continuous identification of new risks driven by unique industry data

RED HAT® INSIGHTS



" As a global leader in healthcare information technology, security, and infrastructure intelligence are main priorities for us. Red Hat Insights enables us to be alerted to potential vulnerabilities across thousands of active systems and provide swift remediation."

The technology helps us prioritize risk resolution in our infrastructure.

— TIM ERDEL
Senior director,
Cerner Works Technology Improvement Center

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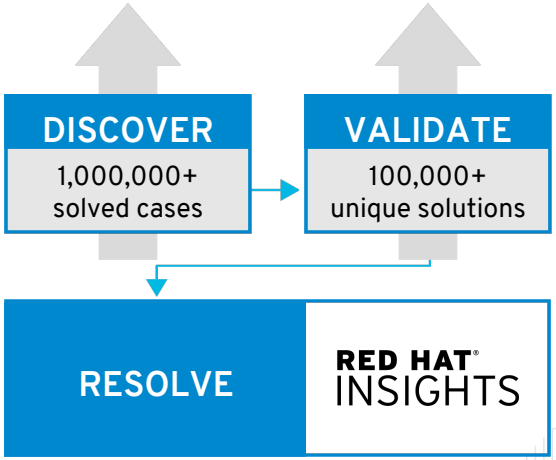
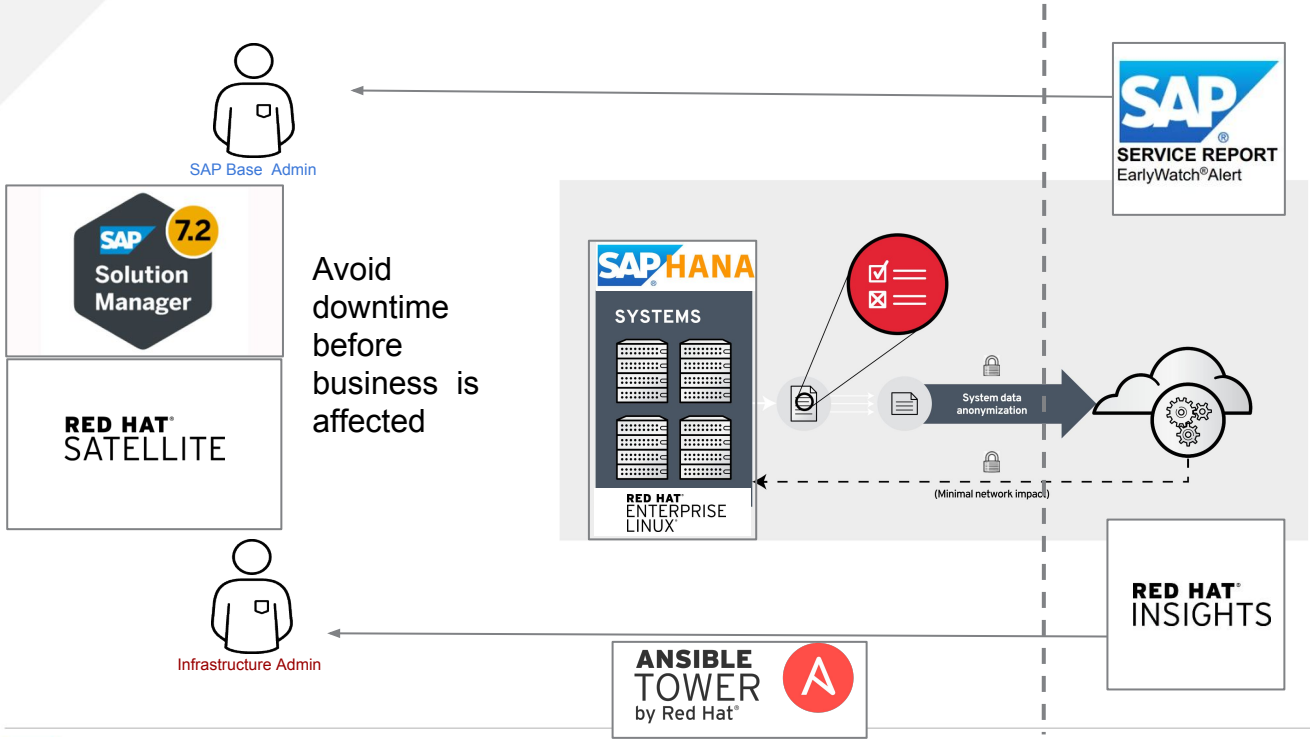
Red Hat Insights - SAP Rules

- Continuous identification of new risks driven by unique industry data
- Put SAP Applications on a firm foundation
  - OS compatibility with SAP workloads
  - SAP related tuned profiles
  - Optimal OS configurations



https://access.redhat.com/blogs/2184921/posts/2849871

Red Hat Insights: proactive resolution



SAP EARLY WATCH

- proactive application monitoring
- top down view
- ML in SAP datacenter

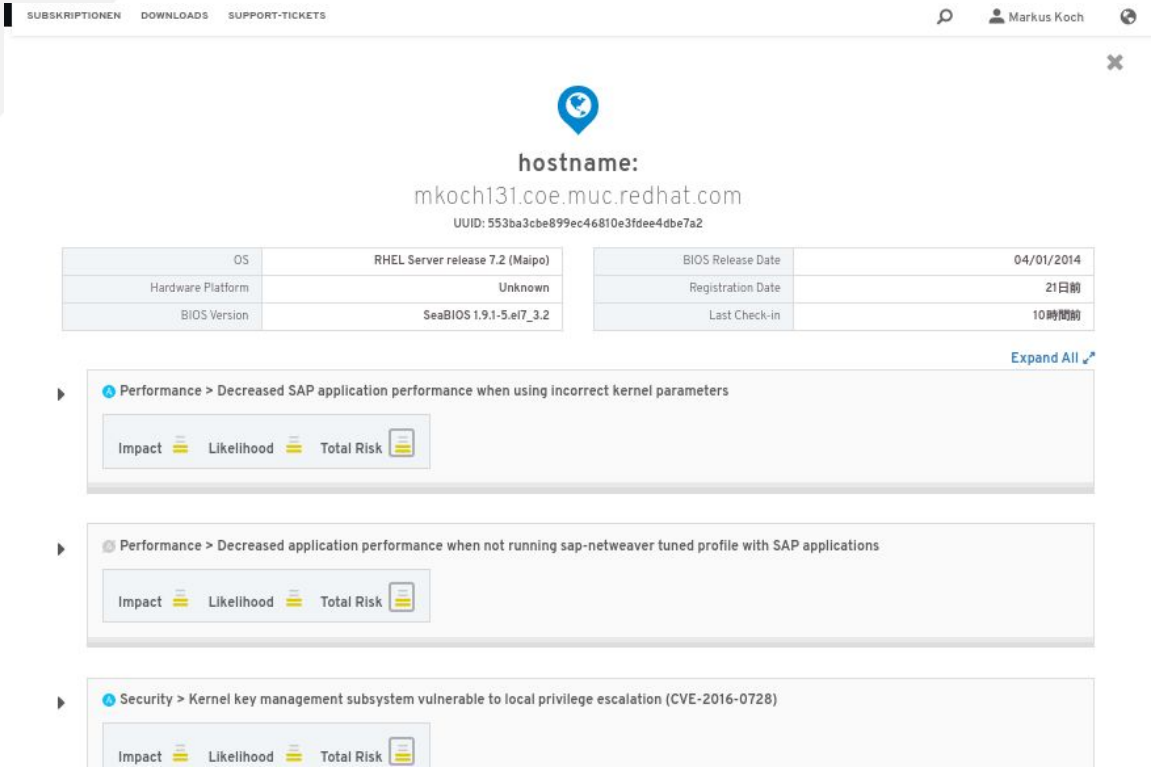
Red Hat Insights

- proactive infrastructure monitoring
- bottom up view
- ML in Red Hat datacenter

PUT YOUR SAP APPLICATIONS ON A FIRM FOUNDATION

Rule	Description	Reference
SAP application incompatibility with installed RHEL Version	SAP applications will encounter compatibility errors when not running on RHEL for SAP.	Overview of Red Hat Enterprise Linux for SAP Business Applications subscription
Decreased application performance when not running sap-netweaver tuned profile with SAP applications	Enable the sap-netweaver tuned profile to optimize hosts for SAP applications	Overview of Red Hat Enterprise Linux for SAP Business Applications subscription
Decreased SAP application performance when using incorrect kernel parameters	When SAP's kernel parameter recommendations are not followed, SAP applications will experience decreased performance.	Red Hat Enterprise Linux 6.x: Installation and Upgrade - SAP Note
Decreased SAP application performance when file handler limits do not meet SAP requirements	Current file handle limits do not meet the application requirements as defined by SAP. This results in decreased SAP application performance.	Red Hat Enterprise Linux 7.x: Installation and Upgrade - SAP Note
Time discrepancy in SAP applications when not running ntp on SAP servers	SAP strongly recommends running an ntp service on systems running SAP	Red Hat Enterprise Linux 7.x: Installation and Upgrade - SAP Note
Database inconsistencies when UUIDD not running with SAP applications	SAP applications require UUIDD to be installed and running in order to prevent UUIDs from being reused in the application. When UUIDD is not running, database inconsistencies can occur.	Linux UUID solutions - SAP Note

Red Hat Insights - SAP Rules

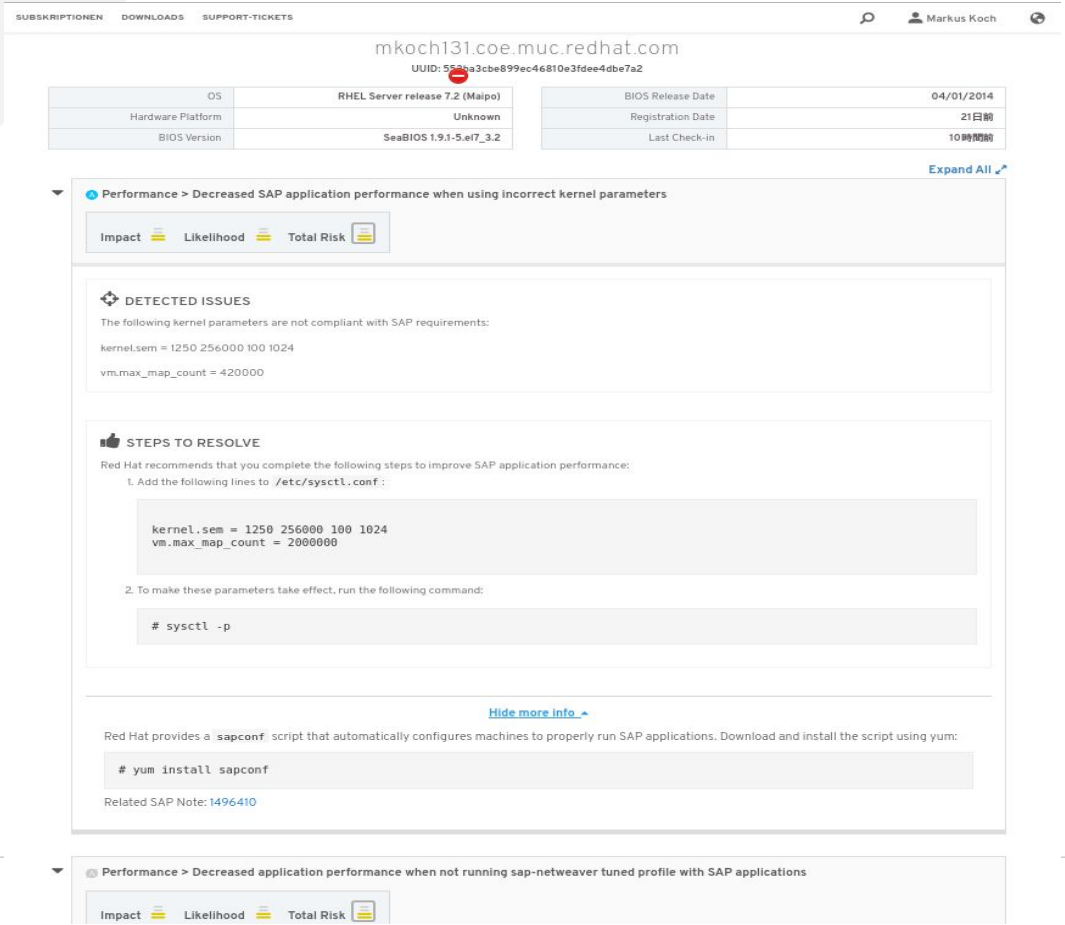


- early notifications of minimum releases of certain packages
- check of correct kernel parameters
- new findings in SAP development will automatically be messaged

Leads to higher stability, security and manageability of Red Hat based SAP landscapes

redhat.

Red Hat Insights - SAP Rules



- early notifications of minimum releases of certain packages
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Leads to higher stability, security and manageability of Red Hat based SAP landscapes

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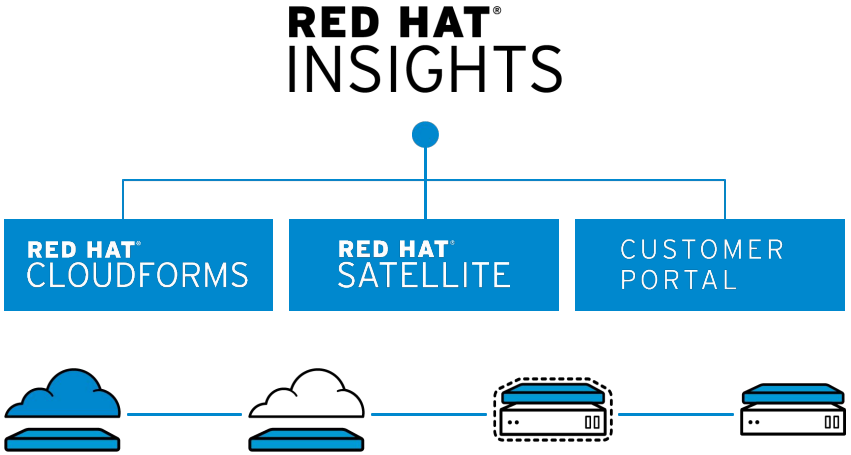
INTEGRATED INTO TOOLS YOU ALREADY USE



- Works on physical, virtual, cloud, and container-based workloads
- No new infrastructure to manage
- Integrated into Satellite 5.7, 6.1+, CloudForms 4.0+, and Red Hat Customer Portal
- API available for custom integration
- Ansible Tower integration enables playbooks generated in Red Hat Insights to be automatically imported into Ansible Tower

RED HAT® ENTERPRISE LINUX®
+ INSIGHTS DIFFERENTIATION

	RED HAT® INSIGHTS	CentOS	SUSE	ORACLE LINUX
Proactive analytics	✓			
Automated resolution	✓		✓	
Mature market	✓		✓	✓
Vendor supported	✓			✓
Integrated management	✓			✓

Red Hat Insights: proactive resolution

https://access.redhat.com/blogs/2184921/posts/2849871

- In-depth analysis of the SAP infrastructure enables proactive management
- Mitigate risk / ensure compliance (e.g. configuration drifts)
- Increase stability and performance
- Automate IT remediation of critical issues through Ansible Playbooks
- also on RHEL instances deployed on AWS or Azure

New price model - easy to consume

SKU	Red Hat Enterprise Linux For SAP Solutions on X86	
RH00763	RHEL for SAP Solutions, Premium	1 physical entitlement for a Server (2-sockets) OR 2 Virtual Instances
RH00764	RHEL or SAP Solutions, Standard	1 physical entitlement for a Server (2-sockets) OR 2 Virtual Instances
RH00767	RHEL for Virtual Datacenters for SAP Solutions, Premium	Unlimited Virtual Guests on a Server (2-sockets)
RH00768	RHEL for Virtual Datacenters for SAP Solutions, Standard	Unlimited Virtual Guests on a Server (2-sockets)

Save up some 20% with RHEL for SAP solutions

Example: 2 Nodes Production, 2 Nodes Pre-Production, 1 Node Testing (each node 2 sockets)

- **SLES:**
  5 * SLES for SAP -> 5 * 2.240 EUR = **11.200 EUR**
  (Suse offers only premium support for SAP subscriptions)

- **RHEL:**
  2 * RHEL for SAP Solutions premium -> 2 * 1.965 EUR = 3.930 EUR
  3 * RHEL for SAP Solutions standard -> 3 * 1.648 EUR = 4.944 EUR
  TOTAL = **8.874 EUR -> 21% cheaper than SLES**

How SAP and Red Hat deliver better business outcomes

Your next project

1. Making HANA the digital core

2. Managing hybrid IT.
Your choice of where to deploy.

3. Gaining insights from a universe of connected devices

4. Unleashing the value of your enterprise data

Business Outcomes

- **Fastest Time to Value:**
  - Speed-up deployments
  - Achieve your SLAs: avoid errors and down-time, reduce TCO
  - Increase flexibility: provide hybrid cloud and self-service
- **Unleash the value in enterprise data:**
  - Integration between SAP and non-SAP solutions and sources: *make HANA the digital core*
  - Integrate your non-SAP data with SAP DataHub
- **Accelerate Innovation:**
  - Deliver faster with containers and micro services, streamline development, including extensions of SAP
  - faster access to infrastructure resources: hybrid cloud and self-service functionalities

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Resources

- Overview of Documentation for SAP Netweaver, Hana and DataHub:
  - https://access.redhat.com/articles/3494151
- Success stories: Mohawk Industries, Peavey, Molecular Health
- SAP webinars & events: https://www.redhat.com/en/events?search=sap
- Questions: SAP@RedHat.com

How to Subscribe

- Repos of software child channels
  - rhel-server-7
  - rhel-server-7-sap
  - rhel-server-7-sap-hana
  - rhel-server-7-ha
- Repos of Update Services for SAP Solutions
  - rhel-server-7-e4s
  - rhel-server-7-sap-e4s
  - rhel-server-7-sap-hana-e4s
  - rhel-server-7-ha-e4s

Certified Configurations

- Latest Supported OS Matrix:
  - SAP Note 2235581 - SAP HANA: Supported Operating Systems

- Supported Hardware:
  - Certified and Supported SAP HANA Hardware
    - Appliance vs. TDI
    - TDI “entry level” vs High End

Support Resources

Single-Host Mode Installation Guide

- SAP Note 2009879 - SAP HANA Guidelines for Red Hat Enterprise Linux (RHEL) Operating System

Multiple-Host Mode Installation Guide

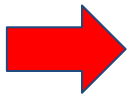
- SAP HANA Server Installation and Update Guide

Storage Requirements

- SAP HANA TDI - Storage Requirements

Other documentation (SAP HANA Technical Operations Guide, SAP HANA Admin Guide, etc.)

- SAP HANA Platform (Core) – SAP Help Portal Page

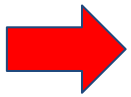


Read the documentation before starting a SAP HANA deployment. The documentation contains information pertaining to supportability. The installation guides are updated frequently, so it is a good idea to check for the latest version before starting a HANA installation.

Support Resources

SAP Notes

- SAP Note 2235581 - SAP HANA: Supported Operating Systems
- SAP Note 2009879 - SAP HANA Guidelines for RedHat Enterprise Linux (RHEL) Operating System
- SAP Note 2292690 - SAP HANA DB: Recommended OS settings for RHEL 7
- SAP Note 2247020 - SAP HANA DB: Recommended OS settings for RHEL 6.7
- SAP Note 2136965 - SAP HANA DB: Recommended OS settings for RHEL 6.6
- SAP Note 2013638 - SAP HANA DB: Recommended OS settings for RHEL 6.5
- SAP Note 2001528 - Linux: SAP HANA Database SPS 08 revision 80 (or higher) on RHEL 6 or SLES 11
- SAP Note 2228351 - Linux: SAP HANA Database SPS 11 revision 110 (or higher) on RHEL 6 or SLES 11
- SAP Note 1943937 - Hardware Configuration Check Tool - Central Note (contains the user guide for HWCCT)



The SAP Notes contain important information regarding configuration, upgrading, and supportability. These documents are updated frequently, so check for the latest version before a HANA installation, as well.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THANK YOU