



TECHNICAL INTRODUCTION TO RHEL 8

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AGENDA

- ★ What's new - Overview
- ★ Where to get RHEL 8 beta ?
- ★ System management with Cockpit
- ★ What is new in package management ?
- ★ Container technologies : Podman, Buildah and Skopeo
- ★ Build your own RHEL images with Image Builder
- ★ Centralized user session recording with System recorder (tlog)

:: WHAT'S NEW ?

WHAT'S NEW IN RHEL 8 ?

- Cockpit improvements
- YUM 4 , Application stream and Flatpak
- Python 3.6 (**note on Ansible, 2.8+)
- Kernel 4.18 (RHEL 7 : Kernel 3.10)
 - 5-level page table (up to 4 PB ram)
 - New tcp stack
 - Tcp bbr congestion control
- Nvdimmm storage support
- Containers : Podman, Buildah and Skopeo
- Composer
- Systemd
- Wayland
- Stratis
- Leapp

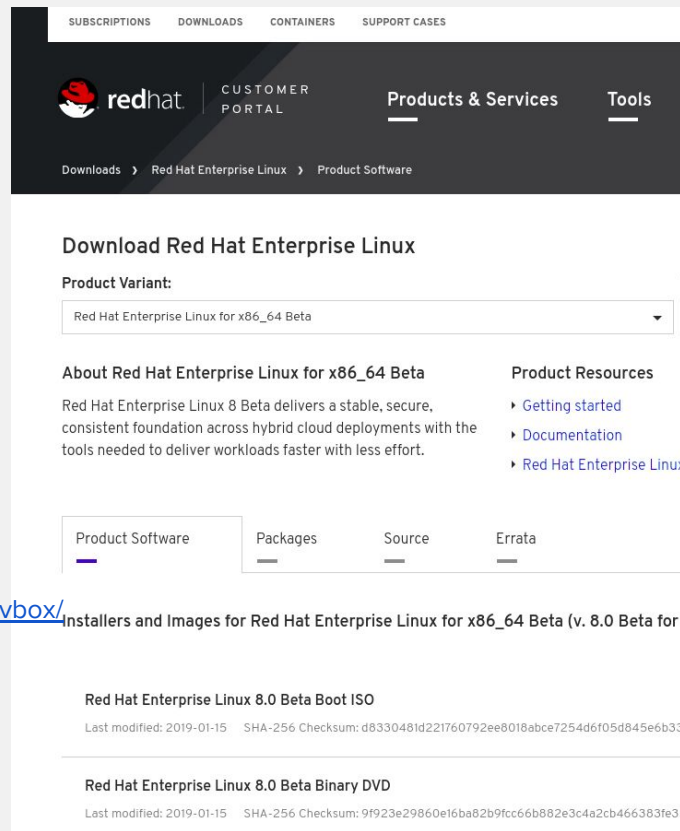
- New patches schedule
- And more ... (we are still in beta)

https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/8-beta/html/8.0_beta_release_notes/

:: WHERE TO GET RHEL 8 BETA ?

WHERE TO GET RHEL 8 BETA ?

- Customer portal
 - <https://access.redhat.com/products/red-hat-enterprise-linux/beta>
 - X86_64
 - Ppc64le
 - aarch64 (raspberry pi 3+)
 - S390x
- Developer program: <https://developers.redhat.com/rhel8/getrhel8/>
 - VirtualBox image <https://developers.redhat.com/rhel8/install-rhel8-vbox/>
 - Gnome Boxes (v3.30.2+)



The screenshot shows the Red Hat Customer Portal interface. At the top, there are navigation links for SUBSCRIPTIONS, DOWNLOADS, CONTAINERS, and SUPPORT CASES. Below this is the Red Hat logo and the text 'CUSTOMER PORTAL'. To the right, there are links for 'Products & Services' and 'Tools'. A breadcrumb trail shows 'Downloads > Red Hat Enterprise Linux > Product Software'. The main heading is 'Download Red Hat Enterprise Linux'. Below this, a dropdown menu is set to 'Red Hat Enterprise Linux for x86_64 Beta'. There are two columns of links: 'About Red Hat Enterprise Linux for x86_64 Beta' and 'Product Resources'. The 'About' section describes the stability and security of the beta. The 'Product Resources' section includes links for 'Getting started', 'Documentation', and 'Red Hat Enterprise Linux'. Below the links, there are tabs for 'Product Software', 'Packages', 'Source', and 'Errata'. The 'Product Software' tab is active, showing 'Installers and Images for Red Hat Enterprise Linux for x86_64 Beta (v. 8.0 Beta for...'. Two download options are listed: 'Red Hat Enterprise Linux 8.0 Beta Boot ISO' and 'Red Hat Enterprise Linux 8.0 Beta Binary DVD', each with its last modified date and SHA-256 checksum.

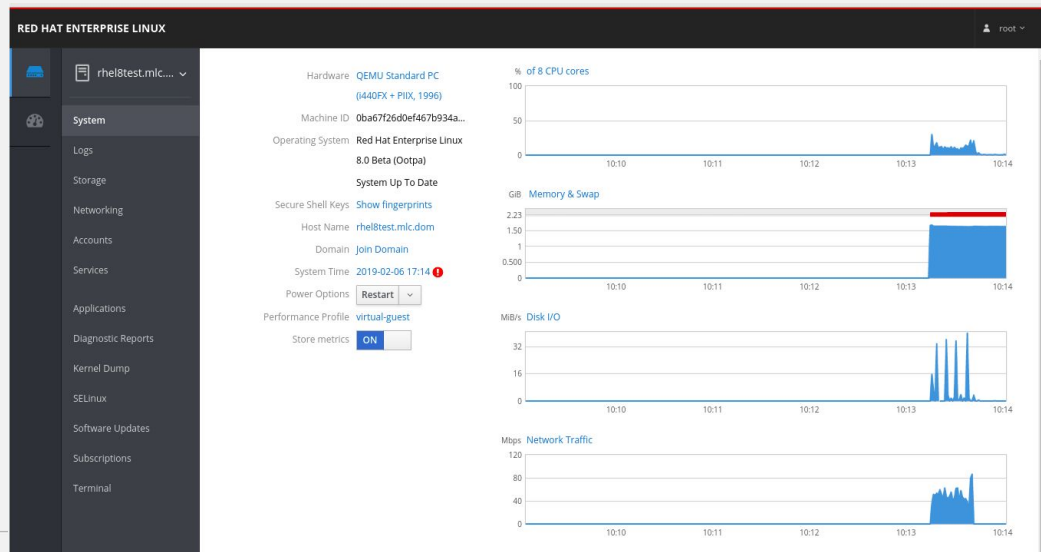
:: SYSTEM MANAGEMENT WITH COCKPIT

COCKPIT

Cockpit is an interactive server admin interface (<https://cockpit-project.org/>)

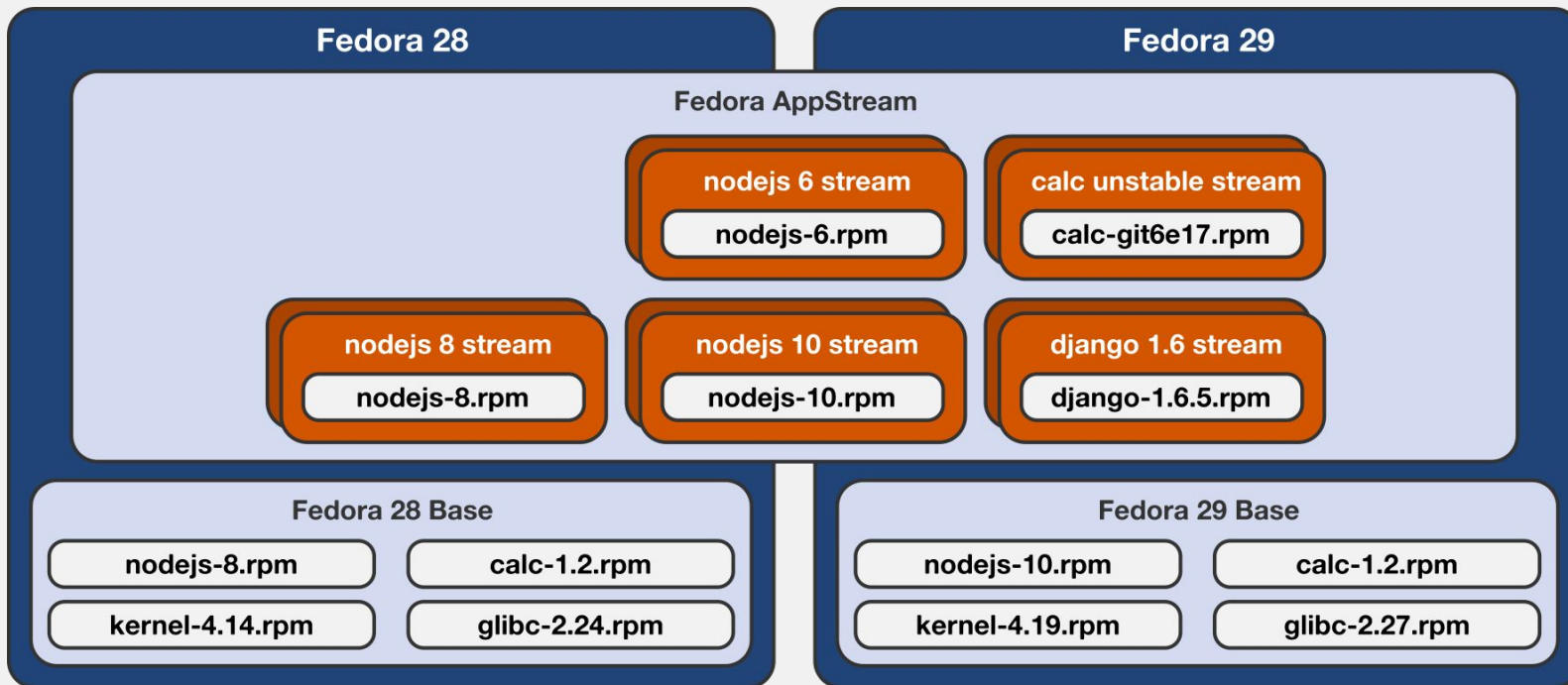
- IDM - idm domain admin can manage Cockpit
- Integration with PCP to activate metric persistence !
- Manage remote server via dashboard (7.6 +)
- New Subscription manager gui
- Tlog (session recorder) gui
- Composer - gui
- Virt manager replacement (8.1+)
- NBDE (8.1+)

** <https://github.com/cockpit-project/cockpit>



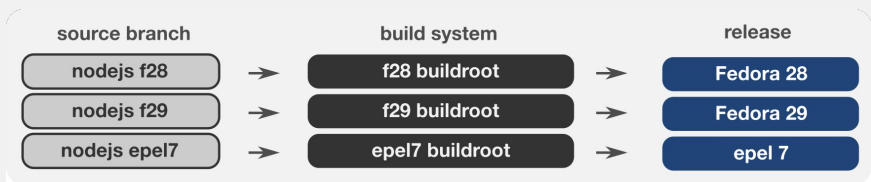
:: WHAT IS NEW IN PACKAGE MANAGEMENT ?

APPLICATION STREAM (Modularity)

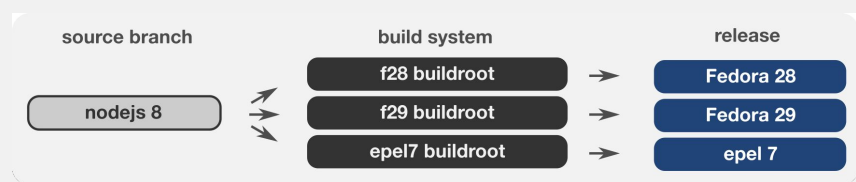


<https://developers.redhat.com/blog/2018/11/15/rhel8-introducing-appstreams/>

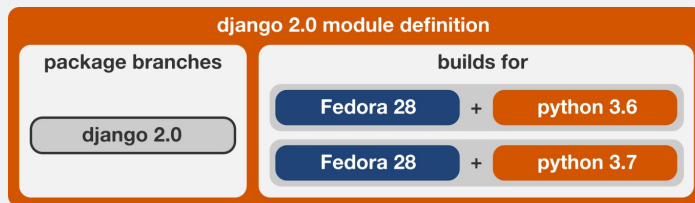
BUILDING SOFTWARE WITH MODULARITY



TRADITIONAL PACKAGE BUILDS



MODULAR PACKAGE BUILDS



BUILDING AGAINST MULTIPLE VERSIONS

APPLICATION STREAM

Provides modularity to package management

- RHEL 8 content is distributed through the two main repositories: BaseOS and Application Stream (AppStream).
 - **BaseOS**

The BaseOS repository provides the core set of the underlying OS content in the form of traditional RPM packages. Same lifecycle as RHEL 7
 - **Application Stream**

The Application Stream repository provides content with varying life cycles as both modules and traditional packages.

```
// DEMO
# yum module list
# yum module list postgresql
# yum module info postgresql
# yum module info postgresql:9.6
# yum module info postgresql:9.6 -v
# yum -y module install postgresql:9.6
# yum module list --enabled
# /usr/bin/postgresql-setup --initdb
# systemctl start postgresql
# psql --version
# yum -y module install postgresql:10
# yum -y module install postgresql/client
```

APPLICATION STREAM VS SCL

SCLs use a different method of packaging allowing for multiple versions of the same piece of software to be installed on one system, by putting them into separate namespaced paths. Modularity on the other hand uses standard RPM packaging — so things are where you expect them to be — but you can only install one version at a time.

SCLs have proven to be hard to maintain and hard to use (Special macros in spec files, package name mangling, running 'scl enable' in order to make them visible). And the ability to install multiple versions in parallel has turned out not to be a common use case. The real benefit of SCLs was the ability to choose a specific version of software — and that's exactly what Modularity offers.

FLATPAK

Flatpak is a next-generation technology for building and distributing desktop applications on Linux



The Future Of Apps On Linux

Flatpak is a next-generation technology for building and distributing desktop applications on Linux

```
//DEMO
# yum install flatpak
# flatpak remote-add --if-not-exists flathub https://flathub.org/repo/flathub.flatpakrepo
# flatpak install flathub com.spotify.Client
# flatpak list
# flatpak run com.spotify.Client
```

:: BUILD YOUR OWN RHEL IMAGES WITH IMAGE BUILDER

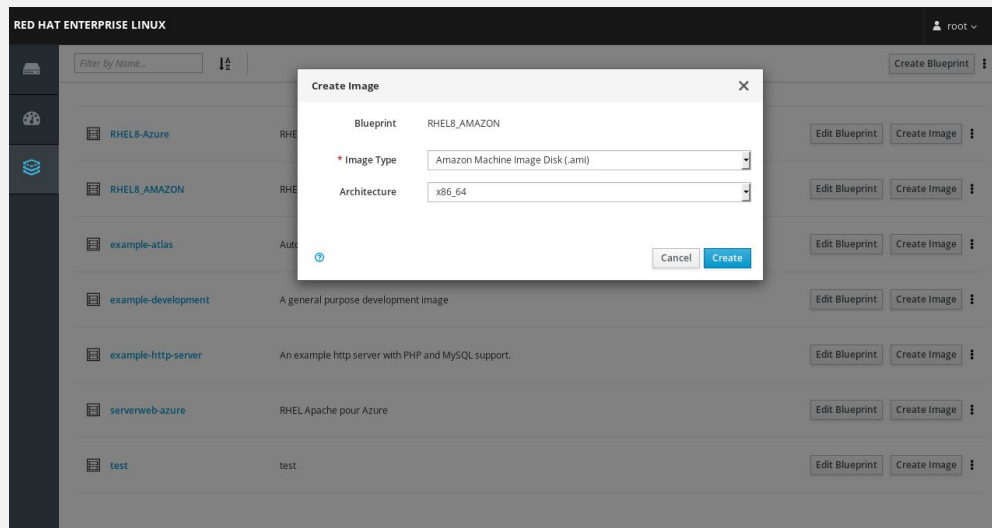
IMAGE BUILDER

<https://weldr.io/>

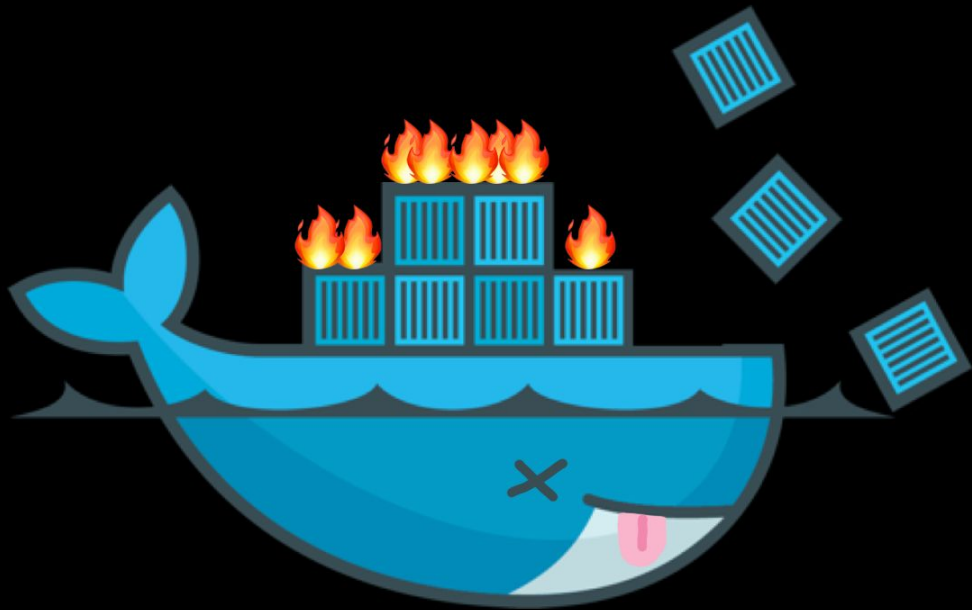
- Image Builder is a tool that enables users to create customized system images of Red Hat Enterprise Linux.
 - Amazon, Azure, .img, .iso, Openstack, qcow2, tar, and VMware
- Image Builder functionality can be accessed through a graphical user interface in Cockpit, or with a command line interface in the composer-cli tool

Ansible Playbook to setup image builder ::

<https://github.com/michaellessard/ansible-rhel8/blob/master/composer.yaml>



:: CONTAINER TECHNOLOGIES



docker

RIP 2010 - 2018

Where is Docker ?

- In RHEL 8, no more Docker daemon
- But, **you can still run/build docker images** with the help of :
 - Buildah
 - Podman
 - Skopeo
- Not new in RHEL 8, but they are becoming the default container tools in RHEL 8 !

https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/8-beta/html/building_running_and_managing_containers/



buildah

<https://github.com/containers/buildah>

Build Open Container Initiative (OCI) and Docker images

- The buildah utility replaced docker build as the preferred, maintained, and supported container images build tool in Red Hat Enterprise Linux 8
- Images can be built in either the OCI image format or the traditional upstream docker image format
- No daemon !

```
//DEMO
# container=$(buildah from fedora)
# echo $container
# buildah run $container bash
# exit
# buildah run $container -- dnf -y install screenfetch
# buildah run $container screenfetch
```



SKOPEO

<https://github.com/containers/skopeo>

Inspect, copy, and sign container images

- Replaces docker push as the preferred, maintained and supported utility for moving container images between registries, and container engines
- Can inspect a repository on a container registry without needlessly pulling the image.
- Can sign and verify container images
- Can delete container images from a remote container registry
- No daemon ! No root user required

```
//DEMO
$ skopeo inspect docker://docker.io/fedora
$ mkdir fedora-29
$ skopeo copy docker://fedora:29 dir:fedora-29
$ tree fedora-29
fedora-24
├── 7c91a140e7a1025c3bc3aace4c80c0d9933ac4ee24b8630a6b0b5d8b9ce6b9d4.tar
├── f9873d530588316311ac1d3d15e95487b947f5d8b560e72bdd6eb73a7831b2c4.tar
└── manifest.json

0 directories, 3 files
```



podman

<https://podman.io/>

Run, manage, and debug containers

- The podman container engine replaced docker as the preferred, maintained, and supported container runtime of choice for Red Hat Enterprise Linux 8
- Podman provides a docker compatible command line experience enabling users to find, run, build, and share containers
- Podman uses Buildah and Skopeo as libraries for the build and push
- No daemon !

```
//DEMO
# podman run -t -p 8000:80 nginx //than open a second terminal
# podman ps
# podman inspect -l | grep IPAddress\:
# curl http://<IP_address> // or with firefox
# podman logs --latest
# podman top <container_id>
# podman stop --latest
# podman ps -a
# podman rm --latest
```

:: SYSTEM RECORDER - TLOG

SYSTEM RECORDER - TLOG

<https://github.com/Scribery/tlog>

- Tlog is a terminal I/O recording and playback package
- implementing centralized user session recording.
- It logs everything that passes through as JSON messages to a logging service.
 - The primary purpose of logging in JSON format is to eventually deliver the recorded data to a storage service such as Elasticsearch, where it can be searched and queried, and from where it can be played back. At the same time, they retain all the passed data and timing.
- Management through command line or Cockpit

```
//DEMO
# yum install cockpit-session-recording tlog
# tlog-rec --writer=journal
# usermod --shell /usr/bin/tlog-rec-session test
# ssh test@127.0.0.1
```




THANK YOU !



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twitter.com/RedHatNews



youtube.com/user/RedHatVideos

:: EXTRA

TCP BBR CONGESTION CONTROL

Developed by Google, used on GCP

During beta testing, kernel 4.18.0-1.el8.x86_64 in RHEL 8 supported close to 558.59 Kcps, a **13%** improvement over RHEL 7.6, which is able to support 496.09 Kcps.

Not enable by default, to activate it :

```
//DEMO
# sysctl net.ipv4.tcp_available_congestion_control
# vim /etc/sysctl.conf
net.core.default_qdisc=fq
net.ipv4.tcp_congestion_control=bbr
# sysctl -p
# sysctl net.ipv4.tcp_available_congestion_control
# sysctl net.ipv4.tcp_congestion_control
```

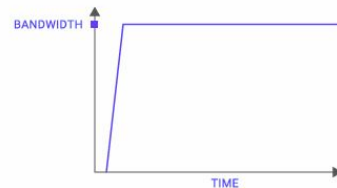
TCP before BBR

Today's Internet is not moving data as well as it should. TCP sends data at lower bandwidth because the 1980s-era algorithm assumes that packet loss means network congestion.



TCP BBR

BBR models the network to send as fast as the available bandwidth and is 2700x faster than previous TCPs on a 10Gb, 100ms link with 1% loss. BBR powers google.com, youtube.com, and apps using Google Cloud Platform services.



STRATIS

<https://stratis-storage.github.io>

Stratis is a Linux local storage management tool that aims to enable easy use of advanced storage features such as thin provisioning, snapshots, and pool-based management and monitoring.

```
//DEMO
# yum install stratis-cli stratisd
# systemctl start stratisd
# startis pool create mypool /dev/sdb
# stratis fs create mypool myfs1
# mkdir /mnt/strat1
# mount /stratis/mypool/myfs1 /mnt/strat1
# mount | grep mnt // XFS default filesystem
```

Stratis Layers

