Management & Automation of SAP Infrastructure

Markus Koch
Technical Partner Enablement Manager SAP
mkoch@redhat.com

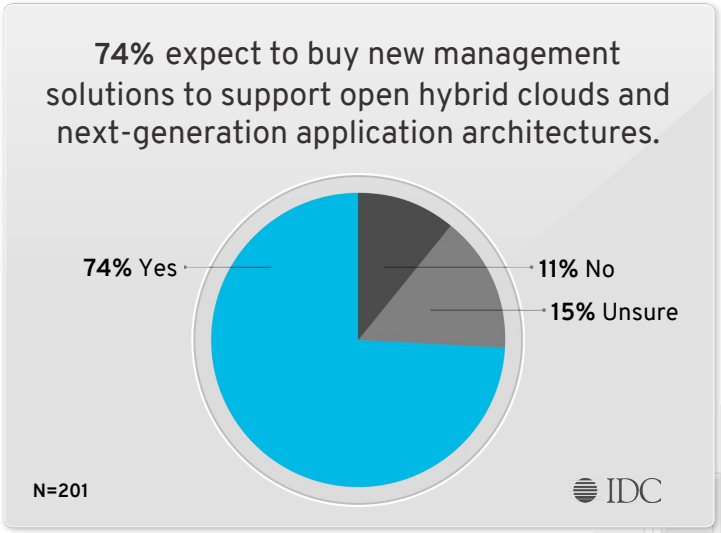
Why automate SAP installations?

Today's IT Challenges

LINE OF BUSINESS
Challenged to deliver services faster, at scale, and more efficiently

DEVELOPERS
Need to develop applications faster with greater productivity

IT OPERATIONS
Must provide infrastructure on-demand that scales as needed



redhat.

Today’s IT Challenges

- Aligning with line-of-business priorities
- Improving use of automation
- Consistently standardizing processes
- Optimizing workload placement and migrations across various cloud and non-cloud resources

What is needed?

EFFICIENCY AND OPTIMIZATION

Improve resource utilization and operational efficiency.

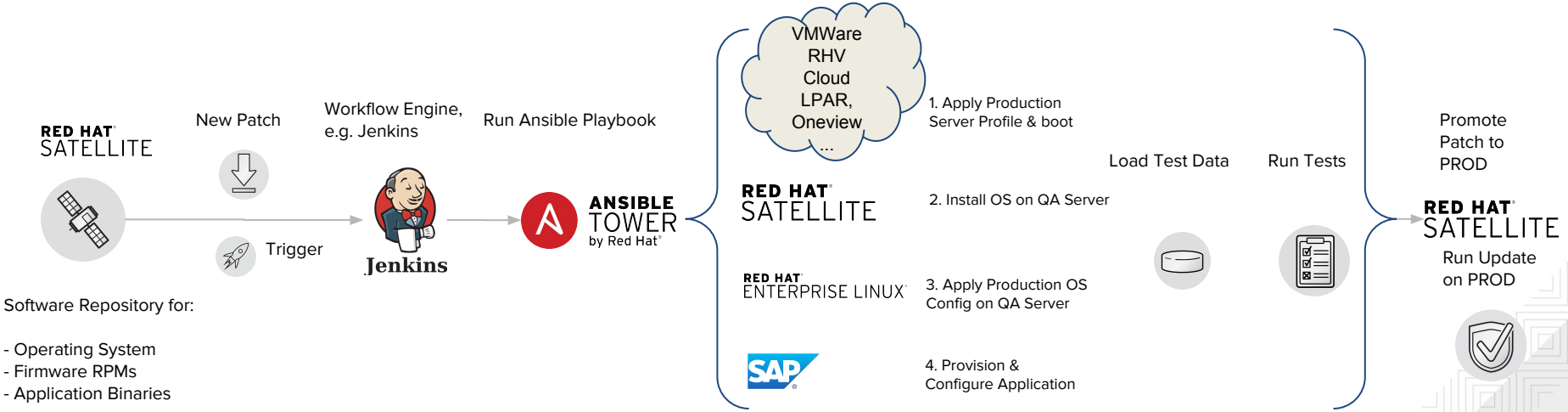
COMPLIANCE AND GOVERNANCE

Responsibly enabling users and developers, without being in the way.

SERVICE MANAGEMENT AND SELF SERVICE

Automate and delegate service delivery processes, saving time and money.

Use Case: reduce risk of patching SAP landscapes



Red Hat offerings for SAP landscapes

RED HAT® ANSIBLE® Tower

RED HAT® SATELLITE

RED HAT® CLOUDFORMS

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

SAP certified Server Hardware

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

RED HAT® VIRTUALIZATION

Certified Cloud Service Providers

CenturyLink™, amazon web services, Microsoft Azure

SLA choices:

- Premium (24/7 production)
- Standard (12/5 non prod)

Per “socket pair” stackable models:

- 2 sockets **or** 2 virtual machines

Virtual Datacenter model

- 2 sockets/Hypervisor
- Unlimited guests

IBM Power8:

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

redhat.

SAP Server management ... with automation

SAP HANA standard installation process

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

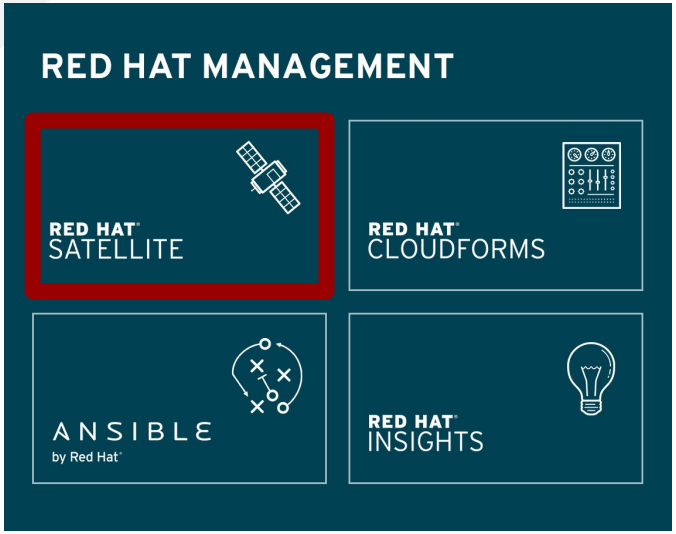
Individually for each server and environment!

SAP HANA optimized installation process

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

Automation for the whole environment

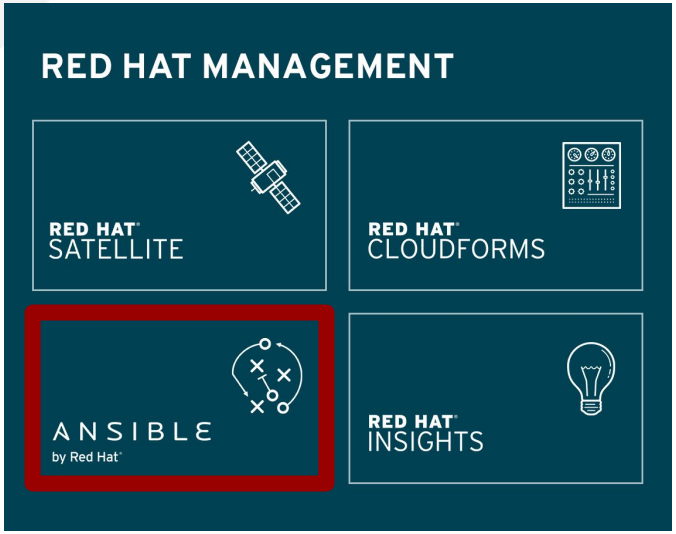
Satellite … the chassis frame



- 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
- bare metal, virtualization & cloud

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://github.com/mk-ansible-roles

the ansible roles under the hood
Supported deployment scenarios

hana scale-up

- one instance
- multi instance and multi container installation
- hana scale-up system-replication (one and multi-instance)

hana scale-out

- one instance
- multi instance and multi container installation
- hana scale-out system-replication (one and multi-instance)

the ansible roles under the hood

Roles overview

The ansible roles covered in this project

- preconfigure
- deployment
- hsr

the ansible roles under the hood
Roles overview

The ansible roles covered in this project

- preconfigure

  check installation media and version

  runs the checks & configures according to SAP Notes

- deployment
- hsr

the ansible roles under the hood
Roles overview

The ansible roles covered in this project

- preconfigure
- deployment

  kicks off the final deployment according to configuration file

  configuration file centrally stored for easier reproduction

- hsr

the ansible roles under the hood
Roles overview

The ansible roles covered in this project

- base-host-setup
- preconfigure
- deployment
- hsr

configure HANA system replication between formerly deployed systems

the ansible roles under the hood
example playbook

```
- name: Install SAP HANA
  hosts: hana.example.com
  become: yes

  vars:
              # SAP Precoonfigure role
              # SAP-Media Check
              install_nfs: "nfssrv:/export"
              installroot: /install
              hana_installdir: /install/HANA_EXPRESS_20

              hana_pw_hostagent_ssl: "MyS3cret!"
              id_user_sapadm: "30200"
              id_group_shm: "30220"
              id_group_sapsys: "30200"
              pw_user_sapadm_clear: "MyS3cret!"

  roles:
              - { role: mk-ansible-roles.saphana-preconfigure }
              - { role: mk-ansible-roles.saphana-deploy }
```

the ansible roles under the hood

example host configuration file for hana.example.com

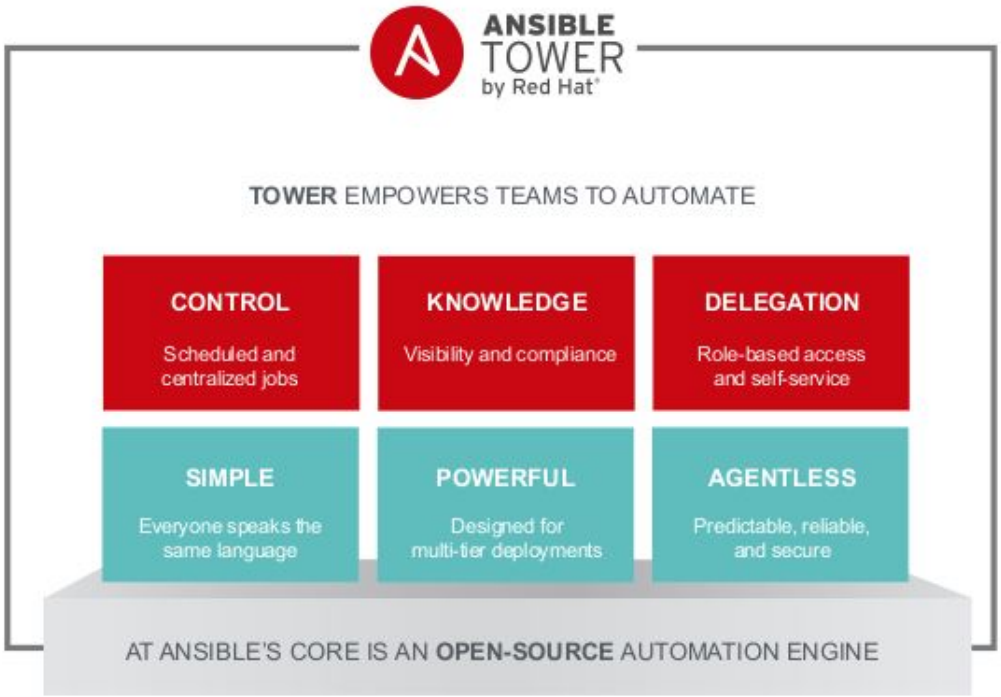
```
---
hostname: "{{ ansible_hostname }}"
deployment_instance: true

instances:
  hxe:
    id_user_sidadm: "30210"
    pw_user_sidadm: "Adm12356"
    hana_pw_system_user_clear: "System123"
    hana_components: "client,server"
    hana_system_type: "Master"
    id_group_shm: "30220"
    hana_instance_hostname: "{{ ansible_hostname }}"
    hana_addhosts:
    hana_sid: HXE
    hana_instance_number: 90
    hana_system_usage: custom
...
```

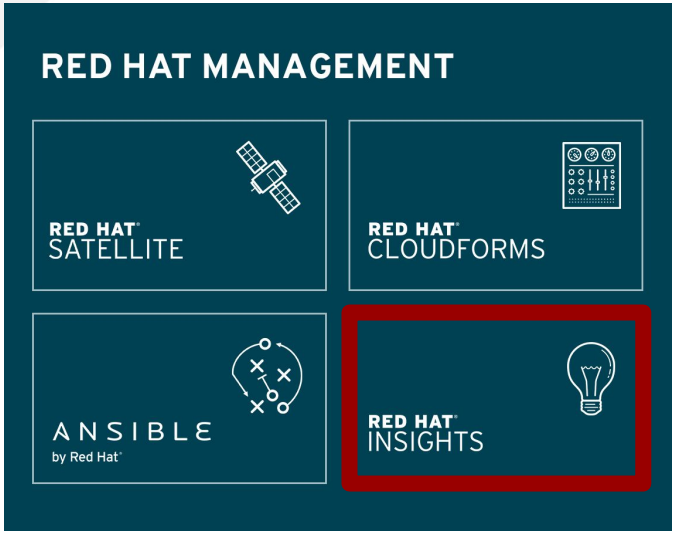
the ansible roles under the hood
example host configuration file for hana.example.com

- some more variables for setting up HSR
- visit http://github.com/mk-ansible-roles to read more
- visit http://people.redhat.com/mkoch/training to learn how to use the roles and create your own playbooks

Ansible - Powerful Automation Engine



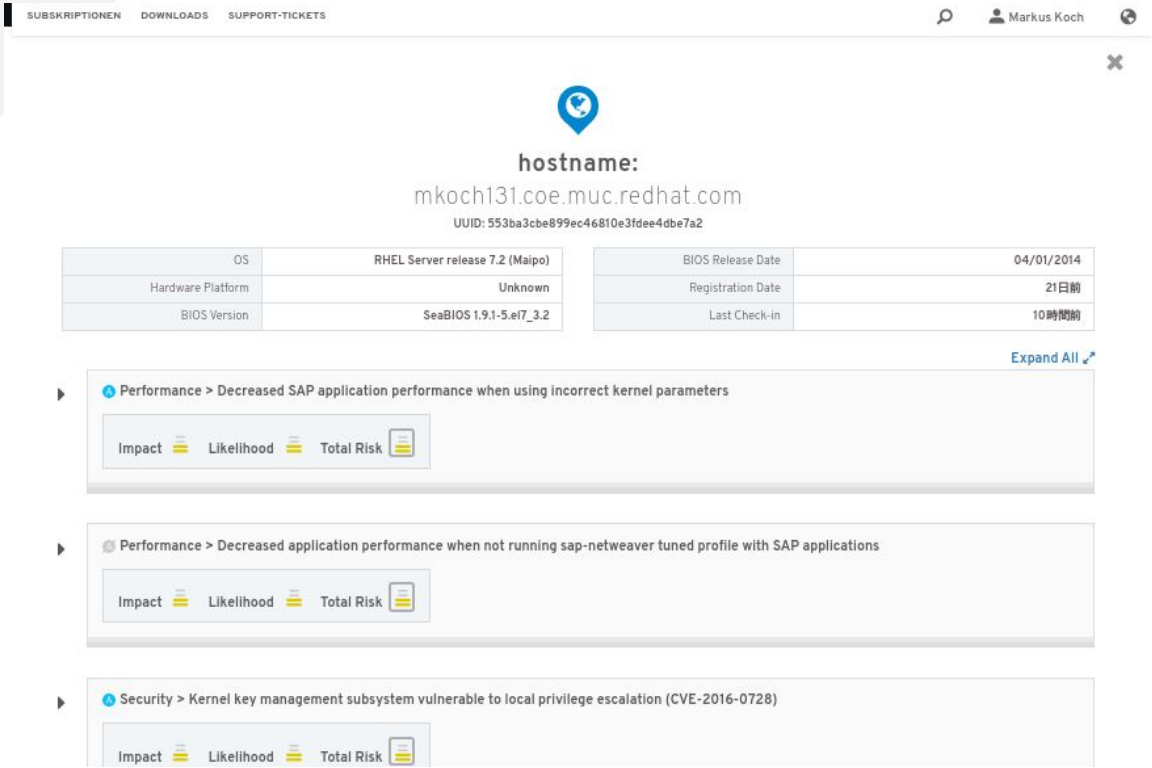
Insights … ground control



- 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

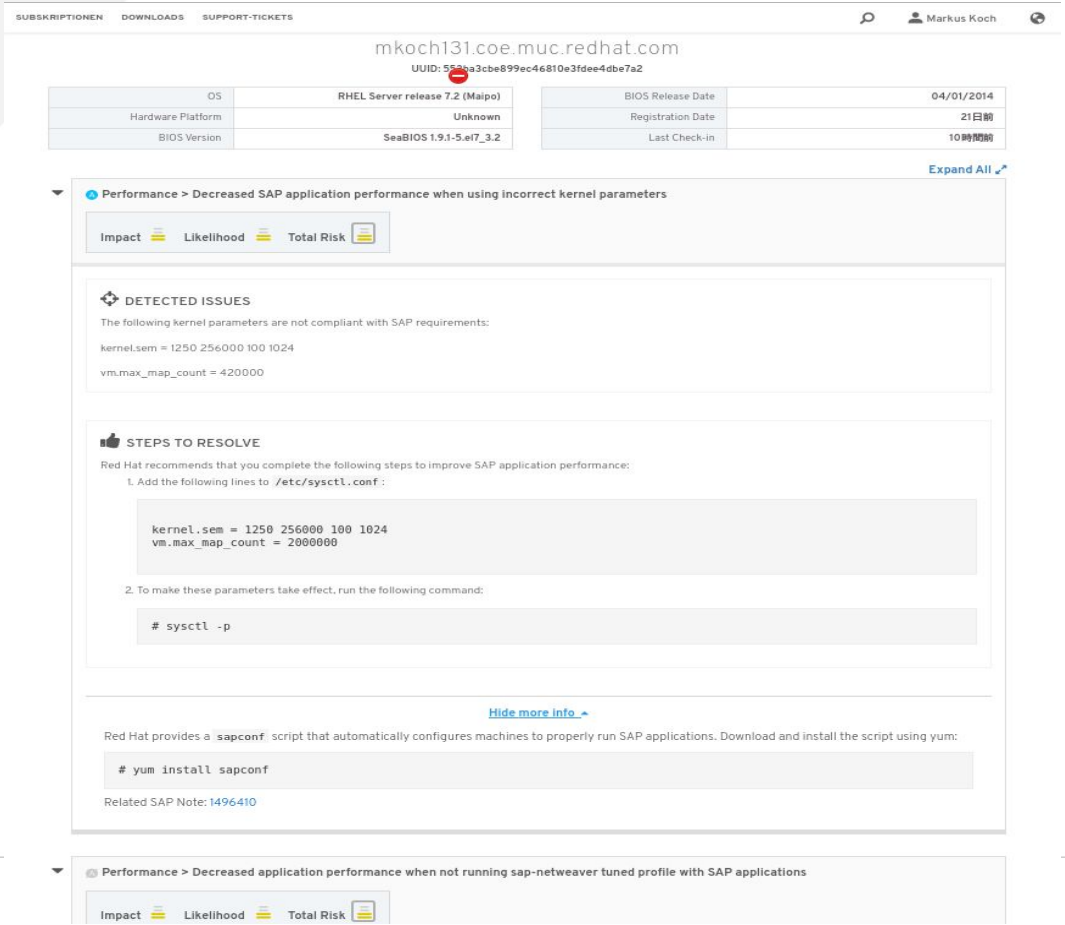


- early notifications of minimum releases of certain packages
- check of correct kernel parameters
- new findings in SAP development will automatically be messaged

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

redhat.

Red Hat Insights - SAP Rules

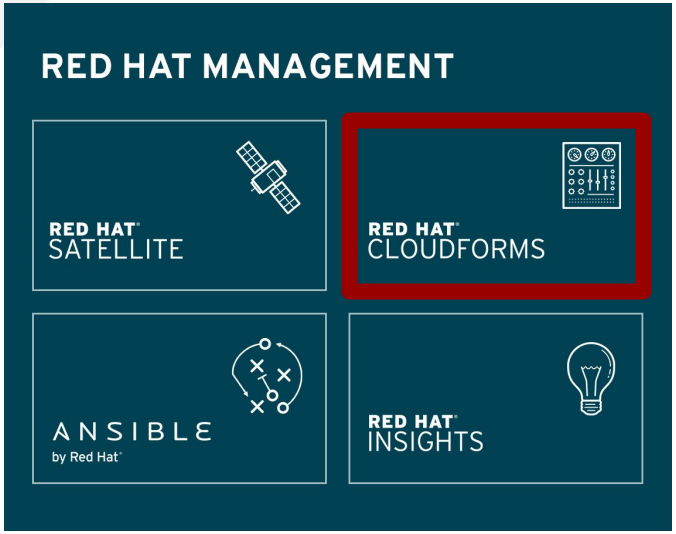


- early notifications of minimum releases of certain packages
- check of correct kernel parameters
- new findings in SAP development will automatically be messaged

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

redhat.

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


RED HAT CLOUDFORMS MANAGEMENT ENGINE
Cloud Operators | EVM
Cloud Intel
Red Hat Insights
Services
Compute
Configuration
Networks
Middleware
Storage
Control
Automate
Services
My Services
Catalogs
Workloads
Requests
Containers
Health
Compliance
Consumption
Top CPU Consumers (Last Hour)
VM Name
CPU Usage
Allocated vCPUs
VM Vendor
Guest OS Information
Virtual Infrastructure Platforms

Cloud Intel
Red Hat Insights
Services
Compute
Configuration
Networks
Middleware
Storage
Control
Automate
Optimize

Configuration

Policy Profiles
All Policy Profiles
Linux Security Check
VM and Instance Compliance: DROWN OpenSSL Vuln...
Vulnerable DROWN openssl packages (RHEL5/6/7)
VM Compliance Check
Generate log message
Mark as Non-Compliant
VM and Instance Compliance: Heartbleed Vulnerability
Vulnerable OpenSSL Package (Heartbleed)
VM Compliance Check
Generate log message
Mark as Non-Compliant
Send Email to Security Team
Show EVM Event on Timeline
VM and Instance Compliance: Permit Root Login Disa...
VM and Instance Compliance: Shell-Shock Vulnerability
OpenSCAP profile
SmartStateProfile
Policies
Events
Conditions
Actions
Alert Profiles
Alerts

Policy "DROWN OpenSSL Vulnerability"

Basic Information

Active	Yes
Created	By Username admin 2017-03-13 09:57:48 CET
Last Updated	By Username admin 2017-03-13 09:57:49 CET

Scope

VM and Instance : OS Name INCLUDES "linux"

Conditions

	Description	Scopes / Expressions
◆	Vulnerable DROWN openssl packages (RHEL5/6/7)	Expression: ((VM and Instance.Guest Applications : Name CONTAINS "openssl" AND FIND VM and Instance.Guest Applications : Version = "0.9.8b" CHECK ALL Release REGULAR EXPRESSION MATCHES "8b-8\.3\.el5|8\.3\.el5_0\.2|10\.el5\b|10\.el5_2\.1") OR (VM and Instance.Guest Applications : Name CONTAINS "openssl" AND FIND VM and Instance.Guest Applications : Version = "0.9.8e" CHECK ALL Release REGULAR EXPRESSION MATCHES "7\.el5\b|7\.el5_3\.2|12\.el5\b|12\.el5_4\.1|12\.el5_4\.6|12\.el5_5\.7|12\.el5_6\.9|12\.el5_6\.10|12\.el5_6\.12|20\.el5\b|20\.el5_7\.1|22\.el5\b|22\.el5_8\.1|22\.el5_8\.3|22\.el5_8\.4|26\.el5_9\.1|26\.el5_9\.2|26\.el5_9\.4|27\.el5_10\.1|27\.el5_10\.3|27\.el5_10\.4|31\.el5_11|32\.el5_11") OR (VM and Instance.Guest Applications : Name CONTAINS "openssl" AND FIND VM and Instance.Guest Applications : Version = "1.0.0" CHECK ALL Release REGULAR EXPRESSION MATCHES "4\.el6\b|4\.el6_0\.1|4\.el6_0\.2|4\.el6_0\.3|10.el6\b|10\.el6_1\.4|10\.el6_1\.5|10\.el6_1\.6|20\.el6\b|20\.el6_2\.1|20\.el6_2\.2|20\.el6_2\.3|20\.el6_2\.4|20\.el6_2\.5|20\.el6_2\.7|25\.el6_3\.1|25\.el6_3\.3|27.el6\b|27\.el6_4\.2|27\.el6_4\.4") OR (VM and Instance.Guest Applications : Name CONTAINS "openssl" AND FIND VM and Instance.Guest Applications : Version = "1.0.1e" CHECK ALL Release REGULAR EXPRESSION MATCHES "15\.el6\b|16\.el6_5\.1\b|16\.el6_5\.4|16\.el6_5\.7|16\.el6_5\.14|16\.el6_5\.15|30\.el6\b|30\.el6_6\.2|30\.el6_6\.4|30\.el6_6\.5|16\.el6_5\b|30\.el6_6\.7|30\.el6_6\.8|30\.el6_6\.9|30\.el6_6\.11|42\.el6\b|42\.el6_7\.1|42\.el6_7\.2|34\.el7\b|34\.el7_0\.3|34\.el7_0\.4|34\.el7_0\.6|34\.el7_0\.7|42.el7\b|42\.el7_1\.4|42\.el7_1\.5|42\.el7_1\.6|42\.el7_1\.8|42\.el7_1\.9|51\.el7_2\.1|51\.el7_2\.2"))

Events

	Description	Actions
	VM Compliance Check	Generate log message Mark as Non-Compliant

Notes

This policy validates VM compliance against openssl package versions affected by DROWN cross-protocol attack (CVE-2016-0800)

Reports

Rates

Rates
Compute
Default
Default Container Image Rate
Hailstorm Container Image Rate EURO
Hailstorm EURO
Storage
Default
Hailstorm EURO

Assignments

Compute Chargeback Rate "Hailstorm EURO"

Basic Info

Description Hailstorm EURO

Rate Details

Group	Description	Range		Rate		Units
		Start	Finish	Fixed	Variable	
CPU	Allocated CPU Count	0.0	Infinity	1.0	0.0	EUR / Hour / Cpu
CPU	Used CPU	0.0	Infinity	0.0	0.02	EUR / Hour / MHz
Cpu Cores	Used CPU Cores	0.0	Infinity	1.0	0.02	EUR / Hour / Cpu core
Disk I/O	Used Disk I/O	0.0	Infinity	0.0	0.005	EUR / Hour / KBps
Fixed	Fixed Compute Cost 1	0.0	Infinity	0.0	0.0	EUR / Hour
Fixed	Fixed Compute Cost 2	0.0	Infinity	0.0	0.0	EUR / Hour
Memory	Allocated Memory	0.0	Infinity	0.0	0.0	EUR / Hour / MB
Memory	Used Memory	0.0	Infinity	0.0	0.02	EUR / Hour / MB
Network I/O	Used Network I/O	0.0	100.0	0.5	0.0	EUR / Hour / KBps
		100.0	Infinity	0.5	0.005	

Cloud Intel
Red Hat Insights
Services
Compute
Configuration
Networks
Middleware
Storage
Control
Automate
Optimize

Instances by Provider
Instances by Provider
RHOSP Overcloud
No Availability Zone
nova
<Archived>
<Orphaned>
Images by Provider
Instances
Images

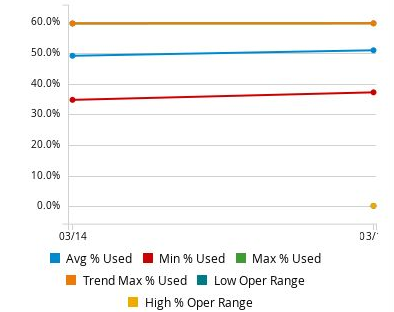
Capacity & Utilization data for Instance "lookbusy-osp"

Options

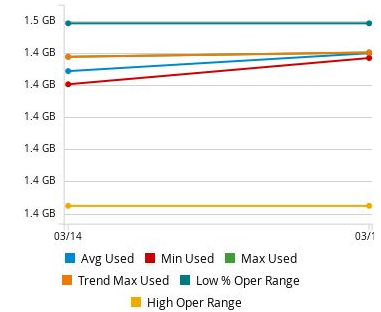
Interval: Daily
Date: Hourly / Daily / Most Recent Hour
Show: back
Time Profile
Compare To: <Nothing>

* Daily charts only include days for which all 24 hours of data has been collected.

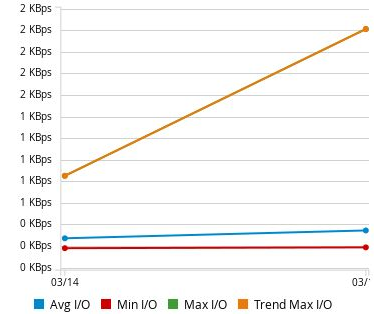
CPU (%)



Memory (MB)



Disk I/O (KBps)



Network I/O (KBps)

Cloud Intel
Red Hat Insights
Services
Compute
Configuration
Networks
Middleware
Storage
Control
Automate
Optimize

VMs & Templates
All VMs & Templates
rhevm.hailstorm3.coe.muc.redhat.com
RHOSP Undercloud
<Archived>
<Orphaned>
VMs
Templates

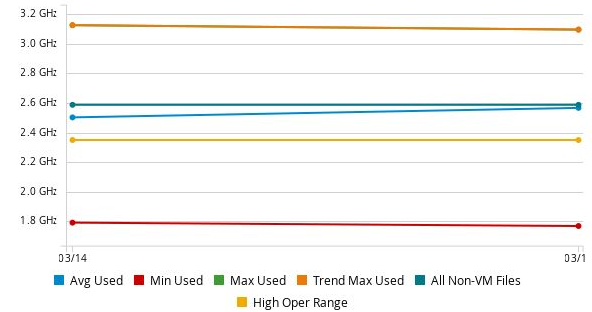
Capacity & Utilization data for Virtual Machine "lookbusy-rhev"

Options

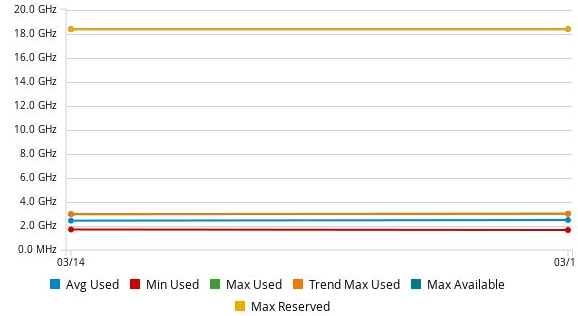
Interval: Daily
Date: 3/16/2017
Show: 1 Week back
Time Profile: UTC
Compare To: Parent 'Host / Node'

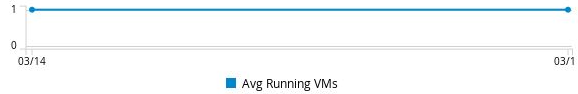
* Daily charts only include days for which all 24 hours of data has been collected.

CPU (Mhz)



CPU (Mhz)





Memory (MB)

Memory (MB)

Cloud Intel
Red Hat Insights
Services
Compute
Configuration
Networks
Middleware
Storage
Control
Automate
Optimize

Optimize
Utilization
Planning
Bottlenecks

rce Allocation

unt 1

Size 2048 MB

ace 20 GB
* Disk space not supported for OpenStack providers

ow Clusters

ore 10

Size 90%

ace 90%

ast 1 Week

file UTC

Submit Reset

Planning Summary

Summary | Report

VM Counts per Cluster / Deployment Role

Cluster / Deployment Role Name	Max VMs	By vCPU Count	By Memory Size	By Disk Space
overcloud-Compute-jocz7haypj5v	0	160	11	0
overcloud-Controller-4h3npyyajqf4	0	120	0	0
Default	30	240	30	39

Total number of VMs that can fit on all of the above Cluster / Deployment Roles: 30

Reference VM Profile

Source Allocation
vCPU Count 1
Memory Size 2048 MB
Disk Space 20 GB

Target Options/Limits

Show Clusters
vCPU per Core 10
Memory Size 90%
Datastore Space 90%

Trend Options

Trend for Past 1 Week
Time Profile UTC
Time Zone UTC * Set in Time Profile

* Information shown is based on available trend data going back 1 Week.

Cloud Intel
Red Hat Insights
Services
Compute
Configuration
Networks
Middleware
Storage
Control
Automate
Optimize

Download as Text
Download as CSV
Download as PDF

Cloud/Infrastructure Providers
rhevm.hailstorm3.coe.muc.redhat.com
Cluster / Deployment Role
Default
rhevh1.hailstorm3.coe.muc.redhat.com
rhevh2.hailstorm3.coe.muc.redhat.com
rhevh3.hailstorm3.coe.muc.redhat.com
RHOSP Undercloud
Datastores

Provider "rhevm.hailstorm3.coe.muc.redhat.com" Utilization Trend Summary

Summary | Details | Report

Options

Trends for past	1 Week
Classification	<None>
Time Profile	UTC
Selected Day	3/15/2017

Basic Information

Utilization Trend Summa...	Provider [rhevm.hailstorm3.coe.muc.redhat.com]
Trend Interval	2017-03-13 - 2017-03-15
Selected Day	2017-03-15
Time Profile	UTC
Time Zone	UTC

CPU	
Total	55.2 GHz (100%)
Available	55.2 GHz (100%)
Max Used	10.6 GHz (19%)
Avg Used	9.9 GHz (18%)
CPU Max Used MHz Trend: Projected to hit Total	122 days, on 07/17/2017 (UTC)
CPU Average Used MHz Trend: Projected to hit Total	24 days, on 04/10/2017 (UTC)
CPU Max Used MHz Trend: Projected to hit Available	122 days, on 07/17/2017 (UTC)
CPU Average Used MHz Trend: Projected to hit Available	24 days, on 04/10/2017 (UTC)

Memory	
Total	93.8 GB (100%)
Available	93.8 GB (100%)
Max Used	20.7 GB (22%)
Avg Used	21.6 GB (23%)
Memory Max Used Trend: Projected to hit Total	after 1 year
Memory Average Used Trend: Projected to hit Total	21 days, on 04/07/2017 (UTC)

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

redhat.

THANK YOU

plus.google.com/+RedHat

facebook.com/redhatinc

linkedin.com/company/red-hat

twitter.com/RedHatNews

youtube.com/user/RedHatVideos