



RED HAT SOLUTIONS FOR SAP

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Red Hat, Inc.

AGENDA

- Why Red Hat
- RHEL for SAP Solutions
- Contents/Solutions
- Advanced Possibilities with RedHat
- Resources

Why Red Hat?

Facts (Corporate Viability):

- 90% of the Fortune 500 trust Red Hat
- 70% Paid Linux market share
- > 2B\$ revenue
- Development Powerhouse
#1 Openstack, #2 Linux contributor

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

Completeness of the portfolio:

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

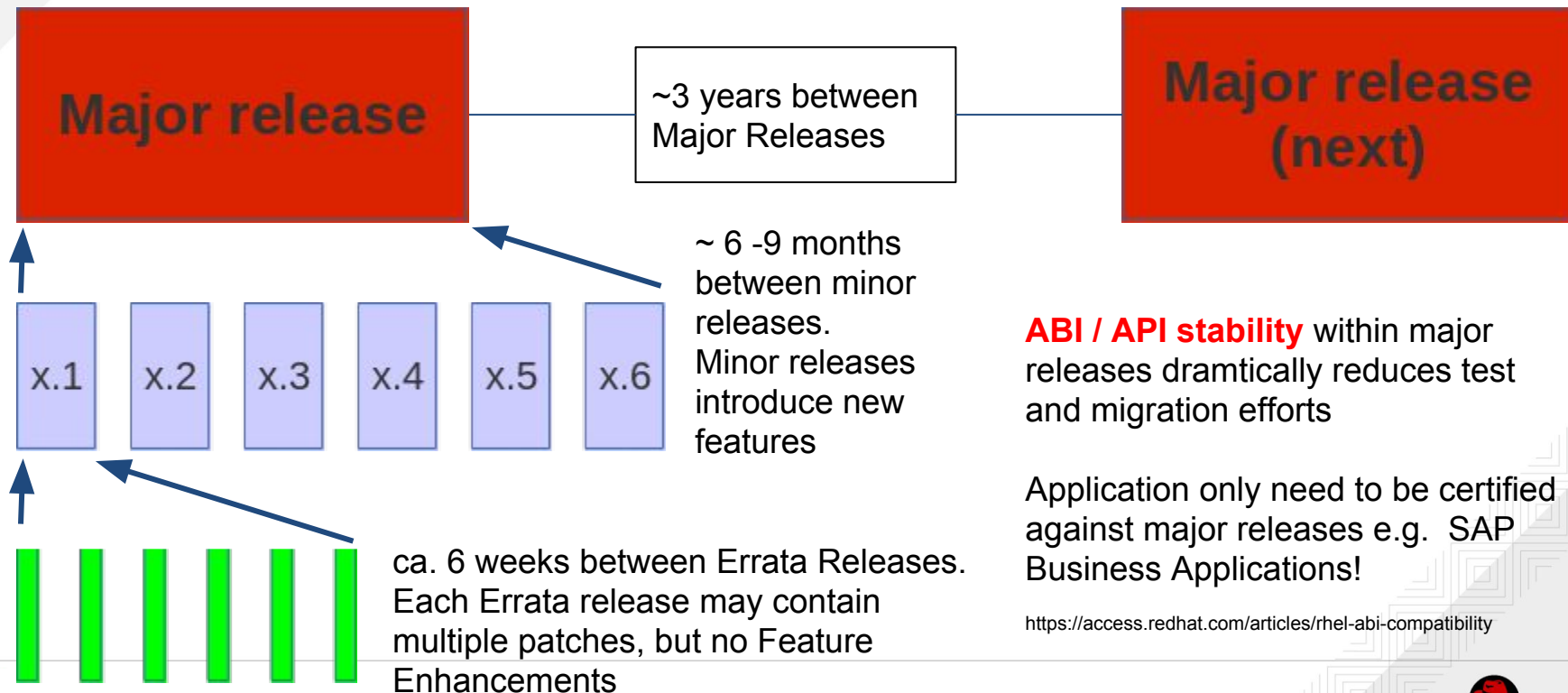
Upstream Development Model



- 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

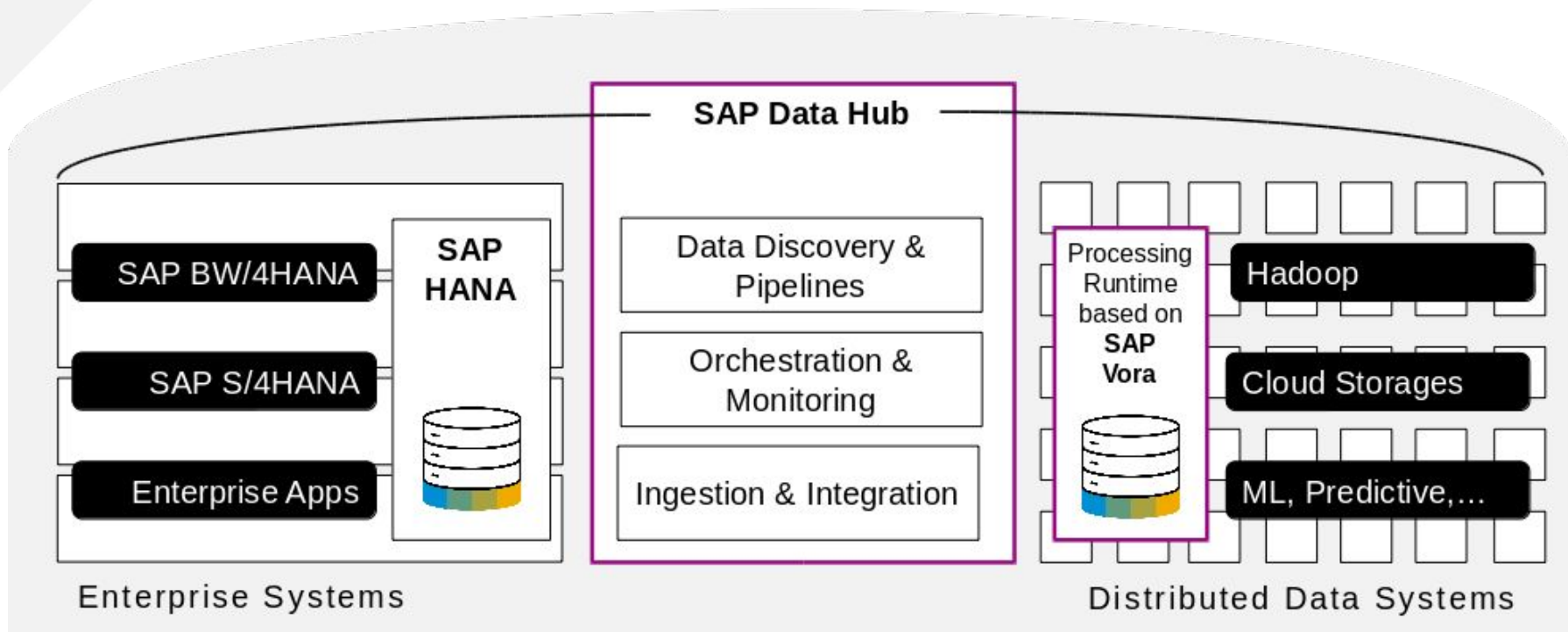
RHEL Release types: Major, Minor and Errata





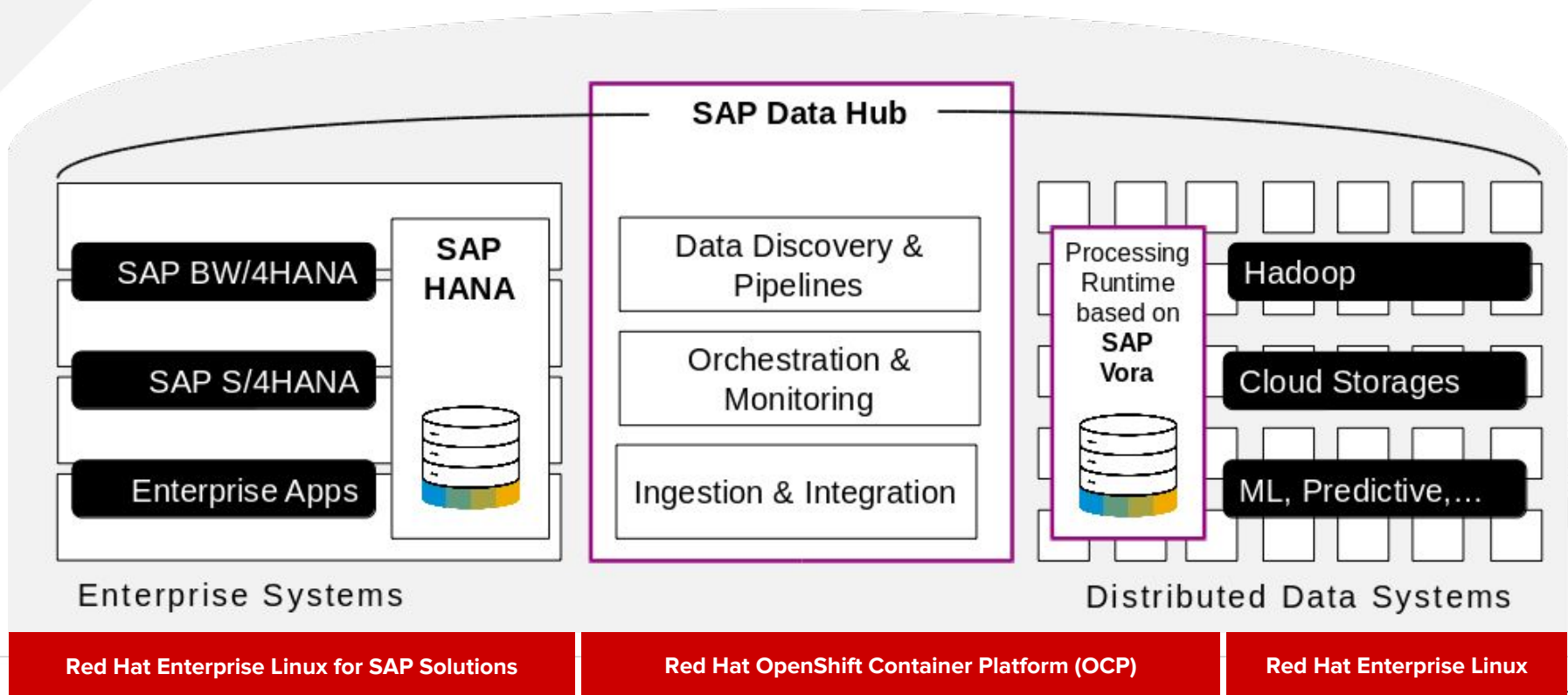
SAP Data Hub

Unifying Data Silos

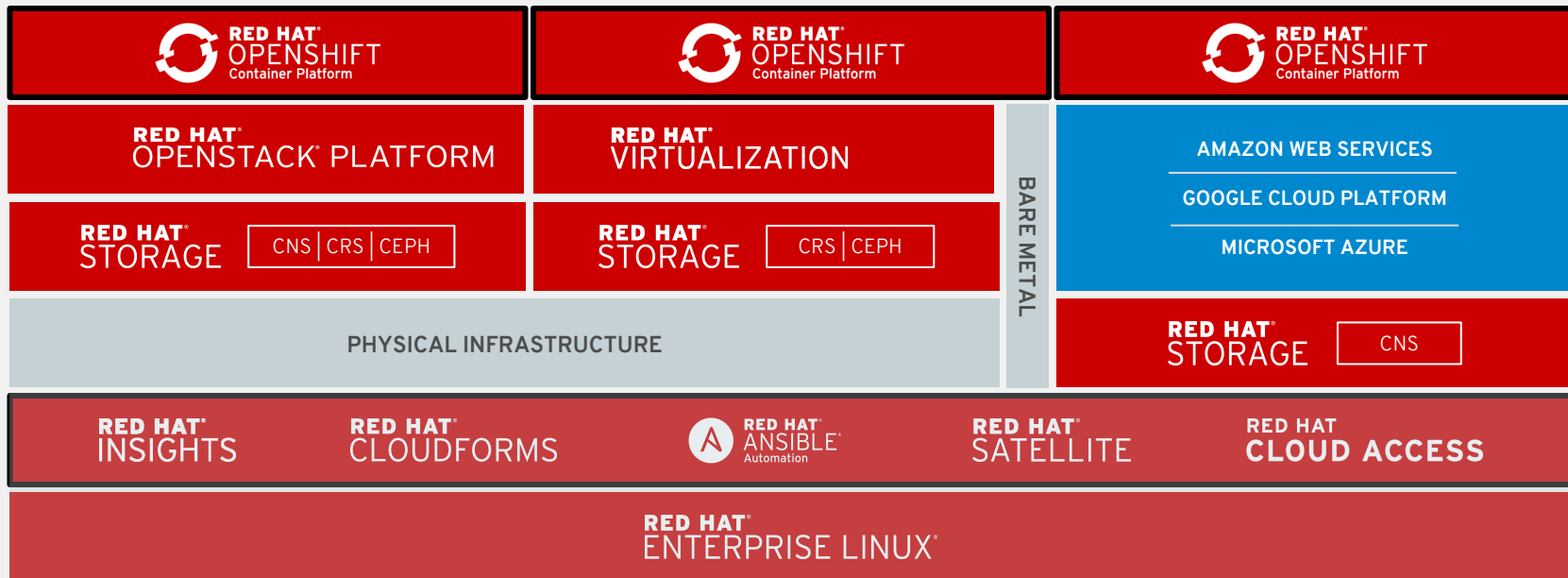


SAP Data Hub

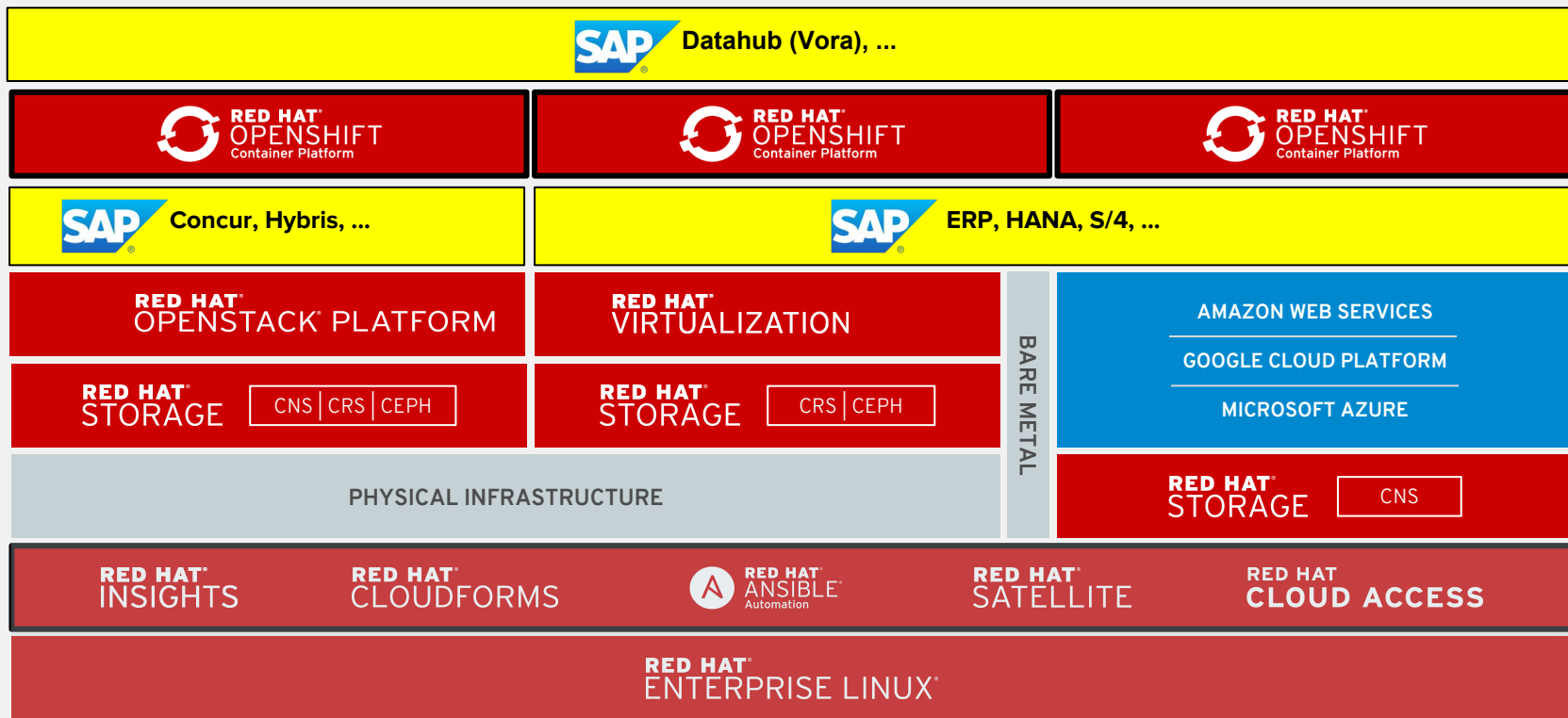
Unifying Data Silos



RED HAT MULTICLOUD ARCHITECTURE



RED HAT MULTICLOUD ARCHITECTURE



Collaborative Support



Integrated ticketing system—Customer has single support interface

Customer

- Customer identifies issue
- Customer opens ticket with SAP

SAP

- SAP responds to customer issue
- Ticket routed to SAP Linux Lab
- Joint troubleshooting with Red Hat and IBM on-site engineers

Red Hat and IBM

- Red Hat SAP technical account managers
- Red Hat Global support services engaged via SAP global backbone
- Specialty Based Routing (SBR) model ensures SMEs work the issue
- Collaborates with SAP, IBM, and customer
- Escalates bugs to engineering



The Basics

RHEL for SAP Solutions

Red Hat Enterprise Linux for SAP Solutions

- **Content:**

- Easier to consume: RHEL for SAP Apps & RHEL for HANA bundled together
- High Availability Add-On: uses pacemaker & offers a standards-based approach, ensuring the availability of SAP HANA and Application Servers
- Smart Management Add-On: provision, patch, configure, and fully control RHEL systems with Red Hat Satellite (included)
- Update Services for SAP Solutions: extending the lifecycle of minor releases to 4 years to give longer system stability and ease of operation
- Red Hat Insights: helps to optimize availability and performance of the SAP environment using predictive analytics
- **NEW:** kpatch available for RHEL 7.4 E4S and RHEL 7.5

- Available as L1-L3 SKUs and L3 SKUs from Cisco

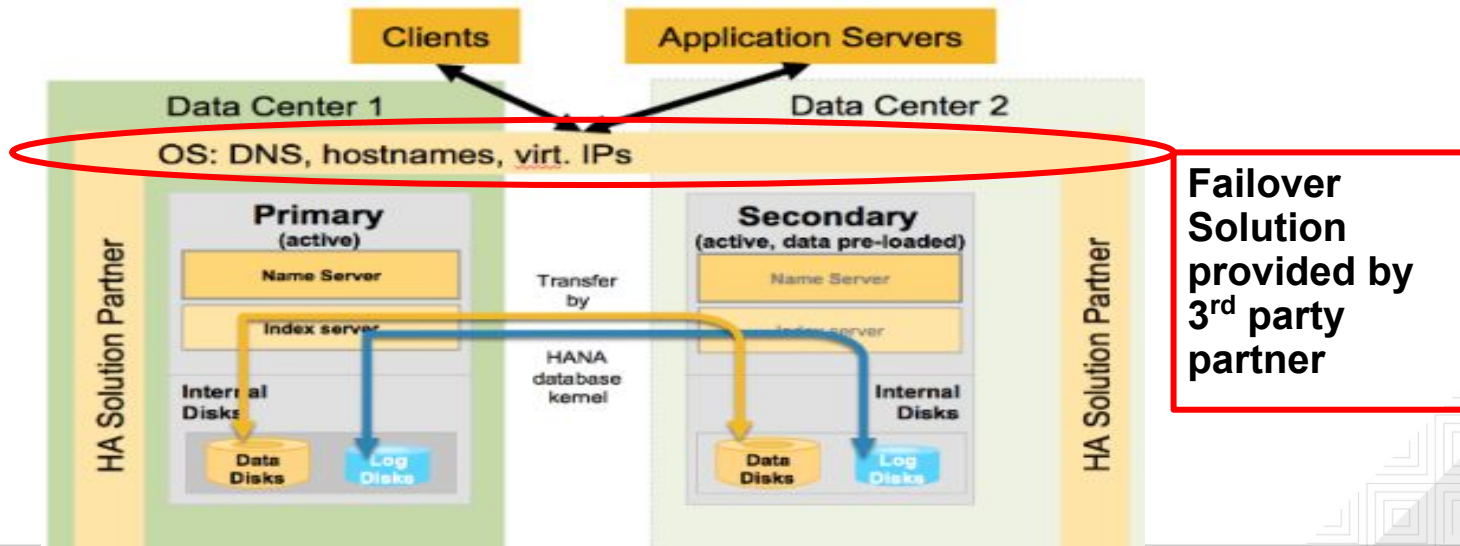
<https://www.redhat.com/de/resources/red-hat-enterprise-linux-sap-solutions-technology-overview>

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 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 Oct. 2017)

Currently the following scenarios and parameters are supported:

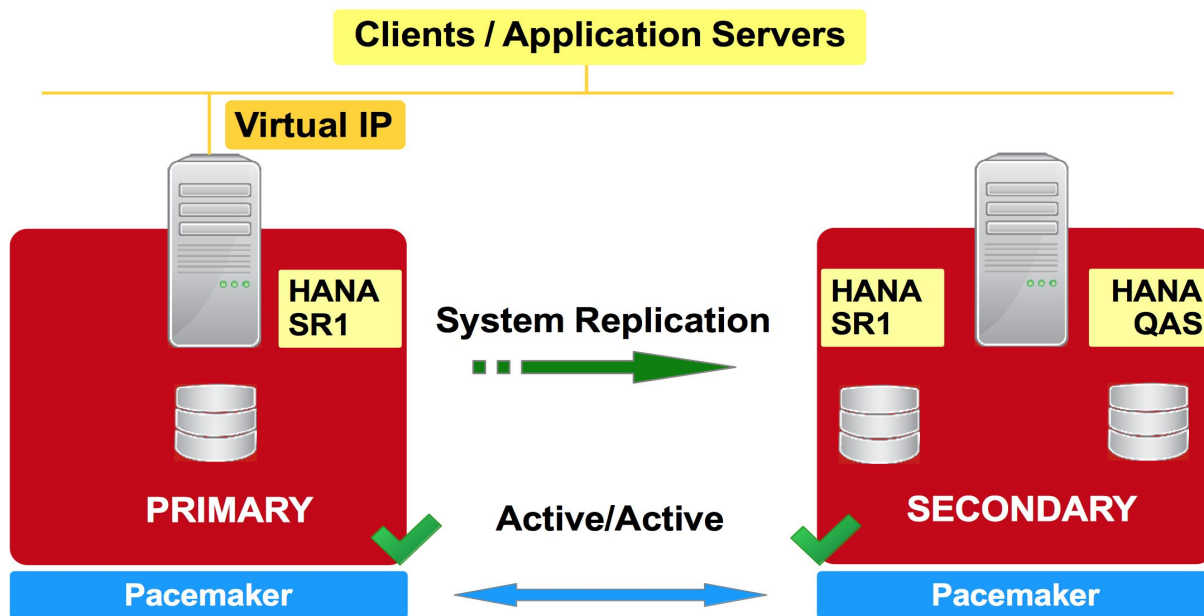
- Two-node clusters only
- SAP HANA Scale-Up (single-box to single-box) System Replication only
- Support HANA 1.0 and HANA 2.0 *
- Support "Multiple Components One Database" (MCOD) and "Multiple Database Containers" (MDC) *
- "Multiple Components One System" (MCOS) is only supported if all databases running on the hosts are replicated and the replication is always to the same secondary node *
- Currently only support x86_64. Power LE (ppc64le) support will be available in RHEL 7.4

* : Please check minimum version required on <https://access.redhat.com/articles/3004101>

Automated SAP HANA System Replication

Supported Configuration - continued

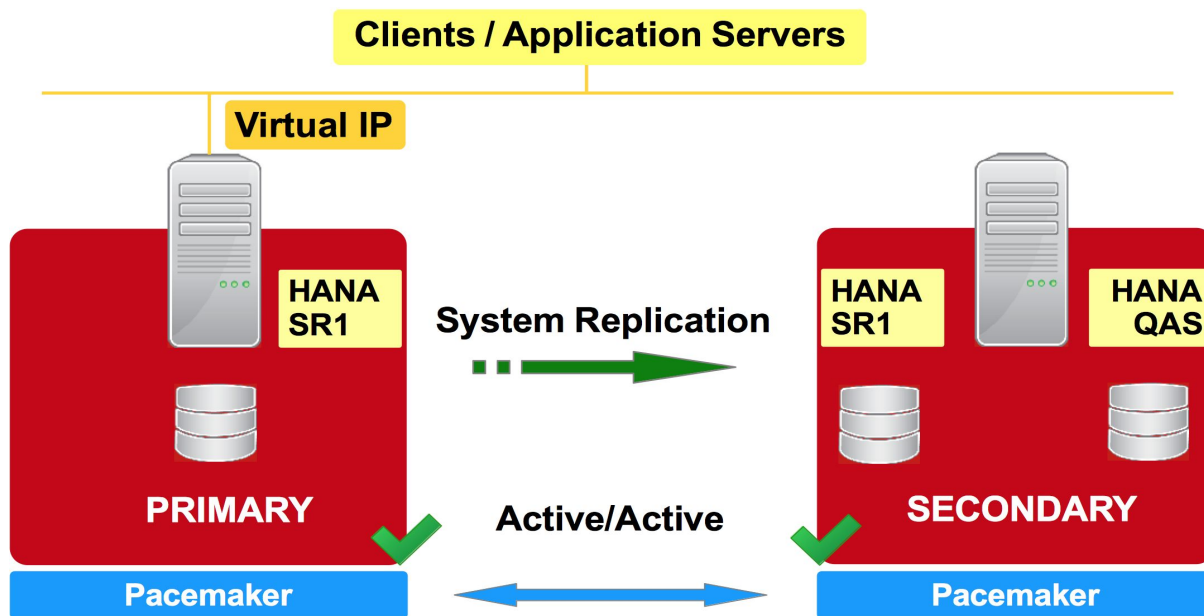
- Active-Active Read-Enabled: in HANA 2.0, the secondary instance can take Read-Only inquiries
- Support a second virtual IP on the secondary node



Automated SAP HANA System Replication

Supported Configuration - continued

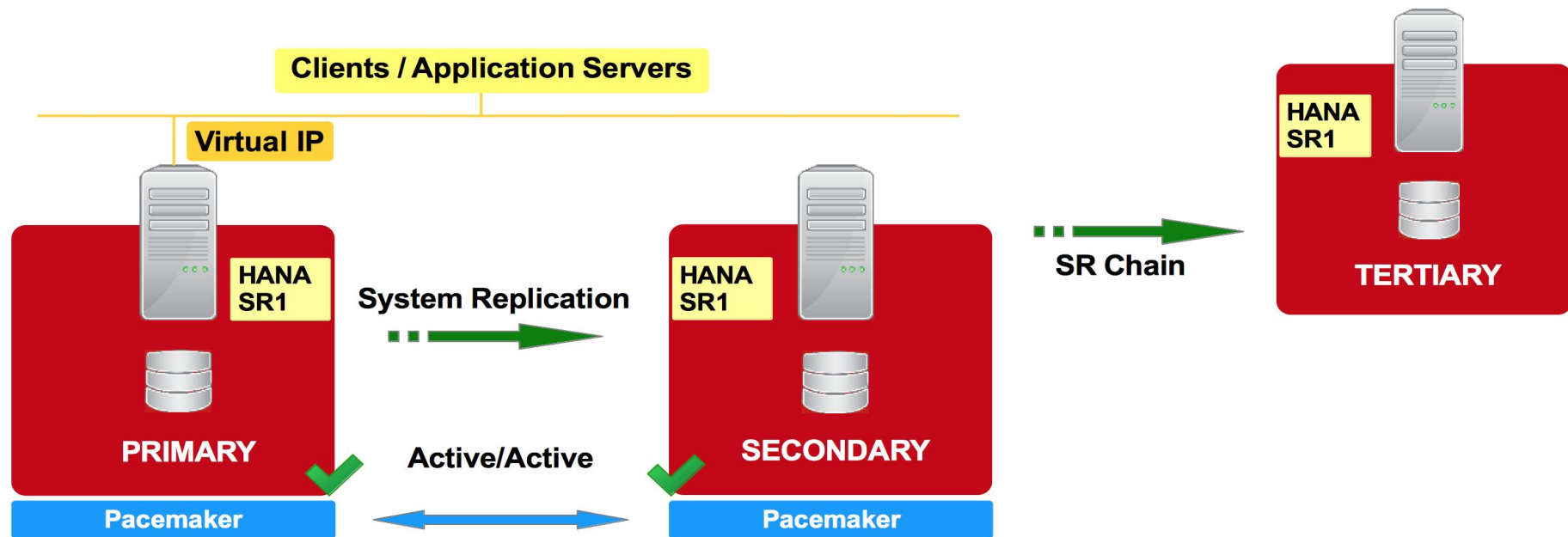
- Support a QA/Test instance running on the secondary node (Cost-Optimized)
- QA/Test instance will be shutdown first during failover



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>

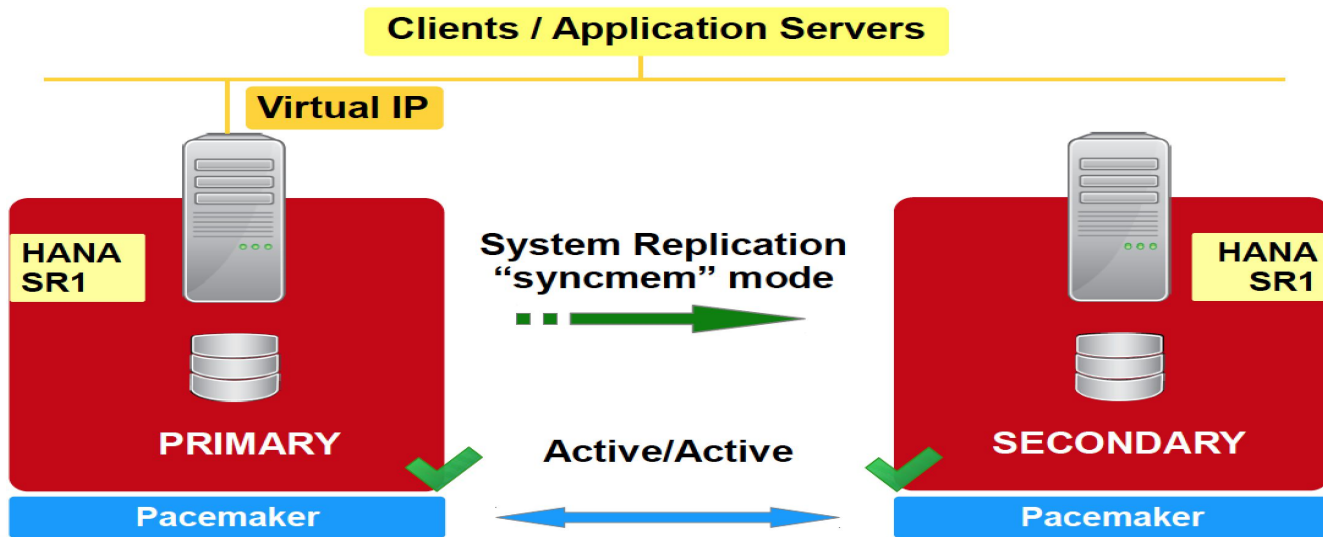
Automated SAP HANA System Replication

Resource Agents

- SAP HANA
 - Manages pre-configured SAP HANA System Replication environment
- SAP HANA Topology
 - Gathers information about the current status of SAP HANA System Replication
- Both are bundled in resource-agents-sap-hana rpm
- Configuration Guide
 - <https://access.redhat.com/articles/3004101>

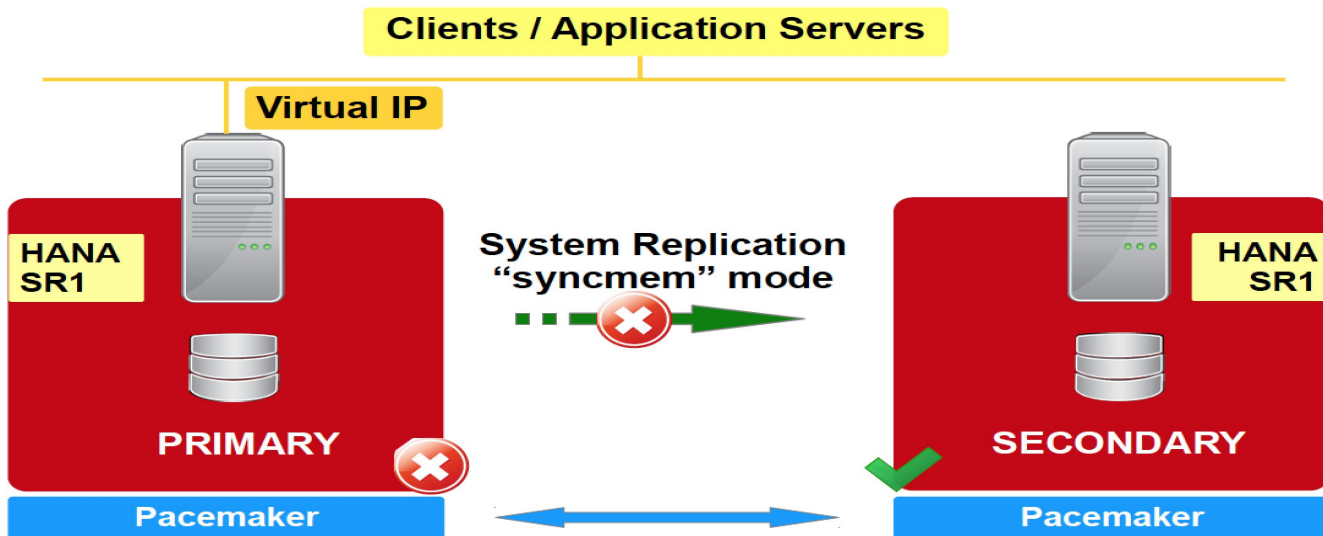
Failover Scenario – System Replication on Pacemaker

- System Replication modes: sync, [syncmem], async
- PREFER_SITE_TAKEOVER = True
- AUTOMATED_REGISTER = False
- No shared storage



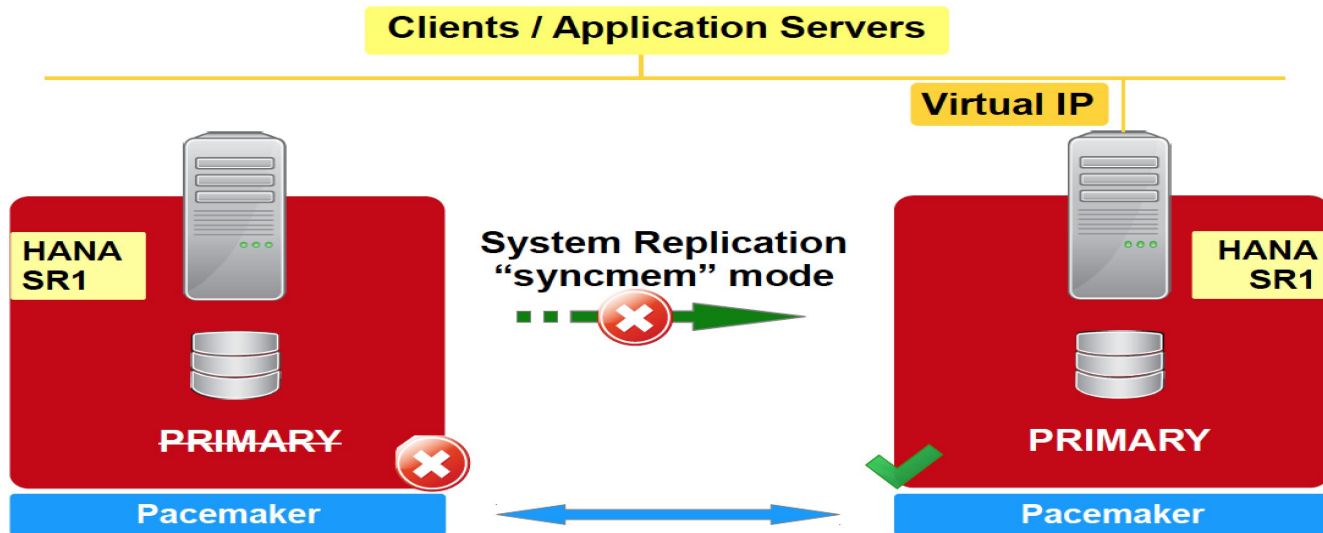
Failover Scenario – Primary Node Down

- Primary node down
- System Replication interrupted
- Pacemaker cluster fence the primary node



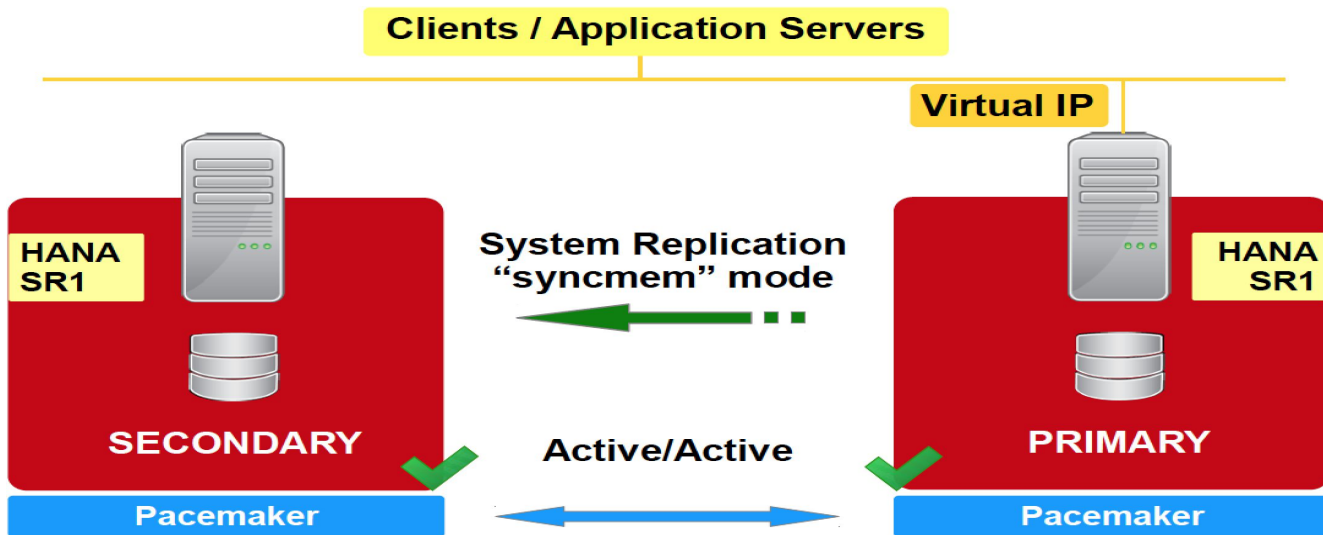
Failover Scenario – Secondary Node Take-Over

- Secondary becomes the new Primary
- Virtual IP binds to the new Primary node
- Previous Primary remains Primary, because “AUTOMATED_REGISTER = False”, and Administrator must decide if the setup failback or register the old Primary as the new secondary before HANA System Replication can start again



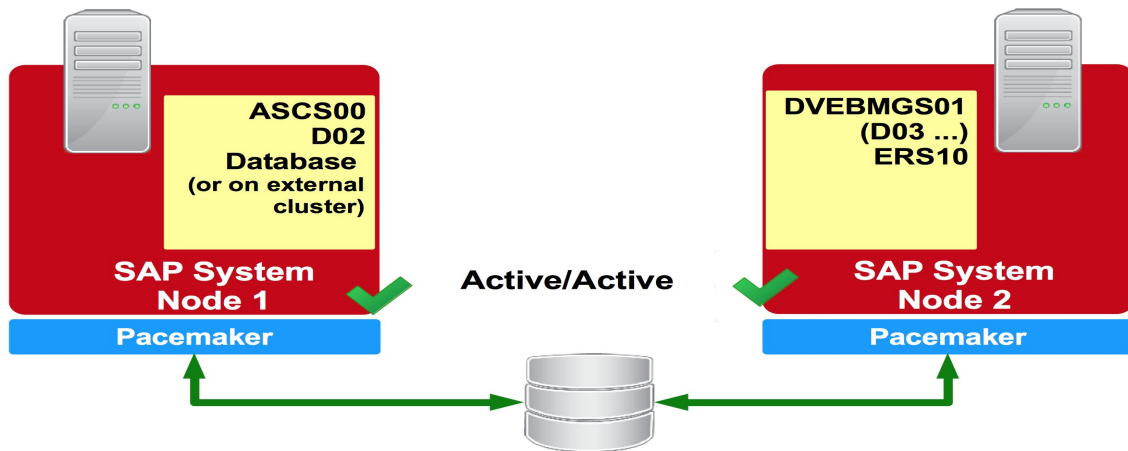
Failover Scenario – What if “AUTOMATED_REGISTER = True”

- Wait for “DUPLICATE_PRIMARY_TIMEOUT” timeout
- Former Primary registers as the new Secondary
- System Replication starts, in the opposite direction



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



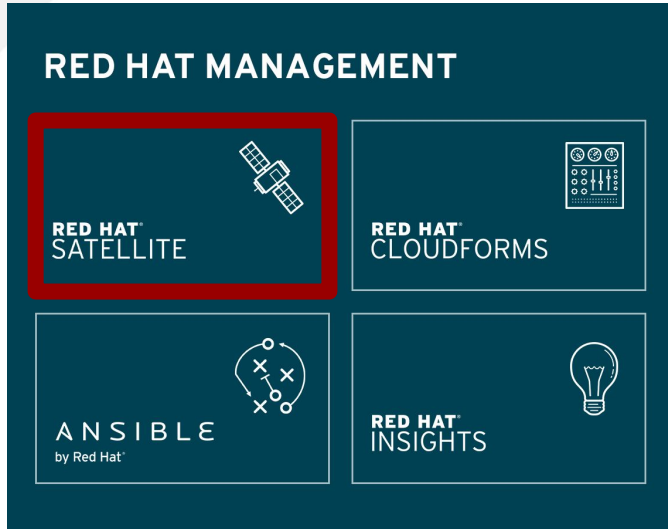
<https://access.redhat.com/articles/3150081>

Manageability

SAP Server management ... with automation

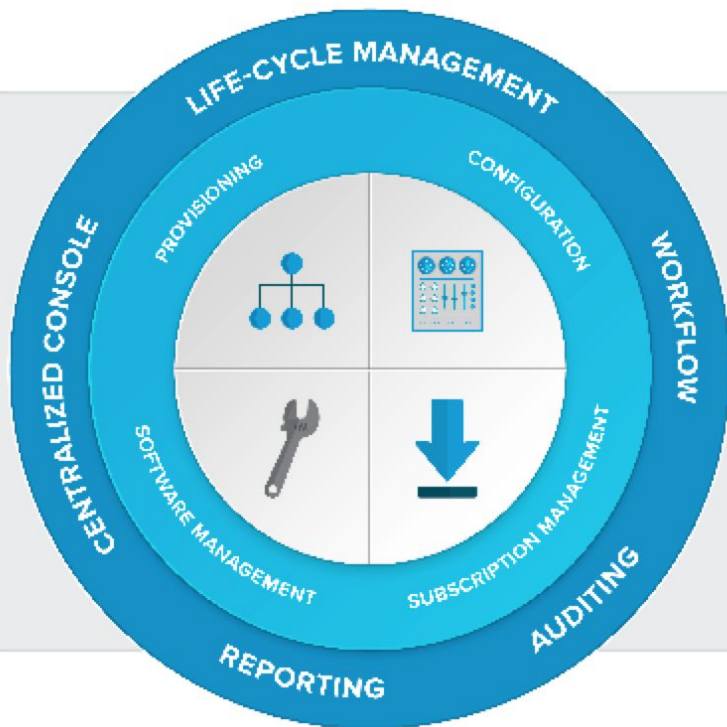


Satellite ... the chassis frame



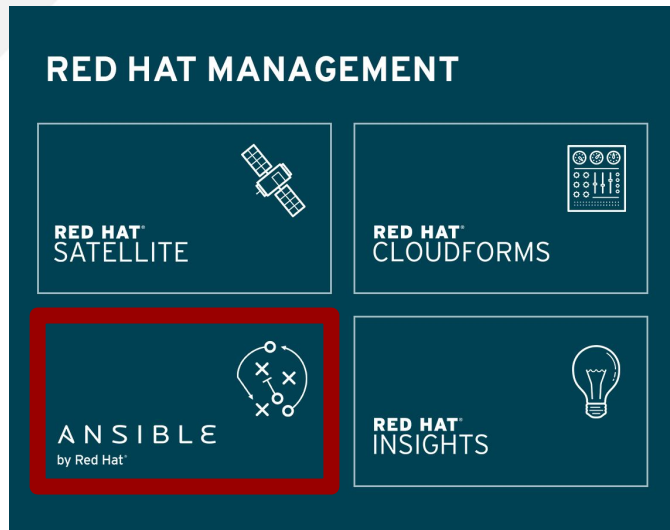
- Manage SAP System Lifecycle across Test/Dev, QA and Prod from a single UI
- Granular, consistent patching of dozens of systems with a single click

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

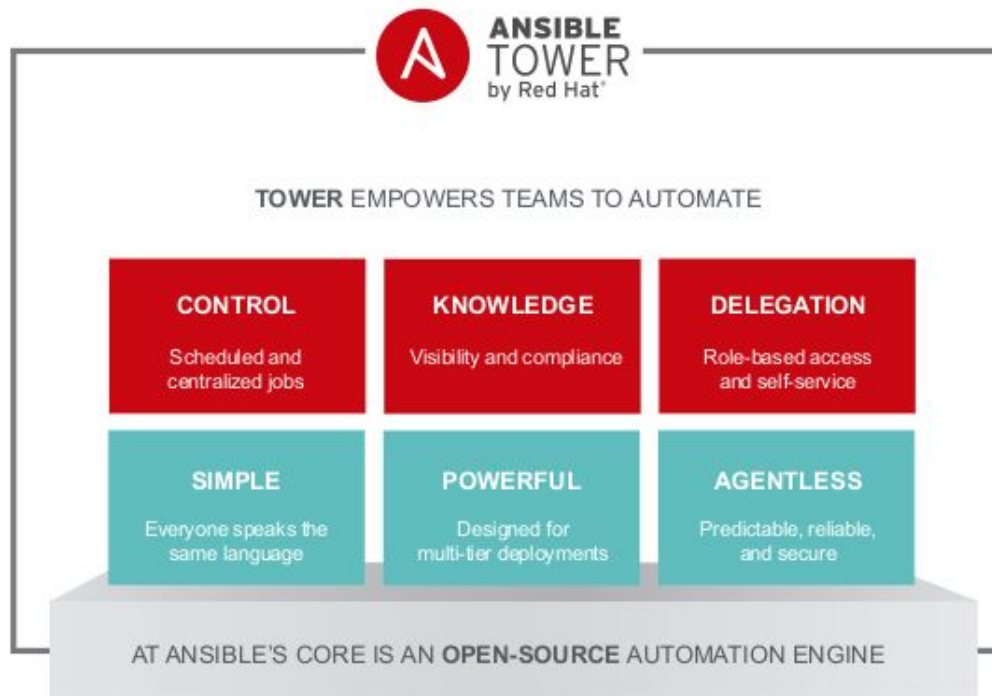
Ansible ... the engine



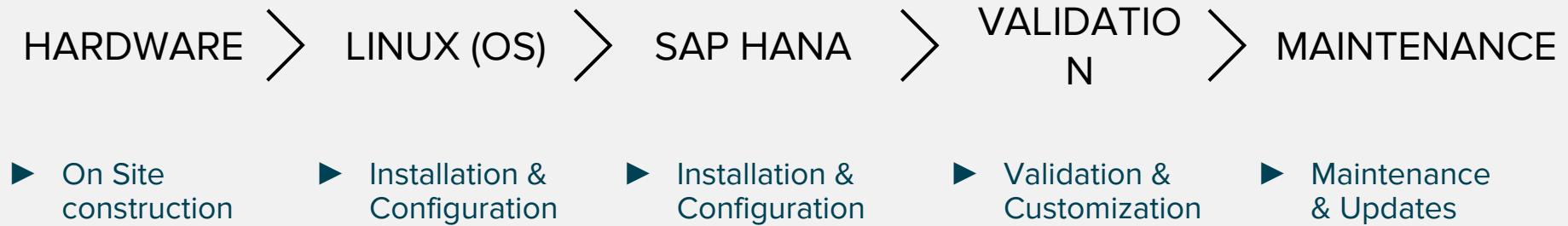
- Automated system provisioning using configuration management
- Set up a SAP (HANA) instance including best practices and tuning within less than 15 min.
- Orchestration enables faster deployment of changes into the production landscape.
- CI/CD and SOE for SAP HANA Infrastructure enables regular security 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://github.com/rhmk/ansible-hana-sysprep>

Ansible - Powerful Automation Engine

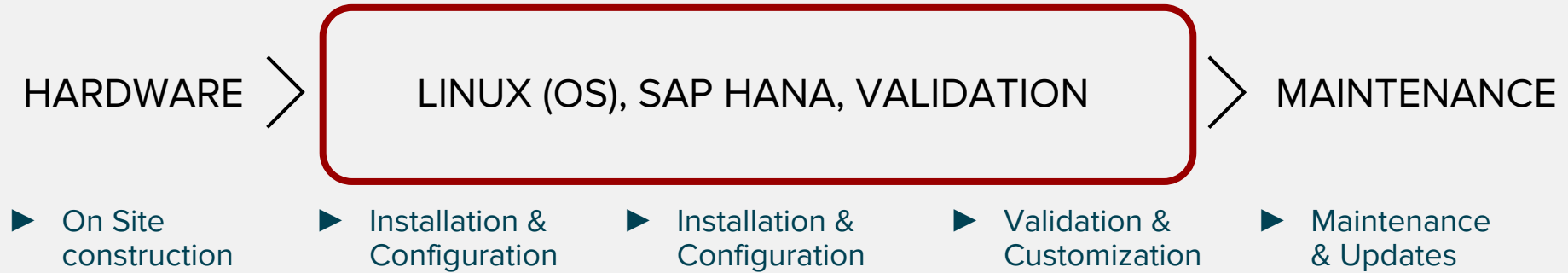


SAP HANA standard installation process



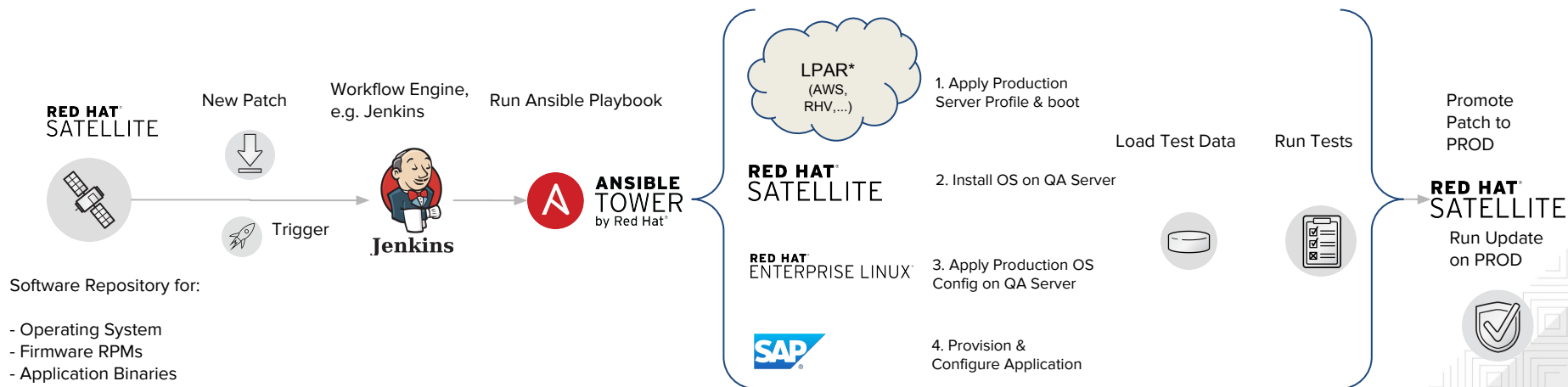
Individually for each server and environment!

SAP HANA **optimized** installation process

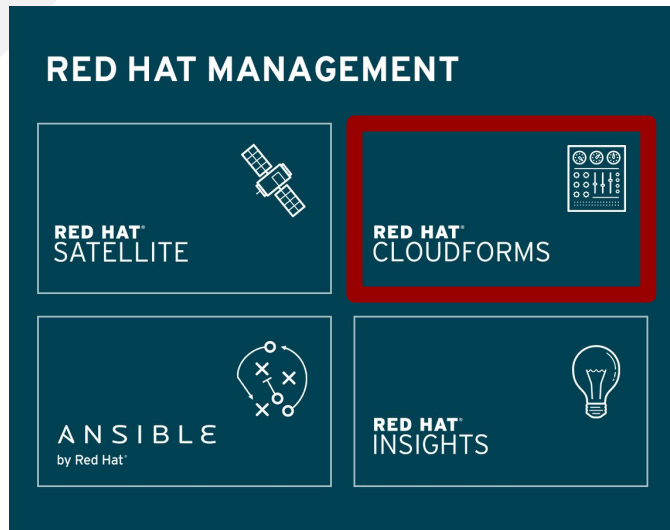


Automation for the whole environment

Use Case: reduce risk of patching SAP landscapes

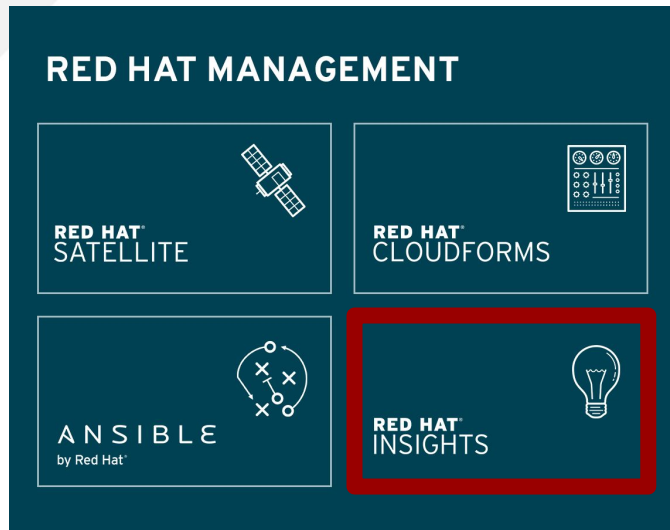


Cloudforms ... the dashboard



- 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 SAP 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

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

Red Hat Insights - SAP Rules

SUBSKRIPTIONEN DOWNLOADS SUPPORT-TICKETS

Markus Koch

hostname:
mkoch131.coe.muc.redhat.com
UUID: 553ba3cbe899ec46810e3fdee4dbe7a2

OS	RHEL Server release 7.2 (Maipo)	BIOS Release Date	04/01/2014
Hardware Platform	Unknown	Registration Date	21日前
BIOS Version	SeaBIOS 1.9.1-5.el7_3.2	Last Check-in	10時間前

Expand All

▶ Performance > Decreased SAP application performance when using incorrect kernel parameters

Impact Likelihood Total Risk

▶ Performance > Decreased application performance when not running sap-netweaver tuned profile with SAP applications

Impact Likelihood Total Risk

▶ Security > Kernel key management subsystem vulnerable to local privilege escalation (CVE-2016-0728)

Impact Likelihood Total Risk

- 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 managabilty of Red Hat based SAP landscapes

Red Hat Insights - SAP Rules

SUBSCRIPTIONS DOWNLOADS SUPPORT TICKETS

mkoch131.coe.muc.redhat.com

UUID: 55bba3cbe899ec46810e3fdee4d8e7a2

OS	RHEL Server release 7.2 (Maipo)	BIOS Release Date	04/01/2014
Hardware Platform	Unknown	Registration Date	21 日前
BIOS Version	SeaBIOS 1.9.1-5.el7_3.2	Last Check-in	10 時間前

Expand All

Performance > Decreased SAP application performance when using incorrect kernel parameters

Impact Likelihood Total Risk

DETECTED ISSUES

The following kernel parameters are not compliant with SAP requirements:

```
kernel.sem = 1250 256000 100 1024
vm.max_map_count = 420000
```

STEPS TO RESOLVE

Red Hat recommends that you complete the following steps to improve SAP application performance:

1. Add the following lines to `/etc/sysctl.conf`:

```
kernel.sem = 1250 256000 100 1024
vm.max_map_count = 2000000
```

2. To make these parameters take effect, run the following command:

```
# sysctl -p
```

[Hide more info](#)

Red Hat provides a `sapconf` script that automatically configures machines to properly run SAP applications. Download and install the script using yum:

```
# yum install sapconf
```

Related SAP Note: [1496410](#)

Performance > Decreased application performance when not running sap-netweaver tuned profile with SAP applications

Impact Likelihood Total Risk

- 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 managabilty of Red Hat based SAP landscapes

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

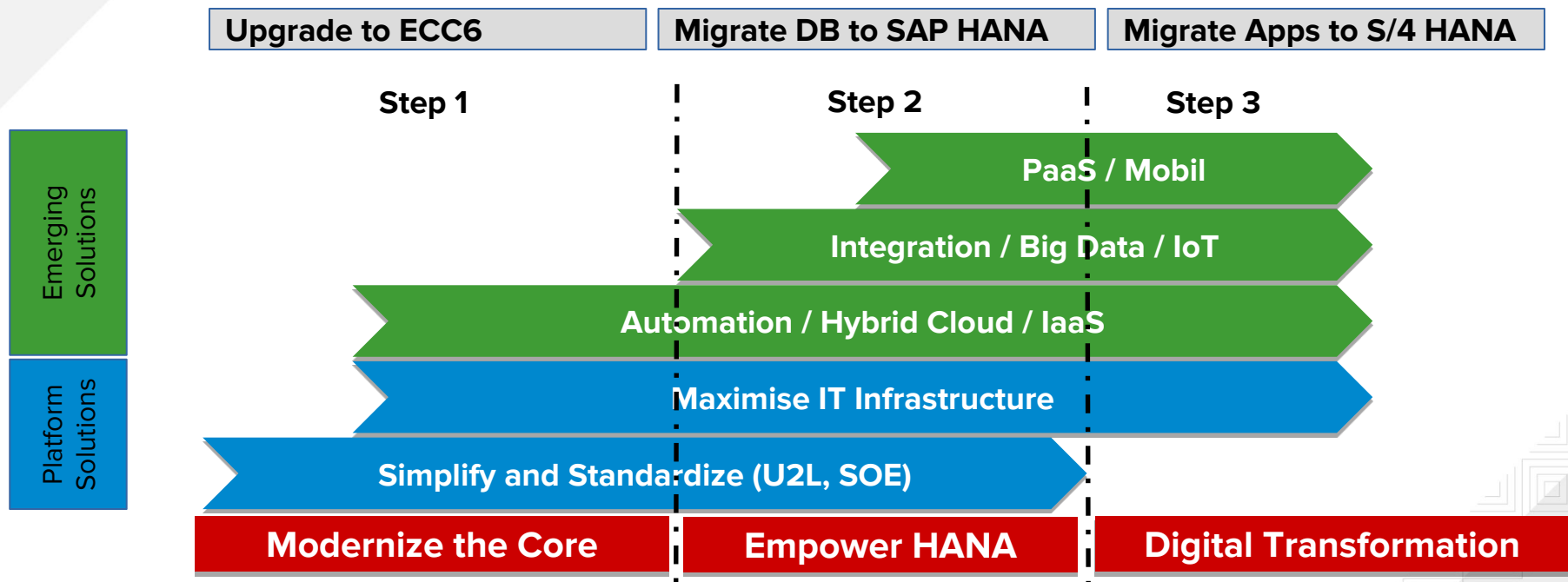
How to Subscribe

- Subscribe to the Update Services for SAP Solutions
 - How to subscribe the SAP HANA system to the Update Services for SAP Solutions?
 - <https://access.redhat.com/solutions/3075991>
 - How to subscribe SAP Applications system to the Update Services for SAP Solutions ?
 - <https://access.redhat.com/solutions/3082471>
- Subscribe to the software child channels
 - How to subscribe a RHEL 7 system to RHEL for SAP HANA child channel?
 - <https://access.redhat.com/solutions/2334521>
 - How to subscribe the system to RHEL for SAP child channel ?
 - <https://access.redhat.com/solutions/1544043>

Advanced

(or the Digital Transformation)

SAP customer journey to S/4 HANA



Common Customer's Status Quo

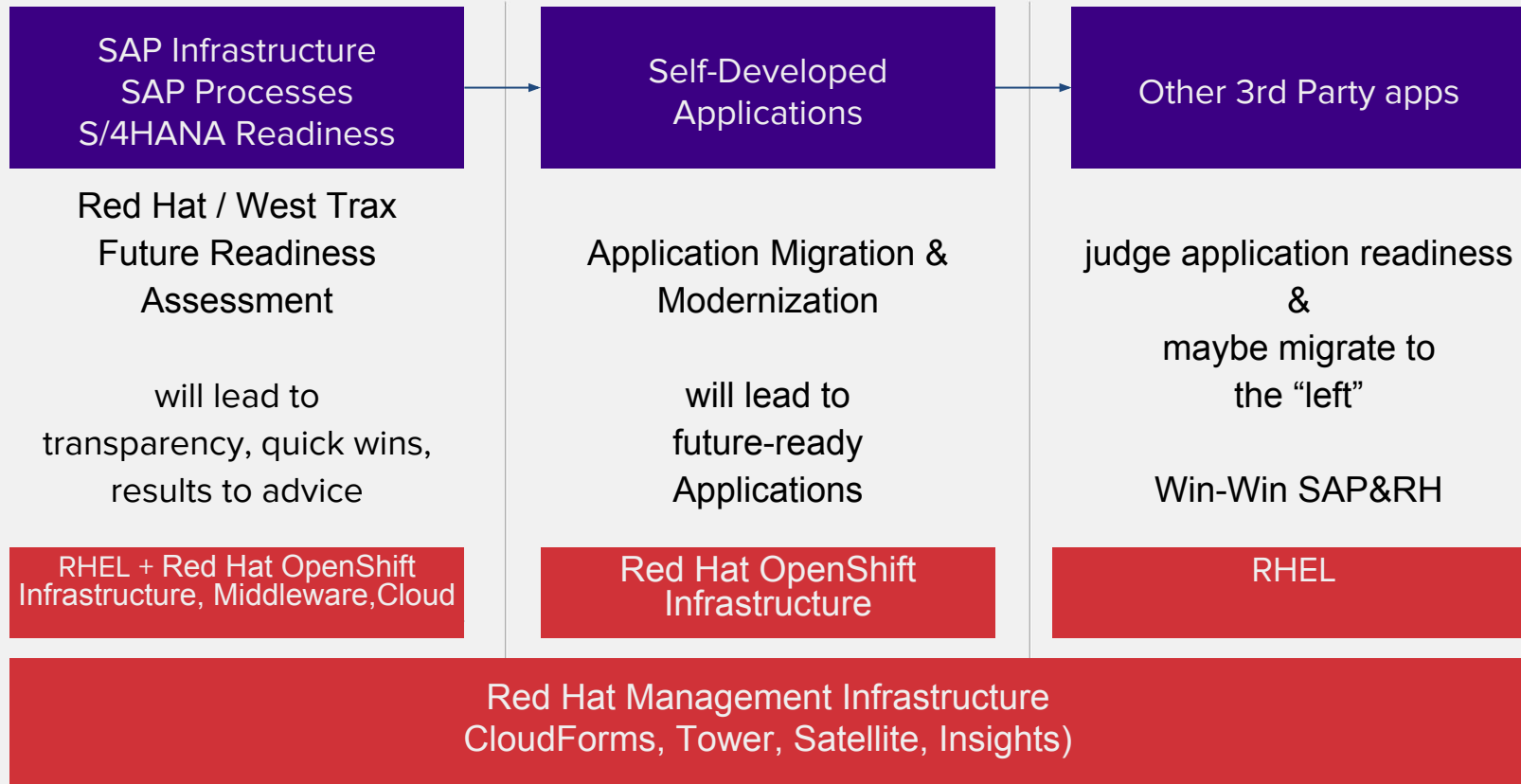
- Processes
 - Self developed, non-standard
 - Not using current software state
 - No or little automation
- Data Quality
 - Low Quality, Redundant data
- Software
 - Old releases, not ready for migration to HANA
- Service Processes
 - No defined rules, No Monitoring
- Know How
 - None or not sufficient
- Lack of resources
- Budget
 - Not sufficient for modernisation or migration to HANA



 **West Trax**
Independent Analyst and Advisor

Help you getting
prepared for the
usage of next-gen
technology

Road to Digital Excellence for SAP customers



Red Hat's value proposition

- **Achieve your KPIs:**
 - faster time to value: speed-up deployments
 - increase flexibility: provide hybrid cloud and self-service functionalities
 - achieve your SLAs: avoid errors and downtime
 - reduce TCO
- **Unlock the value in enterprise data:**
 - Integration between non-SAP solutions and source: make HANA the digital core
- **Accelerate Innovation:**
 - Use containers and microservices to streamline application development and delivery of SAP extensions
 - faster access to infrastructure resources: provide hybrid cloud and self-service functionalities
- **Save Cost:**
 - Red Hat Enterprise Linux for SAP Solutions is less expensive than other solutions

Resources

- **Overview of Red Hat Enterprise Linux for SAP Solutions subscription**
 - <https://access.redhat.com/support/policy/updates/errata>
- **Enablement**
 - SAP Webinars https://www.redhat-partner.com/webinar_trainings
- **Whitepapers**
 - Digital Transformation with SAP and Red Hat
 - SAP Integration with Red Hat JBoss solutions
 - SAP Infrastructure Automation
 - Forrester Report / Modernize the DC



RED HAT
ENTERPRISE LINUX



TECHNOLOGY DETAIL

DIGITAL TRANSFORMATION WITH RED HAT AND SAP

Partnering with you on your digital transformation journey

EXECUTIVE SUMMARY

Digital transformation is a strategic imperative for companies across industries. It encompasses key areas such as modernizing core infrastructure, exploiting cloud capabilities, leveraging big data, developing and deploying applications faster than ever before, and discovering new business models with the Internet of Things (IoT).

Red Hat and SAP support companies interested in assessing their approach to digital transformation. We provide companies with an approach to execute their digital strategy while offering solutions that make IT infrastructure more agile, efficient, and cost effective, empowering our customers to become digital leaders in their respective industries.

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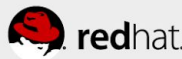
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2 IMPLEMENTATION SCENARIOS	2
2.1 Steps to achieving digital transformation with Red Hat and SAP	2
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Customer Success

- **Peavey Electronics**--built a new platform that provides mobile access to real-time information and reduces capital hardware costs by about US\$100,000.
- **Mohawk Industries**--cut infrastructure costs while boosting performance and sales with Red Hat Enterprise Linux for SAP HANA and Red Hat Satellite
- **Molecular Health**--implemented a highly reliable and stable environment that runs long-term, computing-intensive workloads for cancer research



INNOVATION. AMPLIFIED.*





THANK YOU

Large Memory support

Why does the RedHat support page limits memory to 2GB?

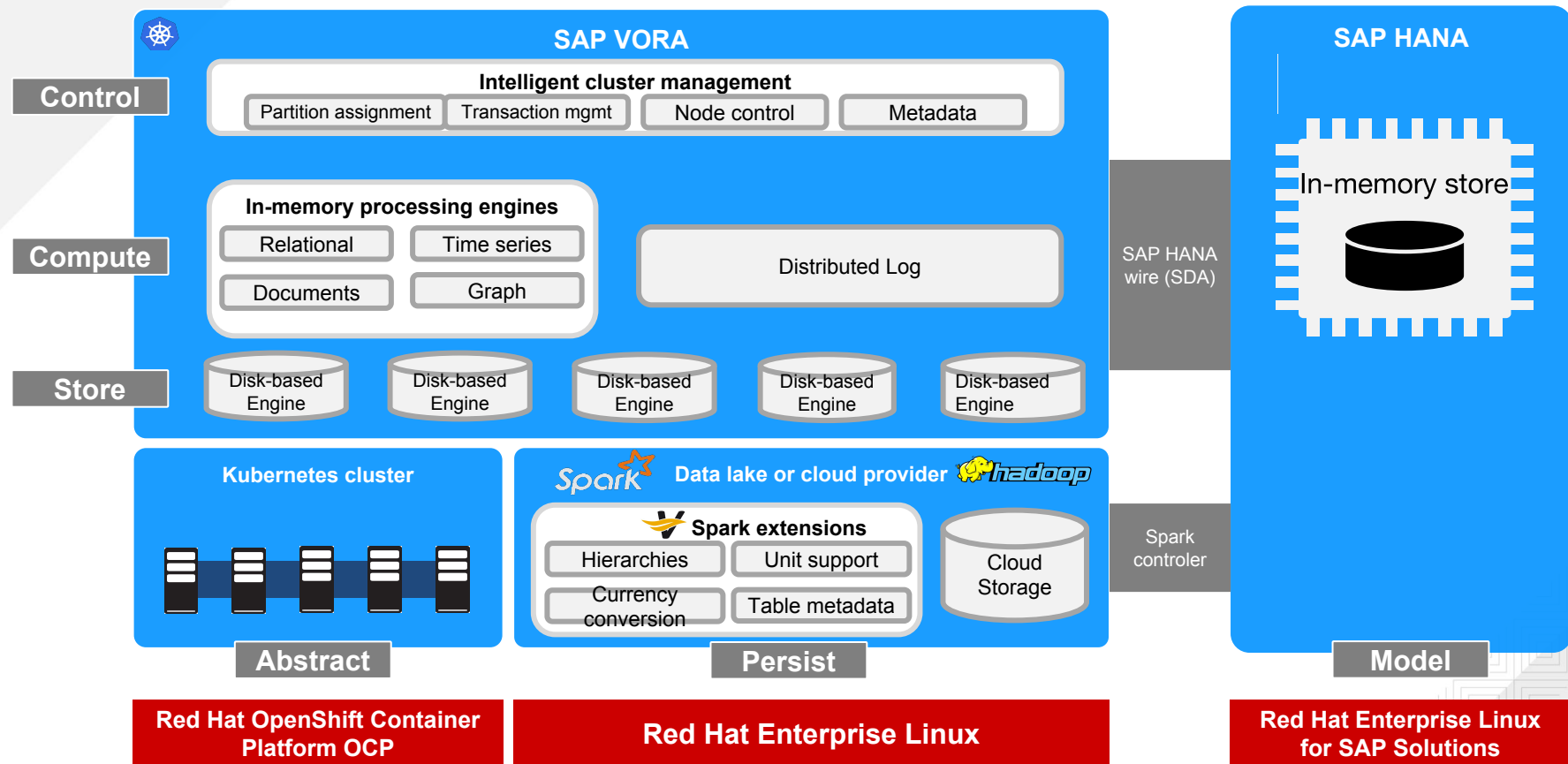
Red Hat QA has discovered a soft lockup bug in the numa implementation of the Linux kernel. Therefore we cannot support it completely, but there is no limit in connection with HANA as HANA does its own numa management and disables this functionality in the Linux kernel. Nonetheless the patch is available on request as a hotfix today with premium support level via a service ticket. Please open a support ticket and request "a hotfix for bugzilla #1541898 for production system"

The Bug is currently on QA and will make it into the regular release during the next couple of weeks. Once it's there the limits page will be updated accordingly.

Advantages of the IBM Power Platform

- IBM Power platform is certified when SAP has validated on Power
 - no dependency on OEM vendor to recertify older hardware
- the only platform where SAP allows dynamic resource allocation
 - Overprovisioning possible for non-prod
 - LPARs grant CPU/Memory, but can donate unused CPU/Memory to other LPARs
- Performance optimized hardware for database workloads

Support for of Red Hat Products for Data Hub



Red Hat: Unleashing Real-Time Business Value

Consume,
Analyze & Act
BUSINESS USER



Discover
APP DEVELOPER



Integrate
ARCHITECT



Operate
DATACENTER
OPERATOR

