RED HAT SUMMIT

RED HAT SECURITY ROADMAP 2018

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AGENDA

Red Hat and Security in the Community

What we are seeing as trends in :

1. Creating secure foundations
    a. Network Bound Disk Encryption Use Case
2. Enabling hybrid cloud deployments
3. Automating security compliance

Where else to go for more information - especially here at Summit

Q&A

RED HAT AND SECURITY

RED HAT AND SECURITY?

Red Hat is not a security company, but....

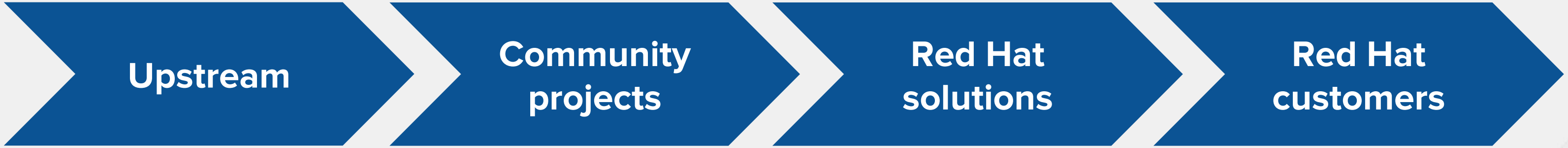
We build security into everything we ship and deliver security capabilities

Over 50 sessions, labs, lightning talks with security content at this Summit!

RED HAT SUPPLY CHAIN SECURITY

- Community leadership
- Package selection
- Manual inspection
- Automated inspection
- Packaging guidelines
- Trusted builds

- Quality assurance
- Certifications
- Signing
- Distribution
- Support
- Security updates/patches



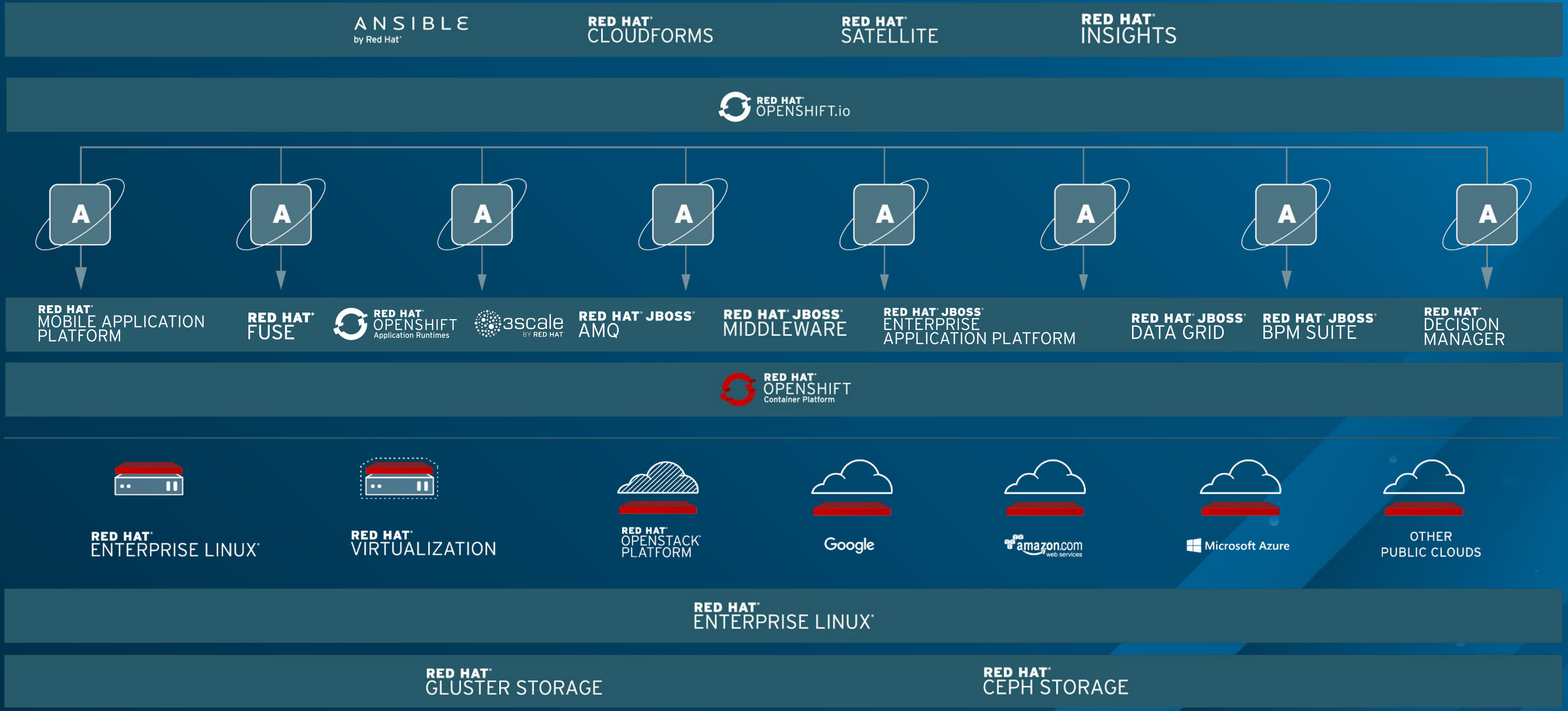
Upstream

Community projects

Red Hat solutions

Red Hat customers

SECURITY THROUGHOUT THE STACK



ANSIBLE by Red Hat

RED HAT CLOUDFORMS

RED HAT SATELLITE

RED HAT INSIGHTS

RED HAT OPENSHIFT.io

RED HAT MOBILE APPLICATION PLATFORM

RED HAT FUSE

RED HAT OPENSHIFT Application Runtimes

3scale BY RED HAT

RED HAT JBOSS AMQ

RED HAT JBOSS MIDDLEWARE

RED HAT JBOSS ENTERPRISE APPLICATION PLATFORM

RED HAT JBOSS DATA GRID

RED HAT JBOSS BPM SUITE

RED HAT DECISION MANAGER

RED HAT OPENSHIFT Container Platform

RED HAT ENTERPRISE LINUX

RED HAT VIRTUALIZATION

RED HAT OPENSTACK PLATFORM

Google

amazon.com web services

Microsoft Azure

OTHER PUBLIC CLOUDS

RED HAT ENTERPRISE LINUX

RED HAT GLUSTER STORAGE

RED HAT CEPH STORAGE

1. CREATING SECURE FOUNDATION

2. ENABLING HYBRID CLOUD DEPLOYMENTS
3. AUTOMATING COMPLIANCE

CREATING SECURE FOUNDATIONS

The foundation drives the security of the rest of the stack

Preventing intrusions and attacks

- SELinux mandatory access controls to prevent breaches with bare metal, VMs and Containers
- USBGuard prevents mounting of rogue / suspect USB devices
- UEFI Secure Boot for verified integrity of boot image
- Trusted Platform Module (TPM) 2.0 support for hardware based key storage
- Multi-factor authentication

Cryptographic protection

- Wide variety of strong, peer-reviewed and FIPS certified crypto algorithms for privacy
- Encrypted data at rest and in-flight throughout the Red Hat software stack
- Deprecation of old crypto algorithms to remove attack vectors

Networking / Firewall

- NFTables firewall for stateful firewalls with online policy change
- IPSec and MACSec L2 for encrypted network communications

TRENDS IN CREATING SECURE FOUNDATIONS

- Advanced cryptographic algorithms
  - While respecting the need for binary compatibility with existing releases (i.e. TLS 1.3)
  - Post-Quantum Computing cryptography
  - More products with FIPS compliance
- Unified crypto policies across all apps on a system for easier management
  - Disable an algorithm system or site-wide without breaking the stack
- Hardware root of trust
  - Attestation standards for proving a system hasn’t been tampered with
  - Trusted Platform Modules using PKCS#11 for broader crypto integration
  - Disk crypto key storage (LUKS and NBDE) in TPM for protecting against disk theft*
  - More applications using TPM, Virtual TPMs & other HSMs for the VMs and Containers
- Methods for executing only ‘white-listed’ utilities and applications to reduce risk
  - Leveraging Software ID (SWID) Tags across all of Red Hat portfolio
- Automatic disk decryption in secured manner (see NBDE)
  - Better integration into Gluster and Ceph

*See booth for example

IDENTITY MANAGEMENT & AUTHENTICATION

It’s not a separate product, it’s a core capability

Identity Management is a core part of the Red Hat stack

- Centralized Linux authentication and authorization for users, groups
- Integrates with integration into Active Directory
- Centralized management of system services (host name, services, etc)
- Smartcard authentication across Linux & Windows systems

Certificate Services

- Provides PKI and X.509v3 certificates for encrypted and authenticated communications

Directory Server

- Provides standards-based LDAP identity for Linux and Unix IDs

TRENDS IN IDENTITY MANAGEMENT & AUTHENTICATION

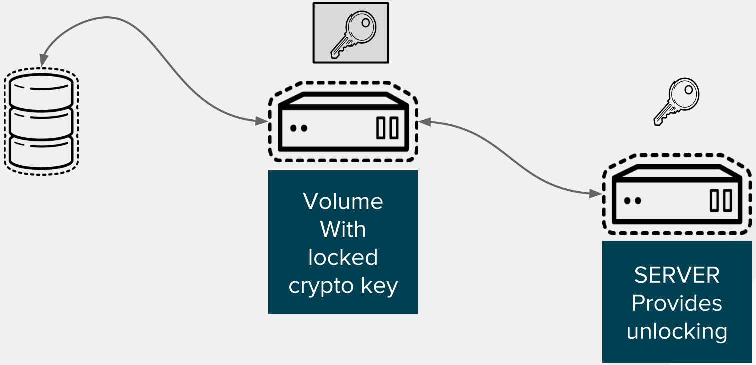
- Better integration of Identity Manager with middleware identity management
  - Beyond OpenStack
- Automatic enrollment of systems into Identity Management upon deployment
  - Using Ansible and other tools
  - RHEL Engineering maintained modules
- Hardware Security Module use
  - TPM, vTPM and other dedicated hardware devices
  - Ideal for secret store and access through Custodia
  - Broader Smartcard support
- Better integration of PKI across whole stack
  - What about LetsEncrypt? Smartcard and PKI

NETWORK BOUND DISK ENCRYPTION AT WORK

STORAGE SECURITY IN THE HYBRID CLOUD

Network Bound Disk Encryption

- *Addresses disk theft & the midnight reboot problem*
- LUKS encrypted volumes for transparently encrypting data at rest across flexible software-defined disks
- Typically at boot time, someone needs to type in a password (not convenient or even possible always)
- Client system maintains local encryption key, but it’s wrapped with a public key from the server and can only be unlocked if the server is present
- The stateless server provides public key to help client unwrap the encryption key and the client system continues its boot process, hands-free!



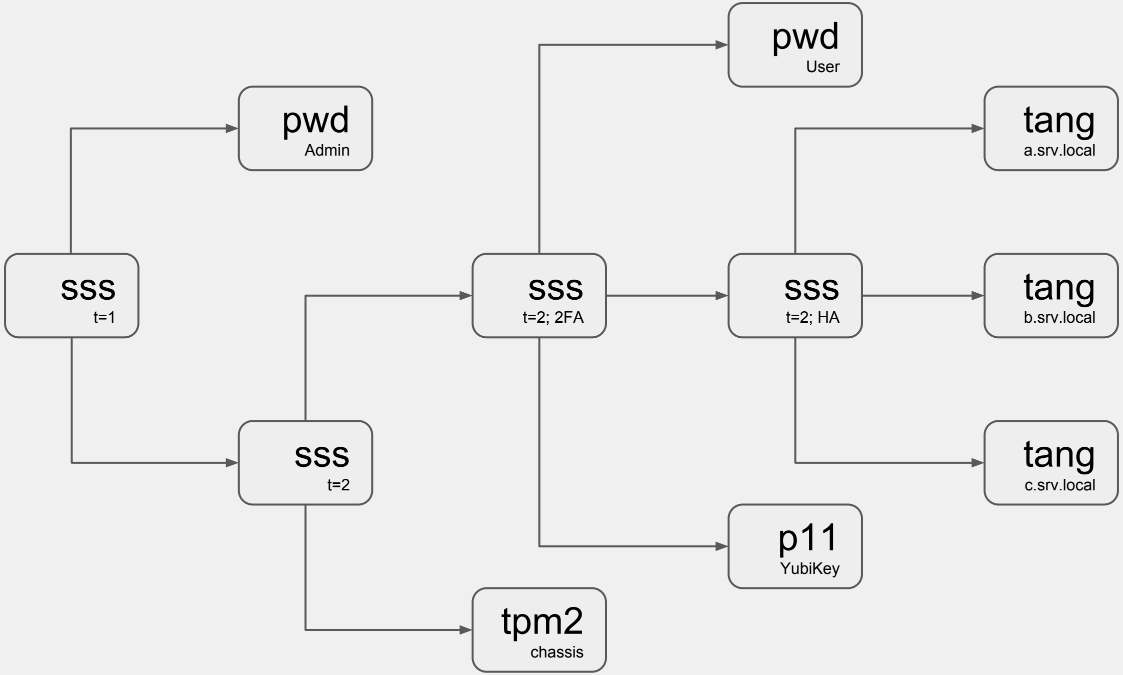
RED HAT IT REQUIREMENTS

- Enterprise Security
  - Data Encryption at Rest
  - Secure data transport
- Operations
  - Avoid manual operator intervention
  - Automatable
  - Consistent solution across all Infrastructure
  - Offline and emergency data recoverability
  - Multisite and Highly Available
- Identity and Access Management
  - Avoid key escrow solutions
  - Open source and standards-based
  - Avoid proprietary solutions

NETWORK BOUND DISK ENCRYPTION OVERVIEW

- Clevis (client-side)
    - Decryption Automation Framework
    - Integration with LUKS (dracut, systemd, GNOME)
    - Uses pins (plugins) for encryption policies:
        - Tang
        - HTTPS-based escrows
        - TPM2 (upstream)
        - Shamir’s Secret Sharing (combine policies into meta-policies)
- Tang (server-side; escrow alternative)
    - Small, Fast, Stateless
    - Foundational Infrastructure
    - ECMR Key Exchange
        - No transport encryption required! (No Chicken & Egg!)

CLEVIS POLICY EXAMPLE*



* Not all features currently implemented.

TANG VS. ESCROW

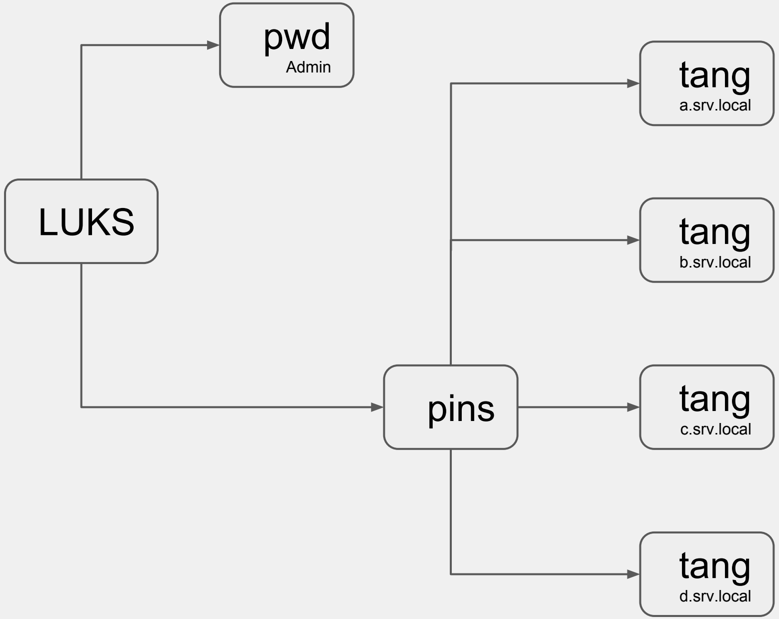
	Escrow	Tang
Client Provisioning	Online	Online or Offline
Client Authentication	Required	Anonymous
Transport Encryption	Required	Optional
State	Secure Storage/Backups	None*
Performance	Slow	Fast
Deployment	Difficult, Manual	Easy, Automatable
Chain of Trust	Required	Optional

* Not yet implemented.

NBDE IN THE DATA CENTER

- Initial use-case
  - Red Hat IdM servers
    - Both bare metal and RHV VMs in 6 data centers across the globe (24 hosts)
  - Tang (NBDE) servers
- Now standard for bare metal systems
  - All new systems deployed with LUKS+NBDE
- Future
  - Data LUNs
    - Application data storage from storage appliances
  - Red Hat Storage
  - SSS and policy-based decryption

RED HAT IT POLICY



1. CREATING SECURE FOUNDATION
2. **ENABLING HYBRID CLOUD DEPLOYMENTS**
3. AUTOMATING SECURITY COMPLIANCE

HYBRID CLOUD PLATFORMS

Red Hat Virtualization, Red Hat OpenStack Platform and Red Hat OpenShift Container Platform*

Control

- Content scanning upon deployment to prevent non-compliant instances from running
- Signing of Container images to allow verification of trust back to build time
- Secure, multi-tenancy hosting
- Read-only Atomic Host for Containers

Defend

- SVirt provides automatic SELinux protecting VMs and host from exploiting each other
- Automatic firewall and VPN encrypted (MACSec L2 and IPSec) communications between guests and hosts
- Automatic firewall configuration
- Isolation of users and root processes from each other for strong protection

Extend

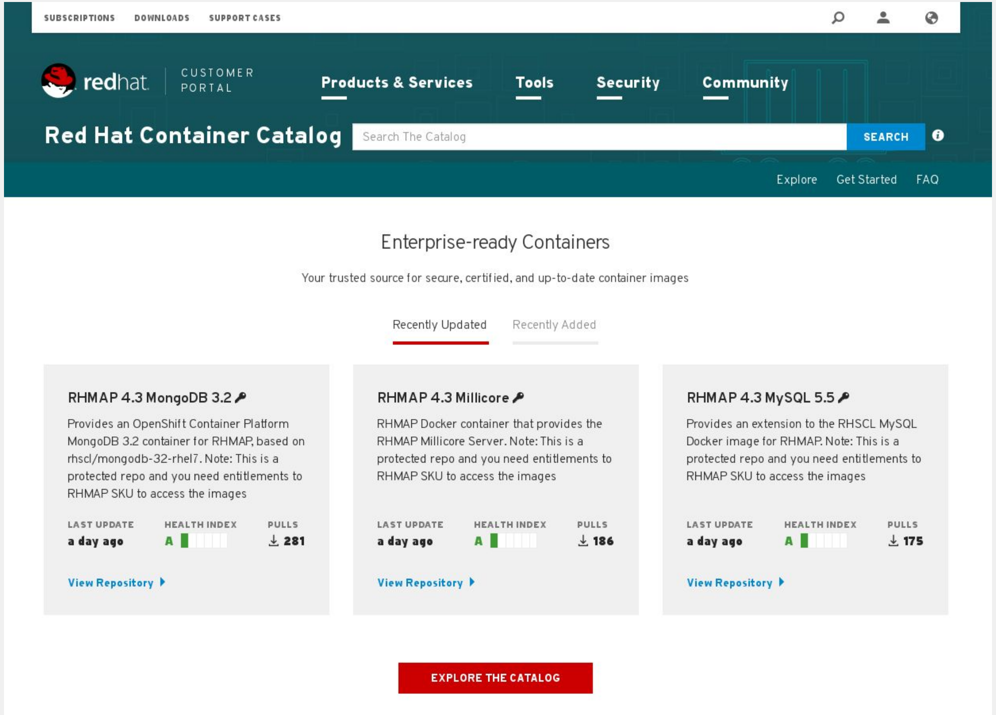
- Partners for PKI, identity, encryption and storage integration

*Exact features vary by product.
See Red Hat Security Roadmap for Hybrid Cloud

TRENDS FOR HYBRID CLOUD

- Boot-time image verification and measurement
  - Using TPM for both RHEL and OpenStack
- OverlayFS support of SELinux
  - Stronger mandatory access controls for Containers file systems
- Better secrets management for Containers
  - Avoid hard coding secrets, or a specific storage vault, into the Container
  - New Vault Operator from CoreOS
- OpenShift reduced attack vectors
  - Deletes old memory-backed volumes to reduce risk
  - Service Containers for privileged process that are still controlled
- Trusted Execution Environments (Intel SGX, AMD SVE, ARM TrustZone)
  - Encrypted memory for protection of VM/Container from host itself
  - Better scale of solutions and better support for virtual TPM for cloud use

TRUSTING THE CLOUD - THE CONTAINER HEALTH INDEX



Red Hat Container Catalog

Enterprise-ready Containers

Your trusted source for secure, certified, and up-to-date container images

RHMAP 4.3 MongoDB 3.2

Provides an OpenShift Container Platform MongoDB 3.2 container for RHMAP, based on rhscl/mongodb-32-rhel7. Note: This is a protected repo and you need entitlements to RHMAP SKU to access the images

LAST UPDATE	HEALTH INDEX	PULLS
a day ago	A	281

RHMAP 4.3 Millicore

RHMAP Docker container that provides the RHMAP Millicore Server. Note: This is a protected repo and you need entitlements to RHMAP SKU to access the images

LAST UPDATE	HEALTH INDEX	PULLS
a day ago	A	186

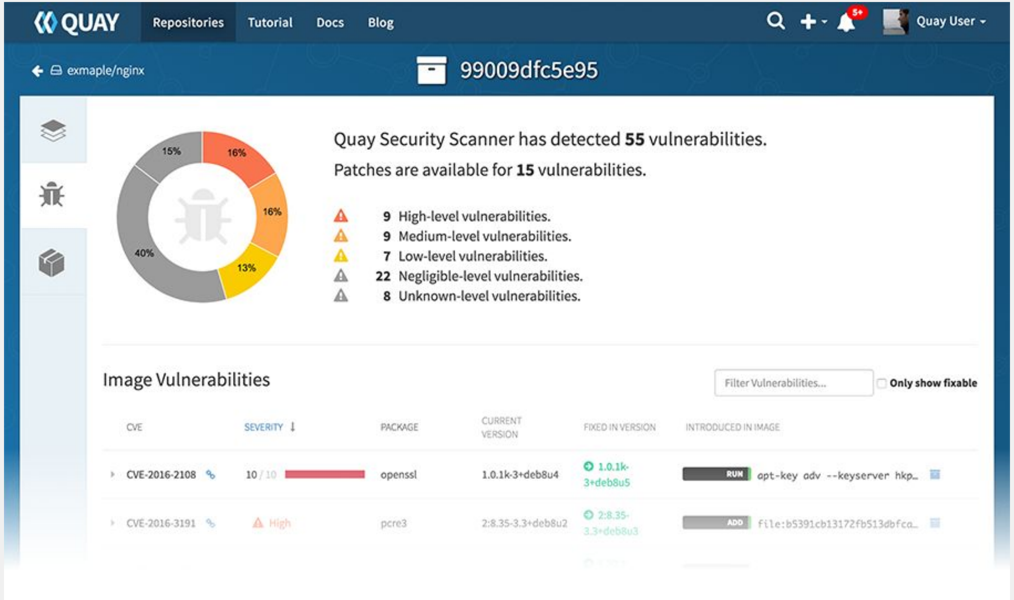
RHMAP 4.3 MySQL 5.5

Provides an extension to the RHSCL MySQL Docker image for RHMAP. Note: This is a protected repo and you need entitlements to RHMAP SKU to access the images

LAST UPDATE	HEALTH INDEX	PULLS
a day ago	A	175

- Trusted Container Images
- Letter grades A through F
  - Age of Image
  - Unapplied updates
  - Signed status
- Updated, maintained
- Unique, easy to use

COREOS VULNERABILITY SCANNER - CLAIR



99009dfc5e95

Quay Security Scanner has detected **55** vulnerabilities.

Patches are available for **15** vulnerabilities.

- 9 High-level vulnerabilities.
- 9 Medium-level vulnerabilities.
- 7 Low-level vulnerabilities.
- 22 Negligible-level vulnerabilities.
- 8 Unknown-level vulnerabilities.

Image Vulnerabilities

Filter Vulnerabilities... □ **Only show fixable**

CVE	SEVERITY ↓	PACKAGE	CURRENT VERSION	FIXED IN VERSION	INTRODUCED IN IMAGE
CVE-2016-2108	10 / 10	openssl	1.0.1k-3+deb8u4	1.0.1k-3+deb8u5	RUN `opt-key adv --keyserver hkp…`
CVE-2016-3191	High	pcre3	2:8.35-3.3+deb8u2	2:8.35-3.3+deb8u3	ADD `file:b5391cb13172fb513dbfca…`

- Part of CoreOS acquisition
- Integrates with Quay container private registry
- Continuously scans your own container images
- Easily identify issues

1. CREATING SECURE FOUNDATION
2. ENABLING HYBRID CLOUD DEPLOYMENTS
3. **AUTOMATING COMPLIANCE**

AUTOMATING SECURITY COMPLIANCE

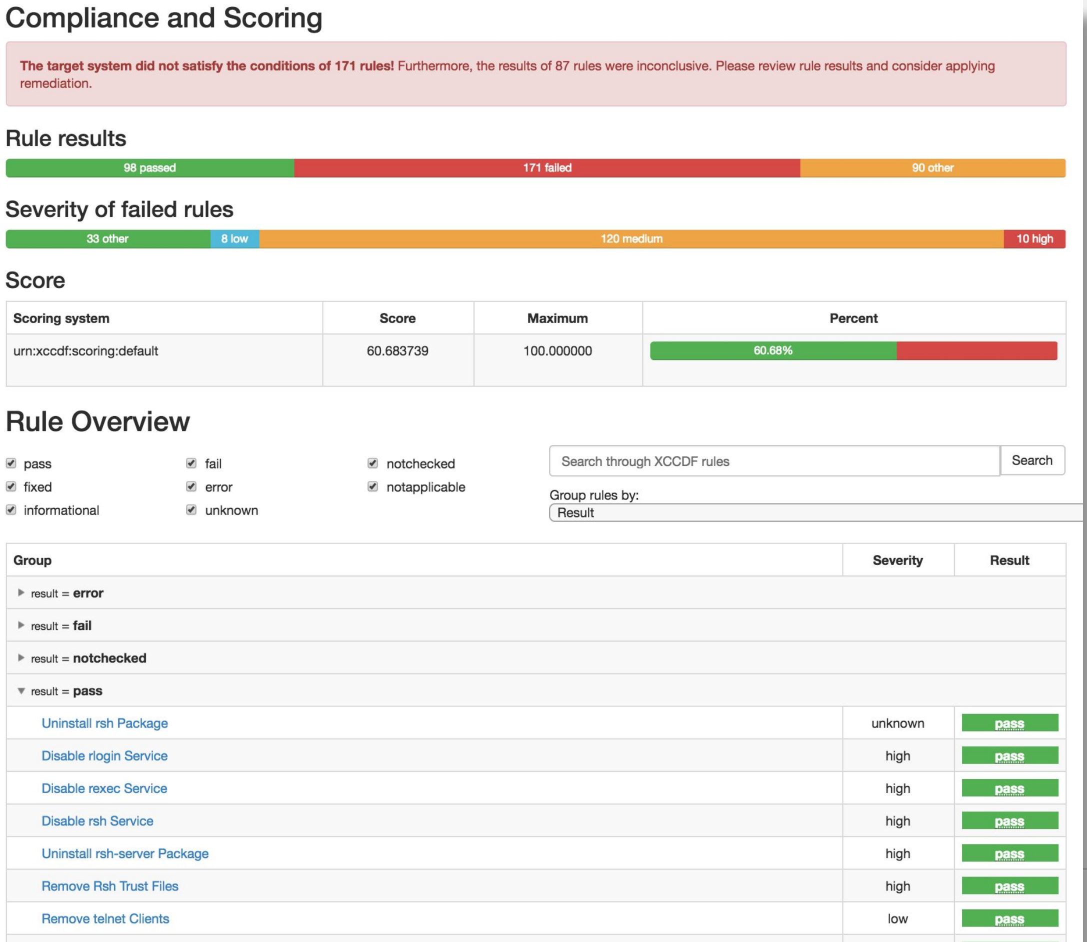
Are you sure you are running a secure system?

- OpenSCAP compliance scanning of a system
  - Automation of remediation w/Ansible, per-system or w/Satellite
  - Variety of compliance standard profiles : DISA STIG, PCI-DSS, USGCB...
- Compliance at install-time for RHEL
- Red Hat Insights service for proactive health & security monitoring
- Red Hat Satellite for automating of patch installation
- Common Criteria and FIPS certification of solutions
- Security Patch Remediation and Response
- Vulnerability API allowing you to query our database

TRENDS IN AUTOMATING SECURITY COMPLIANCE

- Service-based compliance
  - Making compliance just as easy to use as a service as the rest of your cloud
- Automation of scanning and remediation
  - RHEL System Roles, OpenSCAP Ansible remediation
- Common Logging
  - Collection of data, normalize and analysis of audit and log
  - Across Red Hat Enterprise Linux, OpenStack Container Platform, etc.
- Session recording and playback
  - Required by some customers, may be a requirement for certification
- More OpenSCAP profiles and easier contributions
  - OpenControl efforts, easier YAML input, variety of remediation tools
  - Other platforms? Give us your feedback: Windows OpenSCAP community
- Reduced cycle time for certifications (FIPS & Common Criteria)

OpenSCAP Scanner Example



Compliance and Scoring

The target system did not satisfy the conditions of 171 rules! Furthermore, the results of 87 rules were inconclusive. Please review rule results and consider applying remediation.

Rule results

98 passed | 171 failed | 90 other

Severity of failed rules

33 other | 8 low | 120 medium | 10 high

Score

Scoring system	Score	Maximum	Percent
urn:xccdf:scoring:default	60.683739	100.000000	60.68%

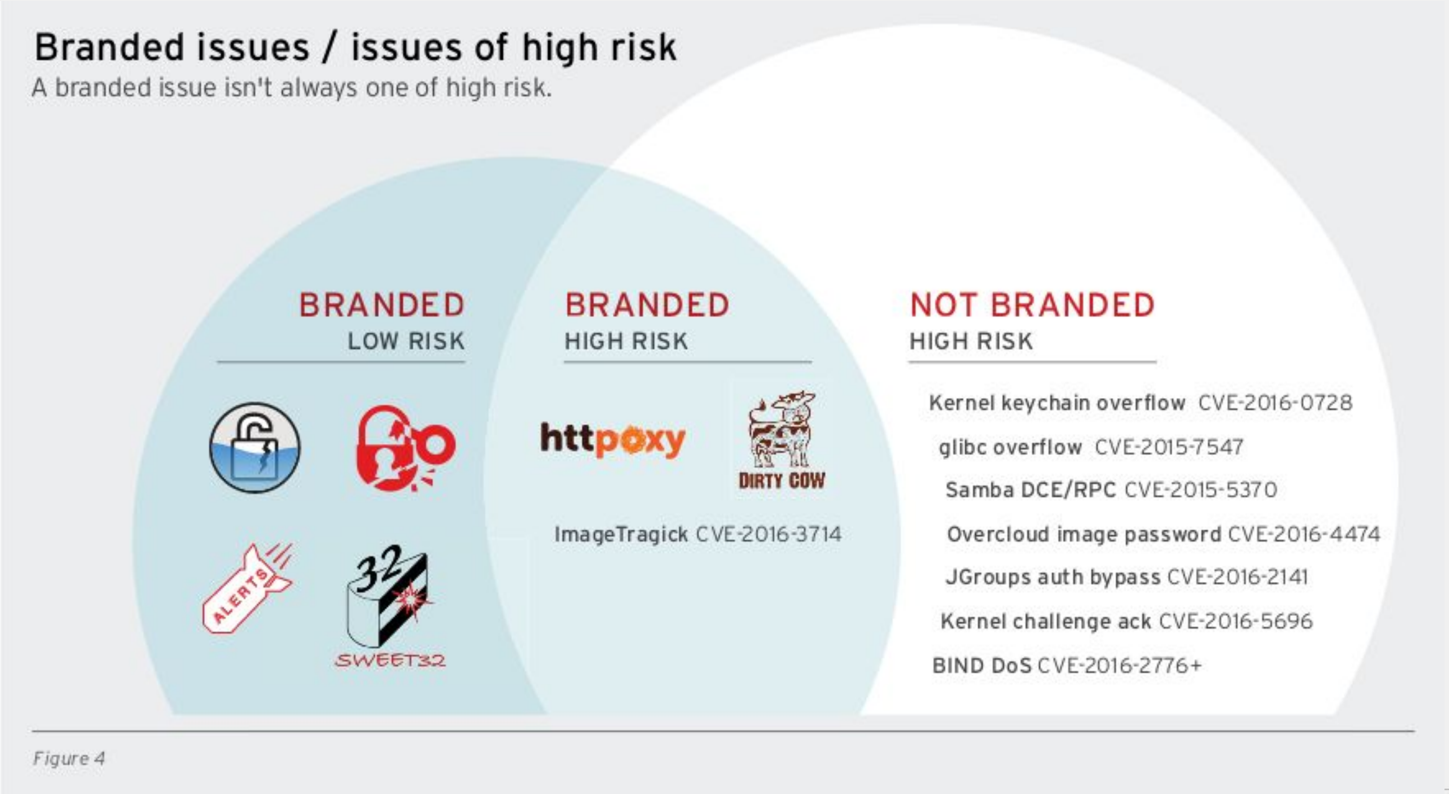
Rule Overview

☑ pass
☑ fixed
☑ informational
☑ fail
☑ error
☑ unknown
☑ notchecked
☑ notapplicable

Group rules by: Result

Group	Severity	Result
▸ result = **error**		
▸ result = **fail**		
▸ result = **notchecked**		
▾ result = **pass**		
Uninstall rsh Package	unknown	pass
Disable rlogin Service	high	pass
Disable rexec Service	high	pass
Disable rsh Service	high	pass
Uninstall rsh-server Package	high	pass
Remove Rsh Trust Files	high	pass
Remove telnet Clients	low	pass

TREND TOWARDS SMART RESPONSES TO BRANDED ISSUES



Branded issues / issues of high risk

A branded issue isn't always one of high risk.

BRANDED
LOW RISK

BRANDED
HIGH RISK

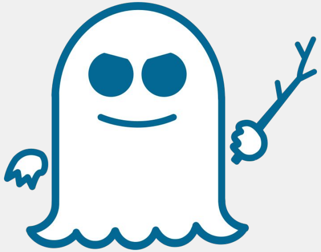
ImageTragick CVE-2016-3714

NOT BRANDED
HIGH RISK

- Kernel keychain overflow CVE-2016-0728
- glibc overflow CVE-2015-7547
- Samba DCE/RPC CVE-2015-5370
- Overcloud image password CVE-2016-4474
- JGroups auth bypass CVE-2016-2141
- Kernel challenge ack CVE-2016-5696
- BIND DoS CVE-2016-2776+

Figure 4

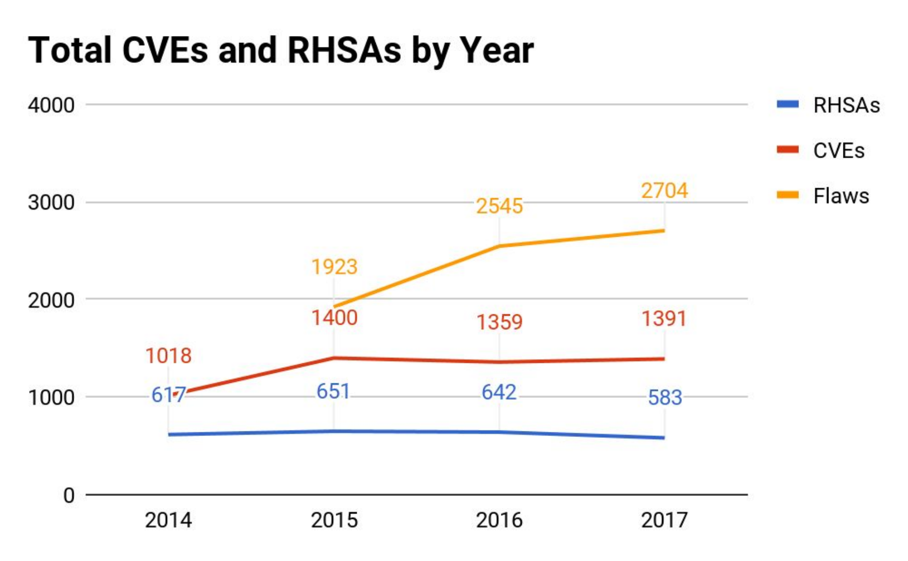
SPECTRE AND MELTDOWN PATCHES

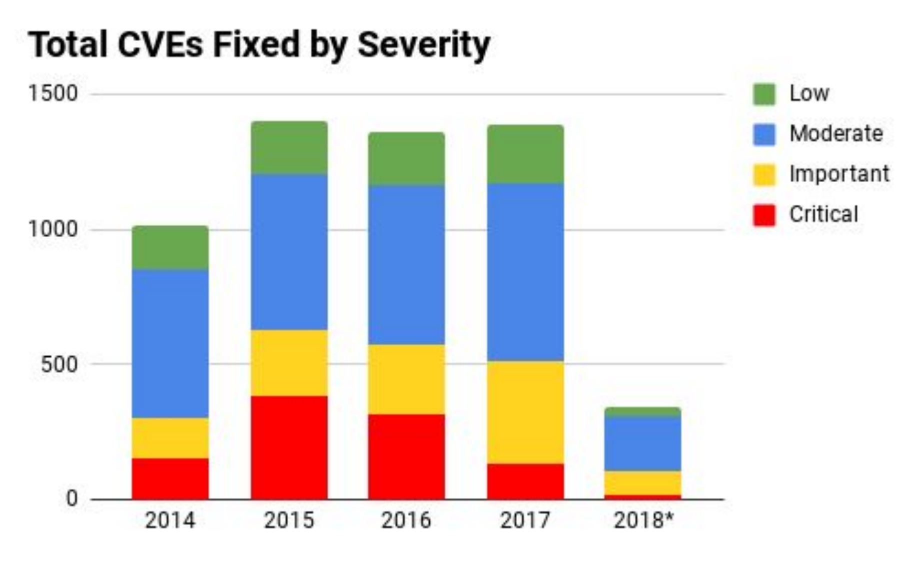


Release	Versions
RHEL 7	7.4z, 7.3 EUS, 7.2 AUS & SAP, 7.4-ALT, 7.5-ALT
RHEL 6	6.9z, 6.7 EUS, 6.6 AUS, 6.5 AUS, 6.4 AUS, 6.2 AUS
RHEL 5	5.11 ELS, 5.9 AUS
RHEV / RHV	3, 3 ELS, 4
OpenStack Platform	6, 7, 8, 9, 10, 11, 12

- Broad coverage of Red Hat Platforms on Jan 3 (early break of embargo)
- Container base images updated within SLA
- Only vendor who delivered support on RHEL 5 / Linux Kernel 2.x

RED HAT PRODUCT SECURITY OVER THE YEARS


Total CVEs and RHSAs by Year


Total CVEs Fixed by Severity

https://www.redhat.com/security/data/metrics/
https://access.redhat.com/documentation/en-us/red_hat_security_data_api/0.1/html-single/red_hat_security_data_api/index

IN CONCLUSION...

REMINDER OF WHAT WE TALKED ABOUT

Red Hat and Security in the Community

What we are seeing as trends in :

- Creating secure foundations
    - Network Bound Disk Encryption Use Case
- Enabling hybrid cloud deployments
- Automating security compliance

Where else to go for more information - especially here at Summit

Q&A

WHERE TO GO AT SUMMIT 2018

Remember over 50 security sessions to choose from!

Sessions (a sampling)

- The Red Hat Security BoF : Ask Us (Almost) Anything
- Getting Strategic About Security
- Defend Yourself Using Built-in RHEL Security Technologies
- Automating Security & Compliance For Hybrid Environments
- Path To Success With Your Red Hat Identity Management Deployment
- Booth: Hat : IT Optimization
  - NBDE with TPM demo
  - USBGuard demo
  - Identity Management demo
  - Product Security Team
- Practical SCAP
- Deploying SELinux Successfully in Production Environments
- Red Hat Security Roadmap for Hybrid Cloud

WHERE TO LEARN MORE

Report a Security Concern

- SecAlert@redhat.com

Product Documentation

- access.redhat.com

Product Security Center

- access.redhat.com/security

Customer Security Awareness Program

- access.redhat.com/articles/2968471

RED HAT SUMMIT

THANK YOU

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