

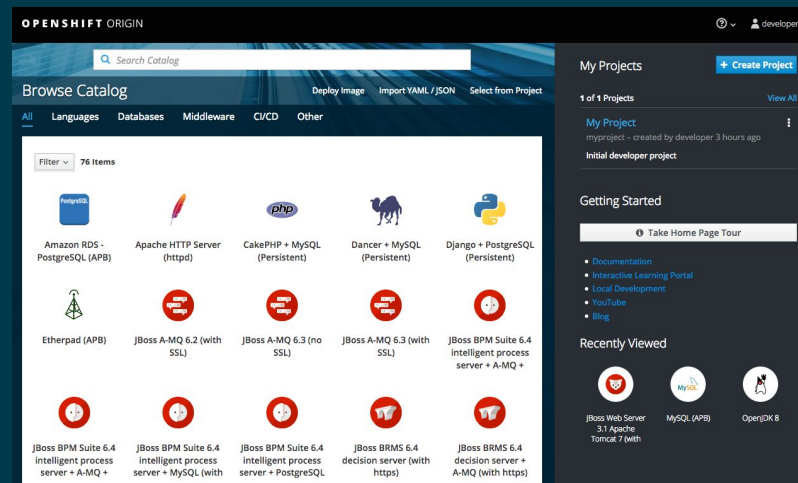
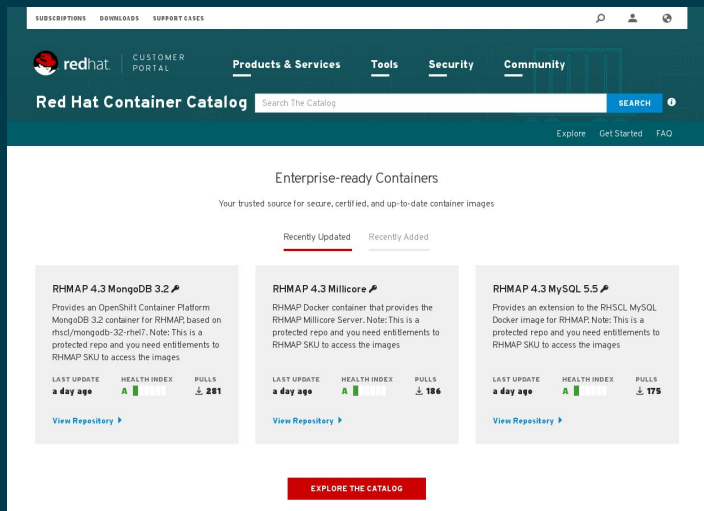


RED HAT CONTAINER CATALOG

How we built it - what's in there - what's next

Dirk Herrmann
(Former Product Owner RHCC)
Product Manager OpenShift
Bonn, April 24th 2018

RHCC is NOT OpenShift Service Catalog (yet?)



<https://access.redhat.com/containers/>

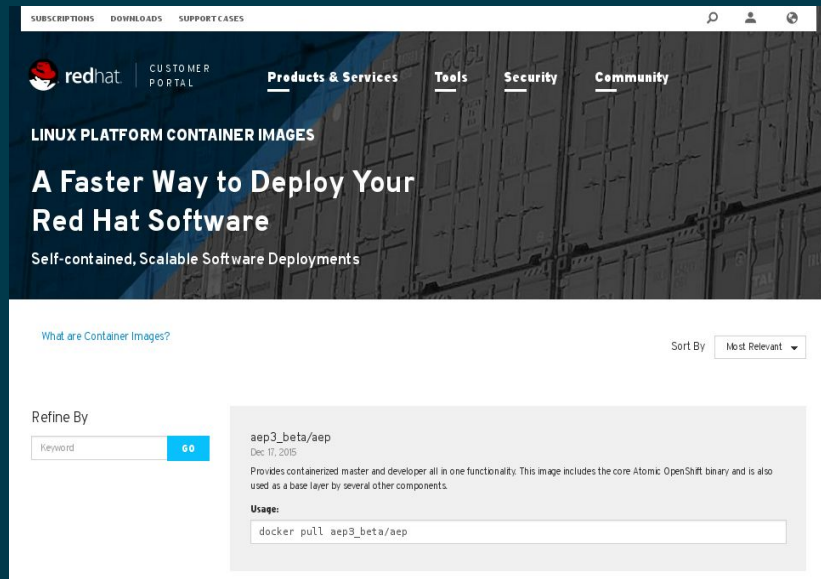
Part of OpenShift Container Platform

The Customer Challenge

When we compared the customer challenge with where we were

It's quick and easy to pull a Linux container image from a public registry and get started.

In fact, too easy. There can be an explosion of different distributions, architectures, performance and security characteristics in different images.



Questions we asked ourselves

- Do we provide sufficient guidance to search for a particular image?
- Do we provide sufficient data to evaluate an image based on different criteria?
- Do we provide sufficient information how to consume an image depending on the container runtime or container management platform?
- Do we bring together existing, valuable assets and show them side-by-side with their corresponding container images?
- Assuming that container images are static content bundles, how we can make clear which image versions is affected by critical security vulnerabilities?

Red Hat Registry Stats

- 544 repositories
- 5,609 images
- 1+ TB storage



Red Hat Security Statistics 2016

- 97 critical RHSA
- 286 important RHSA
- 100% fixed in <1d *



Red Hat Customer Portal Stats 2016

- 13,100,00 visitors
- 2,400,000 searches
- 108,300,000 views



- Cross-team effort of 10 teams across 4 organizations
- Design driven approach focusing on end customer user experience

RED HAT® CONTAINER CATALOG

- Container Health Index
- Extensive Image Metadata
- Image Documentation
- Image Advisories

* 100% of critical security flaws in RHEL have been fixed in less than one day: <https://access.redhat.com/blogs/766093/posts/2957221>



Vision

Our vision is to help developers, architects, and IT operations realize the full potential of containers by transforming the way container-based applications are built, delivered, and consumed

1 Explore &
Search

2 Evaluate &
Select

3 Consume &
Distribute

4 Use &
Maintain

Mission

Our mission is to provide customers and partners with the best experience when delivering and consuming container-based applications. This includes the right information and guidance to make intelligent decisions about which container images to consume

RHCC Mission Statement - 3 Focus Areas

1

Metadata

- Provide as much as possible **relevant** metadata
- Focus on human readable and actionable metadata

2

User Experience

- Provide an intuitive UI supporting target use cases
- Focus on relevant user journeys (UX) and UI design
- Support different target persona

3

Users / Persona

- Focus on high value and existing USPs
(differentiate)

**Joe**

Architect

I want to explore what's inside the Red Hat Container Catalog
I want to search for a product and see all images belonging to it

1 Explore &
Search**2** Evaluate &
Select**3** Consume &
Distribute**4** Use &
Maintain

I'm searching for a database container image
I'm searching for Red Hat Enterprise Linux base image

Jane

Developer



Explore the Catalog:

Repository Activity in the Last 30 Days

New (17)

Brand new repositories which have recently been added to the catalog.

Updated (148)

Active repositories with a recent image update.

Most Popular (50)

Top 50 most pulled repositories over the last month.

Popular Products [View all products](#)

Red Hat Enterprise Linux (53)

Red Hat OpenShift Container Platform (44)

JBoss Enterprise Application Platform (3)

JBoss Fuse (2)

Red Hat Gluster Storage (2)

Popular Application Categories

Container Platform / Management (33)

Operating System (22)

Mobile Application Development Platform (MADP) (20)

Programming Languages & Runtimes (16)

Logging & Monitoring (15)

Virtualization Platform (12)

Image Architectures

Application Image (46)

Builder Image (13)

Base Image (10)

use our explore page to browse most relevant products and image categories

app categories such as database, programming language, logging

popular Red Hat and Ecosystem products

Base, Builder and Application Images


 CUSTOMER
PORTAL

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[Tools](#)
[Security](#)
[Community](#)

 RED HAT **CONTAINER CATALOG**

Search The Catalog

SEARCH


[Explore](#)
[Get Started](#)
[FAQ](#)


Jane
Developer

I'm looking for a base image, what are my options?

Image Repositories

Products

APPLICATION CATEGORY

Operating System (0)

PRODUCT

[Red Hat Enterprise Linux \(0\)](#)

RELEASE CATEGORIES

[Generally Available \(0\)](#)

IMAGE ARCHITECTURES

[Base Image \(0\)](#)

10 of 10 Results

Hide Beta

Hide Deprecated

Repository Name	Health Index	Push
<div>rhel7/ha</div> <div>Red Hat Enterprise Linux by Red Hat, Inc.</div> <div> 4 days ago 7.3-82 Health A 1 1 </div>	<div>75k</div>	
This platform image provides a minimal runtime to build, run and deploy Red Hat Enterprise Linux 7 applications as a container on a Red Hat Enterprise Linux 7 and Red Hat Enterprise Linux 7 Atomic host.		
<div>rhel7/ha</div> <div>Red Hat Enterprise Linux 6.8 by Red Hat, Inc.</div> <div> 4 days ago 6.8-85 Health A 1 1 </div>	<div>2k</div>	
This platform image provides a minimal runtime to build, run and deploy Red Hat Enterprise Linux 6 applications as a container on a Red Hat Enterprise Linux 7 and Red Hat Enterprise Linux 7 Atomic host.		
<div>rhel7.3</div> <div>Red Hat Enterprise Linux by Red Hat, Inc.</div> <div> 4 days ago 7.3-82 Health A 1 1 </div>	<div>15k</div>	
This platform image provides a minimal runtime to build, run and deploy Red Hat Enterprise Linux 7.3 applications as a container on a Red Hat Enterprise Linux 7 and Red Hat Enterprise Linux 7 Atomic host.		

Popular Application Categories

 Container Platform /
Management (33)

Operating System (22)

 Mobile Application Development
Platform (MADP) (20)

 Programming Languages &
Runtimes (16)

Logging & Monitoring (15)

Virtualization Platform (12)

Image Architectures

Application Image (46)

Builder Image (13)

Base Image (10)

Base Image

Category Overview

Simply put, a base image is an image that has no install layer. Typically, a base image contains a fresh copy of an operating system. Base images normally include the tools (yum, rpm, apt-get, etc.) necessary to install packages. Image updates to the image over time. While base images can be "hard crafted" in practice they are typically produced and published by open source projects (like Debian, Fedora or CentOS) and vendors like Red Hat. The provenance of base images is critical for security. In short, the sole purpose of a base image is to provide a starting place for creating your derivative images. When using a Dockerfile, the choice of which base image you are using is explicit. FROM registry.access.redhat.com/rhel7

Red Hat currently provides two main base images supported to be used for different use cases:

RHEL Image

- Defines the RHEL "platform" tier
 - All standard RHEL packages
 - Less than 200M
- Standard RHEL lifecycle
- Major & minor releases are preserved in the registry (similar to ISO)
- YUM package manager
- Standard RHEL binaries

[GO TO RHEL IMAGE](#)

Atomic Image

- Minimal footprint
 - 200M compressed
 - TSMON disk
- Only latest minor release
- Removal of non-essential components (python, systemd, etc)
- Microdnf package manager
- No SUDO binaries

[GO TO ATOMIC IMAGE](#)

The Red Hat Container Catalog provides namespaces, repositories, and tags to make it easy to consume images with the desired lifecycle. Here are some examples:

- Latest version of the current release: rhel/ha:latest
- Latest version of a major release: rhel/ha:rhel7
- Latest version of a specific minor release: rhel/ha:rhel7.3

When a new Red Hat Enterprise Linux minor release is shipped we deprecate the older minor release version and mark it in the Red Hat Container Catalog accordingly including a pointer to the repository supported to be used instead. Minor release repositories are useful for standardizing at a point in time and are analogous to ISO images for RHEL.

All Red Hat Enterprise Linux Base Image variants listed below:

10 of 10 repositories belong to this category

Repository Name	Health Index	Push
<div>rhel/ha</div> <div>Red Hat Enterprise Linux by Red Hat, Inc.</div> <div> 4 days ago 7.3-82 Health A 1 1 </div>	<div>75k</div>	
This platform image provides a minimal runtime to build, run and deploy Red Hat Enterprise Linux 7 applications as a container on a Red Hat Enterprise Linux 7 and Red Hat Enterprise Linux 7 Atomic host.		
<div>rhel/ha</div> <div>Red Hat Enterprise Linux 6.8 by Red Hat, Inc.</div> <div> 4 days ago 6.8-85 Health A 1 1 </div>	<div>2k</div>	
This platform image provides a minimal runtime to build, run and deploy Red Hat Enterprise Linux 6 applications as a container on a Red Hat Enterprise Linux 7 and Red Hat Enterprise Linux 7 Atomic host.		

use the Base Images
filter on search page

or use Base Images
tile on explore page

to find our Red Hat base images





Type-ahead
contains products,
repositories and
app categories

Search results with
key data

You can search for:

- Images / Repos
- Products
- Image ID
- Advisory ID
- Categories
- Keywords
- etc.

Filter facets
for multiple
characteristics

**Joe**

Architect

I want to see the key characteristics of an image.
Is there documentation available around an image?

1 Explore &
Search

2 Evaluate &
Select

3 Consume &
Distribute

4 Use &
Maintain

What are the environment variables defined inside the image?
I would like to learn how this images has been built.

Jane

Developer





RHEL Atomic Base Image

by [Red Hat, Inc.](#) | in Product [Red Hat Enterprise Linux](#)

[registry.access.redhat.com/rhel-atomic](#) Updated 5 days ago 7.3-19 : Health Index

[Overview](#)[Get this image](#)[Tech Details](#)[Documentation](#)[Tags](#)

Description

The Red Hat Enterprise Linux 7 Atomic Base Image is designed to be a fully supported foundation for your custom developed applications which are built and updated rapidly, and don't require the extensive libraries or services in the operating system. This image is maintained by Red Hat and updated regularly, following the latest minor release cadence of Red Hat Enterprise Linux. It is designed for containerized applications that don't rely on a full, traditional Linux userspace, but wish to maintain complete runtime compatibility with RHEL. When used as the source for your containers, only one copy will ever be downloaded and cached in your production environment. Use this image just like you would a regular Red Hat Enterprise Linux distribution. Only a minimal set of tools are provided - components such as python, systemd, and yum are not included by default. Extra packages can be installed and updated with a simplified package manager called microdnf.

Application Categories [Operating System](#)

Keywords [base](#) [rhel7](#) [atomic](#)

▼ Hide Repository Specifications

Registry	registry.access.redhat.com
Namespace/Repository	rhel-atomic
Release Category	Generally Available
Repository Size	112.5 MB
Image Versions	4
Subscription Required	No

Most recent tag

[View All Tags](#)

Updated 5 days ago

7.3-19

Health Index

Image Advisory

RHBA-2017:1123 [🔗](#)

▶ Show Image Specifications

overview page
shows most
relevant repository
and latest image
version data

additional tabs for
consumption
guidance, further
technical details,
surrounding
documentation
and tag index

CUSTOMER
PORTAL[Products & Services](#)[Tools](#)[Security](#)[Community](#)RED HAT **CONTAINER CATALOG**

Search The Catalog

SEARCH[Explore](#) [Get Started](#) [FAQ](#)**Joe**

Architect

I want to learn more how to consume and use this image.
Do I need a subscription or license to pull it?

1 Explore &
Search**2** Evaluate &
Select**3** Consume &
Distribute**4** Use &
Maintain

I want to pull this image, what do I need to do?
I'm using Red Hat Satellite 6, how can I sync the repository?

Jane

Developer





RHEL Atomic Base Image

by [Red Hat, Inc.](#) in Product [Red Hat Enterprise Linux](#)[registry.access.redhat.com/rhel-atomic](#) Updated 11 days ago 7.3-15 : Freshness

Overview

Get this image

Tech Details

Documentation

Tags

Choose your platform:

Red Hat Satellite

See [Acquiring Red Hat Container Images](#) for general information on acquiring images listed in the Red Hat Container Catalog. Select "Choose your platform" for specific acquire paths.

Satellite 6 supports two different ways to distribute container images to its managed hosts:

- A. **External Registries:** You can [configure external registries](#) by navigating to **Containers > Registries** in the Web UI of Satellite 6. Note that in this scenario Satellite 6 only triggers commands executed on the corresponding container host. This is a **pass-by** scenario because the image is neither pulled through Satellite 6 nor cached or stored inside Satellite 6. This also applies for the predefined external registry Docker Hub while [creating a new container](#).
- B. **Local Content:** Red Hat Satellite allows you to [import / synchronize images from local and external registries](#). Satellite itself can act as an image registry for hosts. However, hosts cannot push changes back to the registry.

In this document we describe how to use Satellite 6 to synchronize external image repositories (**local content, scenario B**).

1

Prerequisites

Before container images can be synchronized into Satellite 6 the following prerequisites have to be met:

- Red Hat Satellite 6 has been installed following the [Satellite 6 Install Guide](#)
- [Subscription Manifest](#) created and uploaded to Satellite 6 to access content
- For CLI Users only: [hammer CLI installed and configured](#)

2

Creating a Custom Product

consumption
guidance for
different
container
runtime env's
and registries

consumption
details
including copyable
command
lines

CUSTOMER
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Red Hat Container Catalog

SEARCH

[Explore](#) [Get Started](#) [FAQ](#) [Favorites](#)

Jenkins 2 ☆

by [Red Hat, Inc.](#) | in Product [Red Hat OpenShift Container Platform](#)[registry.access.redhat.com/openshift3/jenkins-2-rhel7](#) Updated 5 days ago [v3.6.173.0.21-17](#) [🌱](#): Health Index [A](#)[Overview](#)[Get this image](#)[Tech Details](#)[Documentation](#)[Tags](#)

Description

Jenkins is an open source automation server written in Java. Jenkins helps automating the non-human part of the whole software development process, with now common things like Continuous Integration, but by further empowering teams to implement the technical part of a Continuous Delivery. It is a server-based system running in a Java servlet container.

Application Categories [Container Platform / Management](#) [Developer Tools](#)

Registry	registry.access.redhat.com
Namespace/Repository	openshift3/jenkins-2-rhel7
Release Category	Generally Available
Repository Size	3.1 GB
Image Versions	11

Most recent tag

[View All Tags](#)

Updated 5 days ago

[v3.6.173.0.21-17](#)

Health Index

This image has been signed with
Red Hat's GPG key:
199E2F91FD431D51

[🌱 Signed](#) [🔒 Unprivileged](#)[► Show Image Specifications](#)

Image Sign
information
verify GPG
signatures



Red Hat Container Catalog

Search The Catalog

SEARCH



Explore

Get Started

FAQ

Jenkins 2 >

Signed

2.32-15

Updated image available

by Red Hat, Inc. | in Product Red Hat OpenShift Container Platform

registry.access.redhat.com/openshift3/jenkins-2-rhel7

DATE PUSHED	IMAGE ADVISORY	SIZE	DOCKER IMAGE ID
2 months ago	RHBA-2017:1830	291.2 MB	e637a4bfe7df

Security

Change Summary

Package List

Dockerfile

Dockerfile Preview This dockerfile does not include internal build system changes or embedded scripts and configuration files.

```
1. FROM rhel7:7.3-released

# Jenkins image for OpenShift
#
# This image provides a Jenkins server, primarily intended for integration with
# OpenShift v3.
#
# Volumes:
# * /var/jenkins_home
# Environment:
# * $JENKINS_PASSWORD - Password for the Jenkins 'admin' user.

MAINTAINER Ben Parees <bparees@redhat.com>

ENV JENKINS_VERSION=2.32 \
    HOME=/var/lib/jenkins \
    JENKINS_HOME=/var/lib/jenkins \
    JENKINS_UC=https://updates.jenkins-ci.org

LABEL io.k8s.description="Jenkins is a continuous integration server" \
    io.k8s.display-name="Jenkins 2.32" \
    io.openshift.tags="jenkins, jenkins2, ci" \
```

Dockerfile content
to understand how
we built the image

RED HAT CONTAINER HEALTH INDEX

Questions we asked ourselves

- How customers know which images are outdated?
- How can complex security information simplified in a way that even non-security experts can easily understand if the image health is good or bad?
- How do customers know which updates are available (both content (pet container use case) and image level)?
- How customers can verify that we are updating our images on a regular basis and in case of relevant (security) events?
- How can provide all relevant information around an update including the Red Hat advisory, content diff, timestamps and other relevant data?

Red Hat Registry Stats

- 544 repositories
- 5,609 images
- 1,594,682 RPMs



images are static
content bundles

but

security issues
emerge frequently

Red Hat Security Statistics

- 3672 advisories
- 5075 unique CVEs
- 2016: 97 crit RHSA



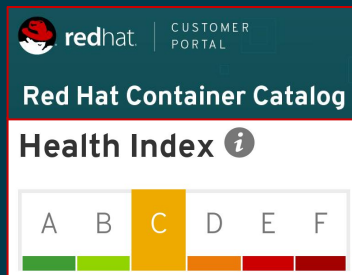
health index indicators

age of the image

unapplied updates

Developed as a **cross-team effort**
leveraging Red Hat's Security expertise

Single item status (grade A-F) as an
aggregated indicator of container health



Leveraging Red Hat security data
(advisories) for RPMs and images

Actionable scan results (RPM, Image)

**Carl**

Security

I want to see which updates are applicable to an image used by us
I want to see an actionable result for applicable security updates

1

Explore &
Search

2

Evaluate &
Select

3

Consume &
Distribute

4

Use &
Maintain

I want to get a list of all images associated with an advisory ID
I want to see an aggregated and simple freshness description

Jane

Developer





Red Hat Container Catalog

Search The Catalog

SEARCH

[Explore](#) [Get Started](#) [FAQ](#)

Jenkins 2 >

Signed

2.32-15 Updated image available

by Red Hat, Inc. in Product Red Hat OpenShift Container Platform

registry.access.redhat.com/openshift3/jenkins-2-rhel7

DATE PUSHED	IMAGE ADVISORY	SIZE	DOCKER IMAGE ID
2 months ago	RHBA-2017:1830	291.2 MB	e637a4bfe7df

[Security](#)[Change Summary](#)[Package List](#)[Dockerfile](#)

Previous Tag Comparison

CURRENT TAG	DATE PUSHED	HEALTH INDEX	PACKAGE CHANGES
2.32-15	2 months ago	B <div><div></div><div></div><div></div><div></div></div>	22 upgraded
PREVIOUS TAG	DATE PUSHED	HEALTH INDEX	
2.32-13	2 months ago	C <div><div></div><div></div><div></div><div></div></div>	

Change Summary
includes Container
Health Index
before / after

Detailed Package Changes

ALL (22)	UPGRADED (22)	DOWNGRADED (0)	ADDED (0)	REMOVED (0)	Search
Package					
Upgraded systemd-219-30.el7_3.9.x86_64					
Upgraded python-dmidecode-3.10.13-12.el7_3.x86_64					
Upgraded ca-certificates-2017.2.14-70.1.el7_3.noarch					

Detailed List of
Package Changes

What we've done

- Defined high level goals based on Google's OKR model
- Reviewing the existing RH security metadata model (advisories, OVAL, etc.)
- Defined and verified customer journeys and priorities
- Investigated existing tooling (scanners) compared with our needs
- Developed to Container Health Index backend (CVE Engine) and algorithm
- Put initial measurement / reporting in place for all our content
- Initiated several improvements inside our own image factory (auto rebuilds)
- Finally released the Container Health Index at Red Hat Summit '17 (PR)

[Technologies](#)[Services & support](#)[Success stories](#)[About Red Hat](#)[INVESTOR RELATIONS](#)

Press releases

Red Hat Sets New Standard for Trusted, Enterprise-Grade Containers with Industry's First Container Health Index

MAY 02, 2017

Red Hat extends container inspection and tooling to ISV partner ecosystem; provides customers with enhanced security, reliability and support for deploying Linux containers at scale

BOSTON--(BUSINESS WIRE)-- Red Hat, Inc. (NYSE:RHT), the world's leading provider of open source solutions, today introduced the industry's first Container Health Index, setting a new standard for enterprise-grade Linux containers. Based upon Red Hat's track record of delivering enterprise-grade open source technologies, including the world's leading enterprise Linux platform, the Container Health Index provides the most comprehensive image detail of any enterprise container service. The index grades all of Red Hat's containerized products as well as the Red Hat base layer of containers from certified independent software vendor (ISV) partners, with Red Hat planning to certify containerized products from 20 ISVs within the next 90 days.

While container-based applications have begun moving into production, not all containers are created or maintained equally. Every container starts with a Linux base layer, which means that every ISV building container images is distributing Linux content. For these containers to be used in production environments, this content needs to be free from known



Red Hat Container Catalog

bf9f9320b3d2

SEARCH

Explore Get Started FAQ

Platform for building and running Node.js 4 applications

by Red Hat, Inc. in Product Red Hat Enterprise Linux

registry.access.redhat.com/rhsc1/nodejs-4-rhel7 Updated 4 days ago 4-11.16 : Health Index A

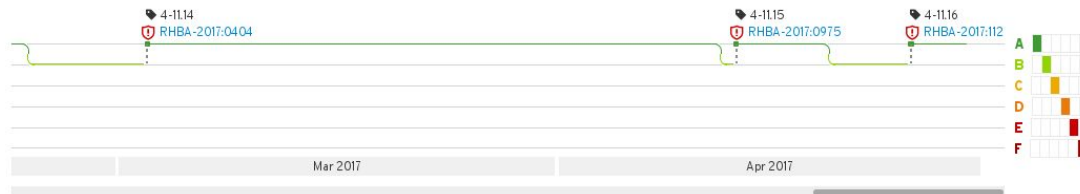
Overview

Get this image

Tech Details

Documentation

Tags



Container Health
Index history

list of all image
versions inside
this repository

Tag Name	Date Pushed	Image Advisory	Health Index	Docker Image ID
4-11.16 4 latest	4 days ago	RHBA-2017:1127	A	9e8704e70637
4-11.15	16 days ago	RHBA-2017:0975	C	79b2e96829e0
4-11.14	2 months ago	RHBA-2017:0404	C	bf9f9320b3d2
4-11.13	3 months ago	RHBA-2017:0174	C	6a532adb1abf

key version
attributes



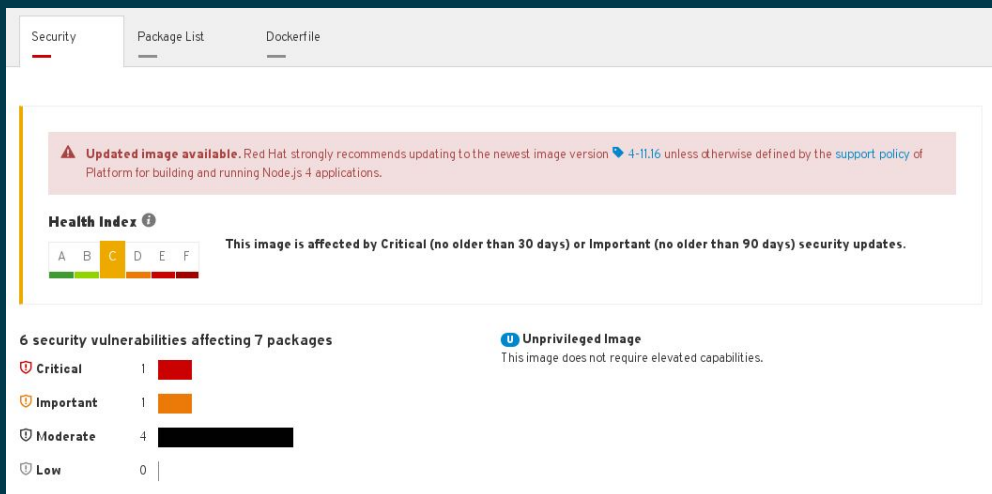


Carl

Security

What is the associated risk with the content inside the image?

warning if
non-current
image version



vulnerabilities by
advisory severity

Container Health
Index based on
applicable security
updates and its age

privilege
requirements

**Carl**

Security

*How can I get rid of those vulnerabilities ?***Affected Packages**

7 of 528 packages have security-related updates

Search affected packages

Impact		Affected Package	RPM Advisory	Fixed in Image
Critical	CVE-2017-5461	nss-util-3.21.3-1.el7_3.x86_64	RHSA-2017:1100	4-11.16
Critical	CVE-2017-5461	nss-sysinit-3.21.3-2.el7_3.x86_64 nss-tools-3.21.3-2.el7_3.x86_64 nss-3.21.3-2.el7_3.x86_64	RHSA-2017:1100	4-11.16
Important	CVE-2017-2636	kernel-headers-3.10.0-514.10.2.el7.x86_64	RHSA-2017:0933	4-11.16

Red Hat
advisory severity

CVE ID

content advisory
which contains fixnewer image version
which contains fix

Ideas of Adding RHCC Features to OpenShift

- Search & explore experience part of OpenShift service catalog
- Container Health Index integration (scanning)
- Multi-content type and dependency information
- Detailed update information (RHCC Errata++ feature)
- Documentation assets incl. custom doc's
- Update notifications and event triggers (rebuild automation)
- RHCC and OpenShift used simultaneously (play store analogy)
- Metadata exposure and sync (Grafeas)
- Interaction with RH web applications (kbase, support cases, etc.)

How you can help / contribute

- File customer support tickets asking for getting RHCC UX into OpenShift
- Soon: **customer survey** asking for use cases and their importance
 - If you're interested please fill out the pre-survey at (link to real survey)

<http://people.redhat.com/dherrman/rhcc.html>

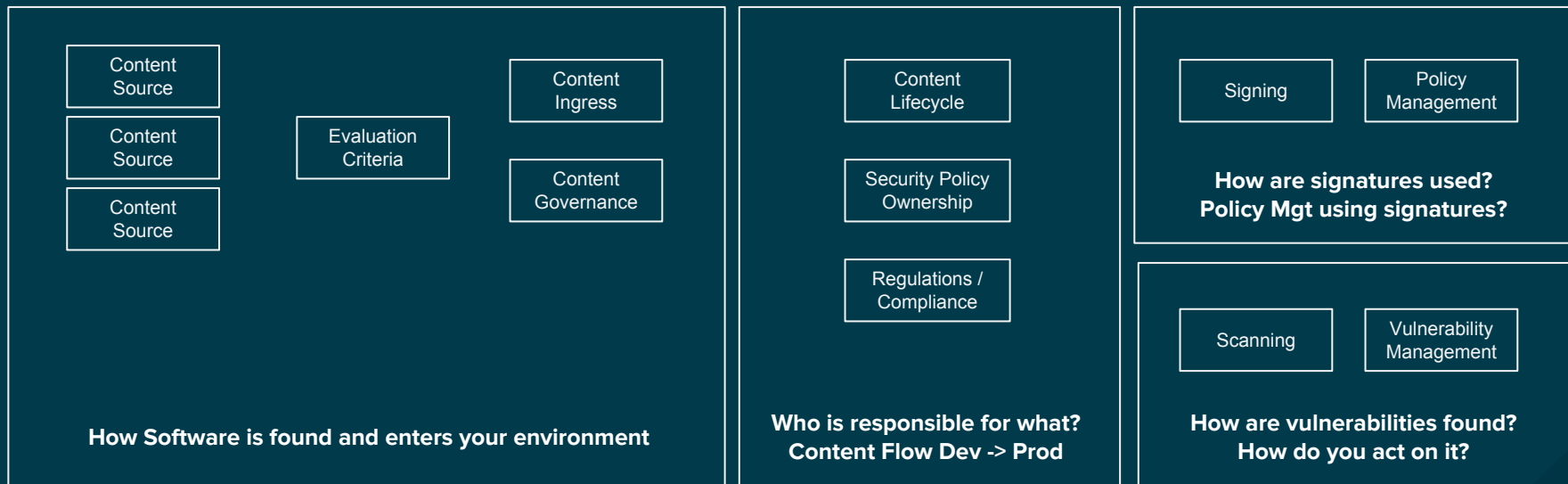
- Later today: workshop and survey around content governance & security
(includes content mgt, metadata, signing, scanning and other topics)

Why we're doing a survey?

- It's all about you - your use cases, requirements and priorities
- Security is a broad and complex topics with nearly unlimited options
 - We would like to focus on what really matters to you
- Many customers are asking us for guidance
 - In order to provide guidance it's important to understand the use case
- The “why - what - how” paradigm
 - Survey helps us to understand the “why” and the “what” to focus on “how”
 - it ensures that our “how” addresses your “why” and “what”
- We've done plenty of surveys and feedback sessions around RHCC
- Survey is the first step, further follow-up sessions planned (workshops)

Security Survey Structure

Survey Focus on Content Mgt, Signing and Scanning



<http://people.redhat.com/dherrman/sec.html>



THANK YOU



plus.google.com/+RedHat



facebook.com/redhatinc



linkedin.com/company/red-hat



twitter.com/RedHat



youtube.com/user/RedHatVideos