Building the future with CentOS Stream

SCaLE 19x

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Meta

Agenda

01 CentOS at Meta

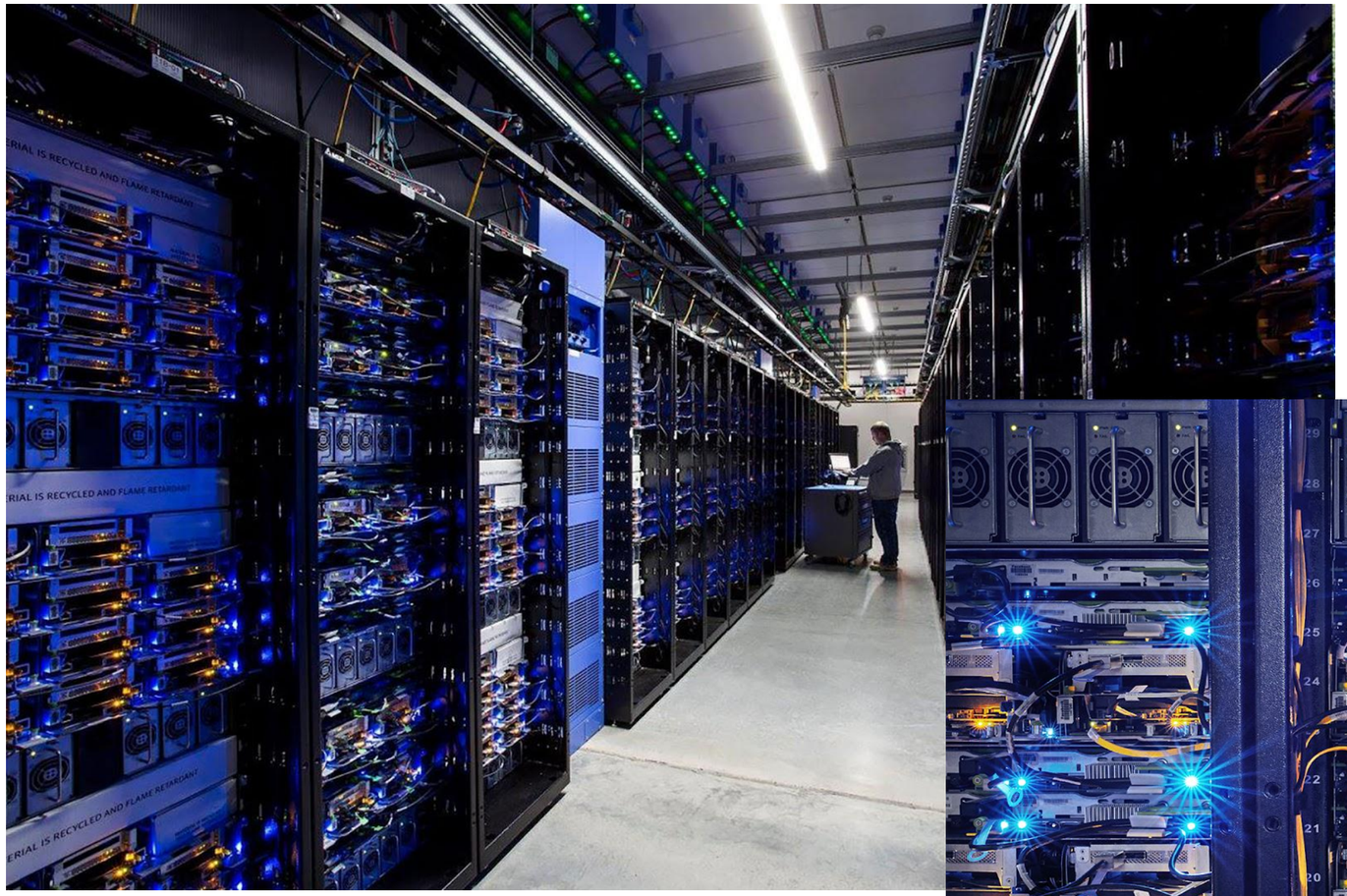
02 Contributing upstream

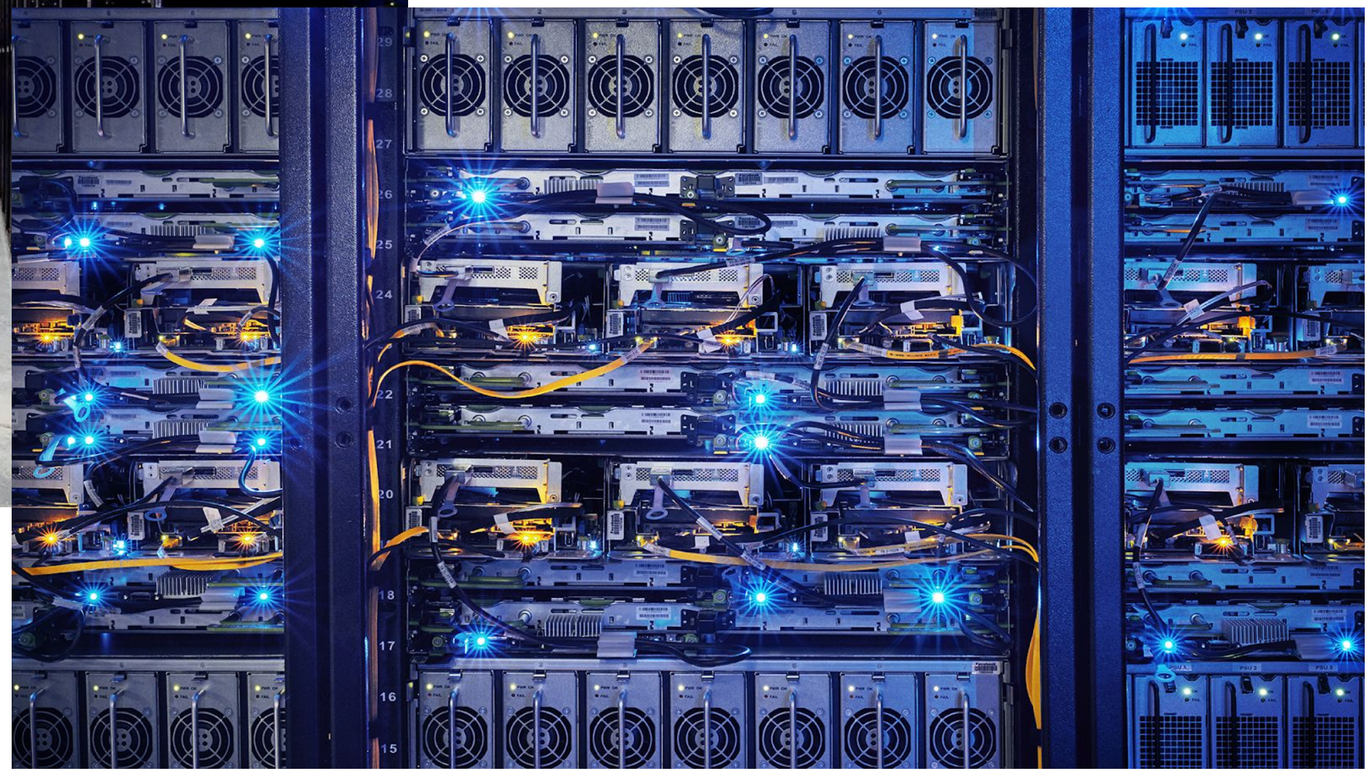
03 Hyperscale SIG

04 Get involved

CentOS at Meta

CentOS at Meta





Why CentOS?

- Stable releases
- Binary compatibility
- Security updates
- Mature and well understood tooling
- EPEL
- Relationship with Fedora

FTL - Fast Thin Layer

- Backports from Fedora Rawhide for stuff we care about
- Mostly plumbing and low-level packages
- GitHub: facebookincubator/rpm-backports
- %facebook macro to gate internal stuff
- CentOS + FTL = stable distro, moving fast

Policy deviations

- Upstream kernel
  - cgroup2 by default
  - btrfs on / by default
- iptables: legacy backend instead of nftables
- networking: network-scripts (and now networkd) instead of NetworkManager

Major OS upgrades

- CentOS Linux 5 -> 6 (~2013-2016)
- CentOS Linux 6 -> 7 (2016-2018)
- CentOS Linux 7 -> CentOS Stream 8 (2018-2022)
- CentOS Stream 8 -> 9 (2022-2023)

- Current status
  - Fleet on CentOS Stream 8
  - Completed qualification for CentOS Stream 9
  - Kicked off the mass migration earlier this month

Major OS upgrades

- Reprovisioning for OS upgrades
  - Clean slate
  - Deprecated unwanted features
  - Policy changes coupling
- Leverage the general host maintenance window
- Tooling and automation for rollouts

Minor OS upgrades

- Incremental Rolling OS upgrades
- Every two weeks we sync down the latest updates…
- …and roll them out over two weeks
- ‘dnf upgrade’ kicked off via Chef
- High level monitoring of rollout health
- Easy stop button and opt out for individual packages

Containers

- Also running CentOS
- Container images built from production repos
- Update cycle somewhat decoupled from hosts
- Update by rolling a new container

Can we do better?

- FTL
  - Internal backports are forks
  - No clear path to upstreaming
  - Bug fixes get lost
  - Distro updates have to be manually integrated
- Policy deviations
  - Have to be maintained long-term
  - Can impact bug reports and repros
  - No real feedback loop

Contributing upstream

Upstream first

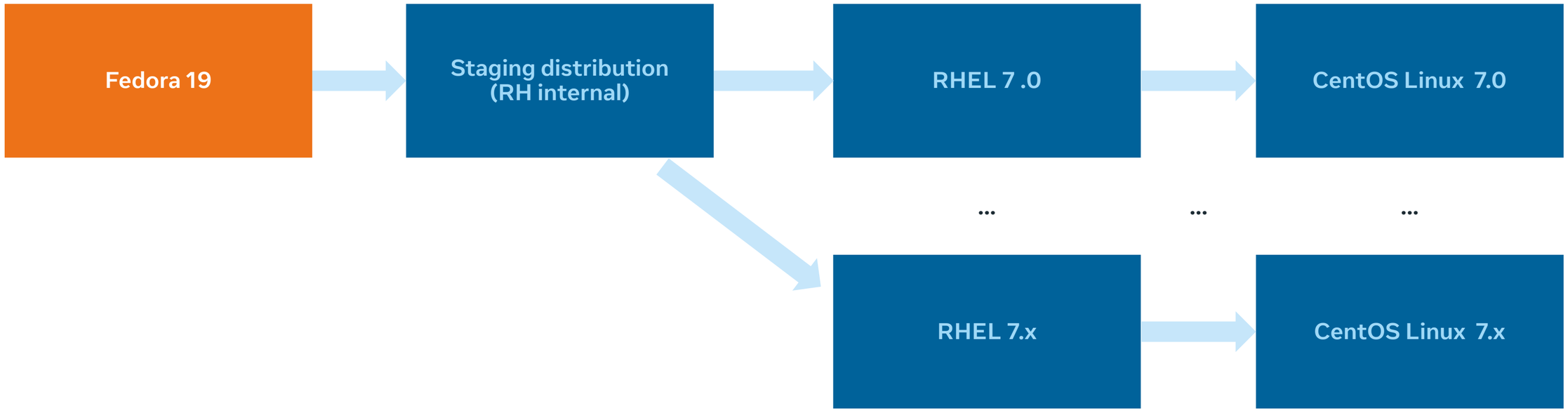
- Community sets the direction
- We move fast; Open Source often moves faster
- We don’t need to write everything ourselves
- Sharing our code means sharing the maintenance and having others extend it

How

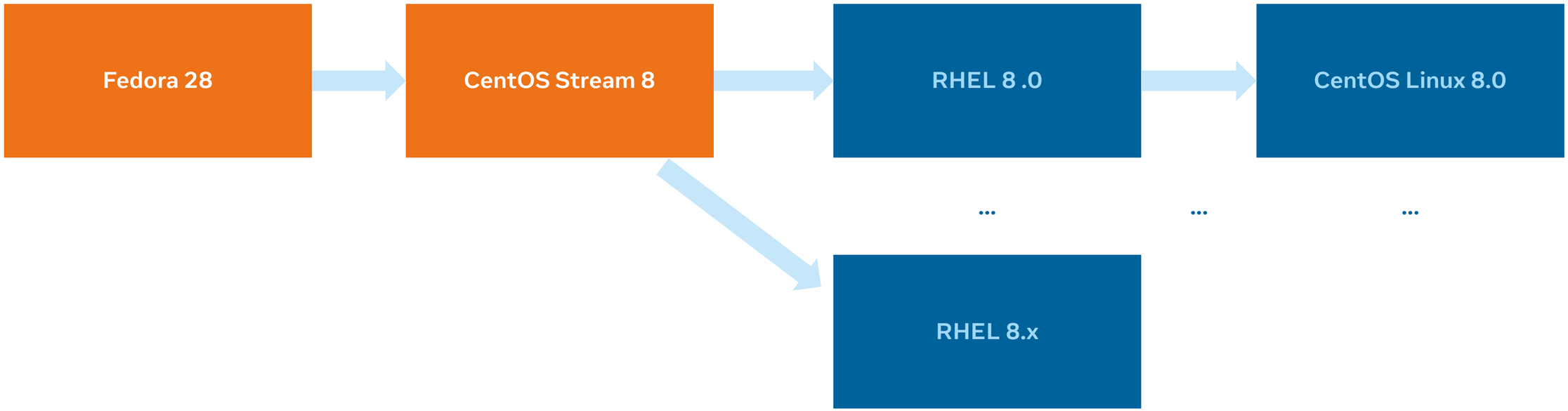
- Show up
- Engage with the community as a peer
- Solve real problems
- Build trust

Contributing upstream

CentOS Linux 7

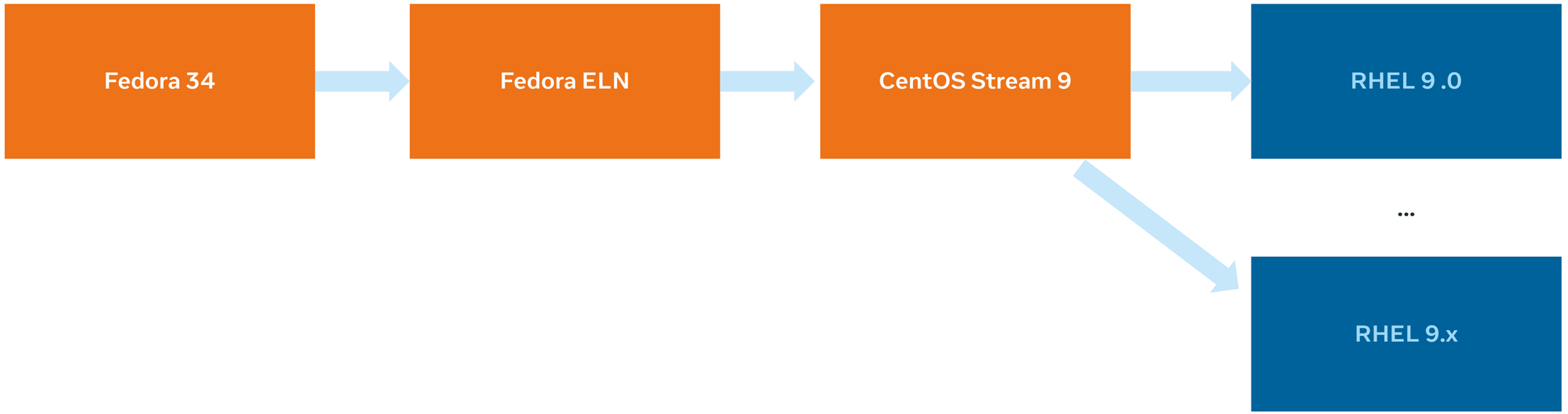


CentOS Linux 8 and CentOS Stream 8



Contributing upstream

CentOS Stream 9



Fedora

- Influences the next CentOS Stream major release
- File and fix bugs, maintain packages, drive Changes, etc.
  - https://src.fedoraproject.org
  - https://fedoraproject.org/wiki/Changes
- Drive and submit change proposals

Fedora change proposals

Completed

- F33: btrfs by default
- F34: btrfs with zstd compression by default
- F34: systemd-oomd by default
- F35: btrfs by default for Fedora Cloud
- F36: relocate rpmdb to /usr

In progress

- F37: GPT for BIOS installs by default
- F37: Fallback hostname
- -fno-omit-frame-pointer by default
- Linux Firmware Minimization
- DNF RPM Copy-on-Write
- fsverity RPM support

Fedora EPEL

- Additional packages for RHEL and CentOS based on Fedora
- https://fedoraproject.org/wiki/EPEL
- EPEL Packagers SIG
  - Streamline the process to add packages to EPEL
  - Tooling improvements
  - Collective maintenance
  - https://fedoraproject.org/wiki/EPEL/Packagers
- ebranch: https://pagure.io/epel/ebranch

Fedora ELN

- Continuous rebuild of Rawhide with the CentOS macros and toolchain
- Assists in the bringup of the next CentOS Stream major release
- ELN SIG
  - Enablement work to make ELN easier to consume
  - Extending ELN to cover more packages via ELN Extras
  - https://github.com/fedora-eln

Fedora ELN at Meta

- Meta opensource project builds via PackIt
  - https://copr.fedorainfracloud.org/groups/g/meta/coprs/
- ELN Extras workload for packages we care about
  - https://tiny.distro.builders/config-workload--eln_extras_meta.html
- Continuous testing and integration pipeline
  - Covering provisioning, Chef, containers
  - Find and fix bugs long before they even make it into CentOS Stream
  - Identify policy and package changes early on

CentOS Stream 8

- Continuously delivered distribution tracking the next minor release of RHEL
  - File and fix bugs: https://bugzilla.redhat.com
  - Product: Red Hat Linux Enterprise 8
  - Version: CentOS Stream
- Follow development and send pull requests
  - https://git.centos.org
- Drive change via Special Interest Groups (SIGs)
  - Building blocks of the CentOS community
  - https://wiki.centos.org/SpecialInterestGroup

CentOS Stream 9

- Being developed right now, in the open
  - File and fix bugs: https://bugzilla.redhat.com
  - Product: Red Hat Linux Enterprise 9
  - Version: CentOS Stream
- Follow development and send pull requests:
  - https://gitlab.com/redhat/centos-stream
  - https://kojihub.stream.centos.org
- Download and test daily composes:
  - https://composes.stream.centos.org/production

CentOS Stream 9 feature contributions

- systemd-oomd package and default configuration
- Packaging macros for third-party nginx modules
- PipeWire with WirePlumber and JACK compatibility
- Wayland support for the GNOME Classic session
- SDL2 support for GNOME Wayland
- libva and wayland updates
- ethtool 5.16 rebase

Hyperscale SIG

What we do

- CentOS Stream focus
- Large scale infrastructure
- Foster cross-company collaboration on packaging and tooling
- Bring in-house development out in the open
- Open to anybody interested in working in this space
- https://wiki.centos.org/SpecialInterestGroup/Hyperscale
- https://sigs.centos.org/hyperscale
- #centos-hyperscale on Libera.Chat and Matrix

Hyperscale SIG

Faster-moving package backports

- Updated backports of distro packages
- Feature enablement, closely tracking upstream development
- Drop in replacements for distro packages
- Stable and targeting production use
- Delivered as a dedicated repository
  - dnf install centos-release-hyperscale

Faster-moving package backports

- Available packages
  - https://cbs.centos.org/koji/packages?tagID=2249
  - dracut, dwarves, grep, less, libvirt, meson, mtr, ninja-build, pykickstart, rasdaemon, systemd, tpm2-tss, tpm2-tools, util-linux, wireshark ...

systemd

- Actively maintained systemd backport
- Running in production at FB
- Tracking latest upstream stable release
  - Staging repo: https://pagure.io/centos-sig-hyperscale/systemd
- Based on the Fedora packaging
  - https://git.centos.org/rpms/systemd/tree/c8s-sig-hyperscale
  - https://git.centos.org/rpms/systemd/tree/c9s-sig-hyperscale

systemd

- CI/CD pipeline to build and test daily snapshots
  - Keeps the staging repo in sync
  - Builds and tests dailies for the latest git master
  - https://pagure.io/centos-sig-hyperscale/systemd-releng
  - Leverages the CentOS OpenShift CI environment

Policy and configuration alternatives

- Modifications of distro packages to enable alternative options
- Meant to be backward compatible and minimize changes
- Example: iptables
  - Only supports nftables in CentOS Linux 8
  - Rebuild to enable the legacy iptables backend as an alternative

Large scale testing

- Provide a way to test distro-wide changes in production settings
- Example: DNF/RPM Copy-on-Write
  - https://fedoraproject.org/wiki/Changes/RPMCoW
  - Requires patched packaging stack
- Currently deployed in production at FB
- Delivered as a dedicated repository
  - dnf install centos-release-hyperscale-experimental

Kernel

- 5.14 kernel based on the CentOS Stream 9 kernel
- Development tree: https://pagure.io/centos-sig-hyperscale/linux
- Build for CentOS Stream 8 and CentOS Stream 9
- Btrfs support
- Work in progress, currently available in the experimental repo
- Kernel userspace: btrfs-progs, compsize, ethtool, kpatch

And more...

- Container image: https://quay.io/centoshyperscale/centos
  - Minimal container image based on Hyperscale repos and packages
  - Build from scratch: https://pagure.io/centos-sig-hyperscale/containers-releng
- Live media spins
  - Live DVD ISO images with Hyperscale repos and packages
  - Leveraging our kernel with btrfs support out of the box
  - https://sigs.centos.org/hyperscale/spins/workstation/
- Work in progress: cloud images, btrfs transactional updates, better testing, ...

Get involved

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Participate in the community

- Join the mailing list: centos-devel@centos.org
- Attend a meeting: https://www.centos.org/community/calendar
- Join a SIG: https://wiki.centos.org/SpecialInterestGroup
- Read and contribute to the blog: https://blog.centos.org
- Report or fix a bug: https://bugzilla.redhat.com
- Maintain a package in EPEL: https://fedoraproject.org/wiki/EPEL/Packagers
- Contribute to Fedora: https://fedoramagazine.org/how-to-contribute-to-fedora
- Related talks: https://sigs.centos.org/hyperscale/internal/talks

Get involved

Join us in Boston in two weeks!

- Boston University, Aug 16-20th 2022
  - Hyperscale meetup
  - CentOS Dojo
  - DevConf.US
- More details: https://tinyurl.com/34dy2ymz

Questions?

THANK YOU FOR YOUR TIME


Meta