Building community with CentOS Stream

LISA21

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FACEBOOK Infrastructure

Agenda

CentOS at Facebook

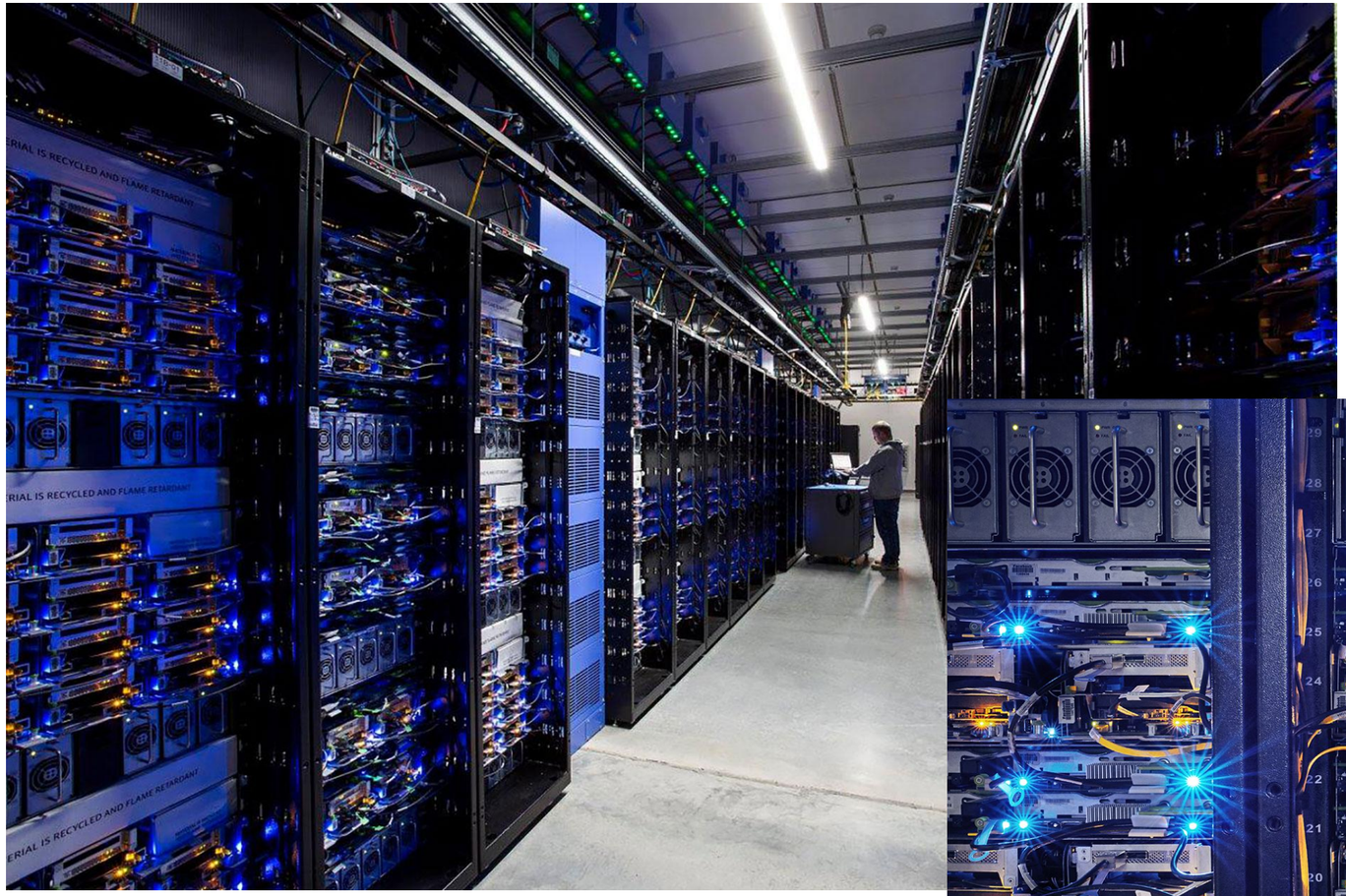
Contributing upstream

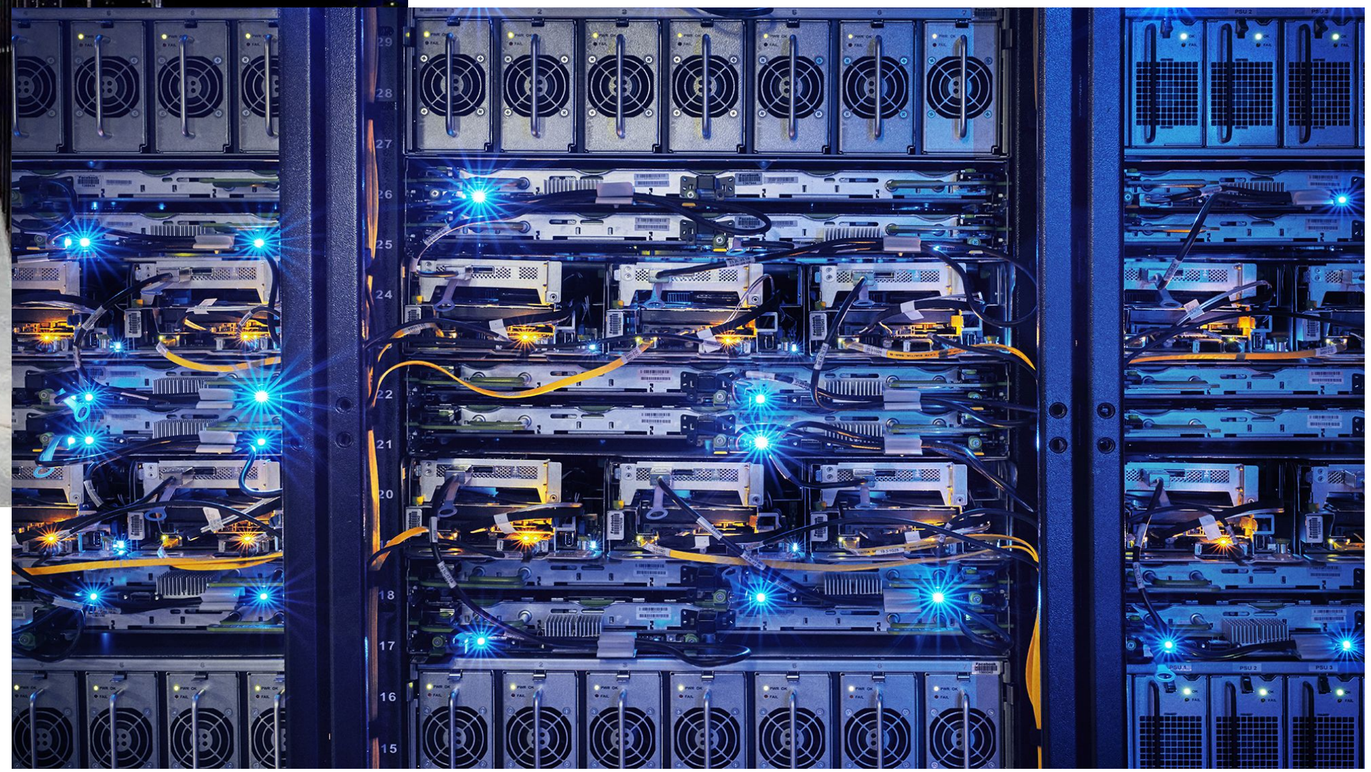
Hyperscale SIG

Get involved

CentOS at Facebook

CentOS at Facebook





CentOS at Facebook

Why CentOS?

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

CentOS at Facebook

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

CentOS at Facebook

Policy deviations

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

CentOS at Facebook

Major OS upgrades

- CentOS Linux 5 -> 6 (~2013-2016)
- CentOS Linux 6 -> 7 (2016-2018)
- CentOS Linux 7 -> CentOS Stream 8 (2018-2021)
- Reprovisioning for OS upgrades
  - Clean slate
  - Deprecated unwanted features
  - Policy changes coupling
- Leverage the general host maintenance window
- Tooling and automation for rollouts

CentOS at Facebook

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

CentOS at Facebook

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

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

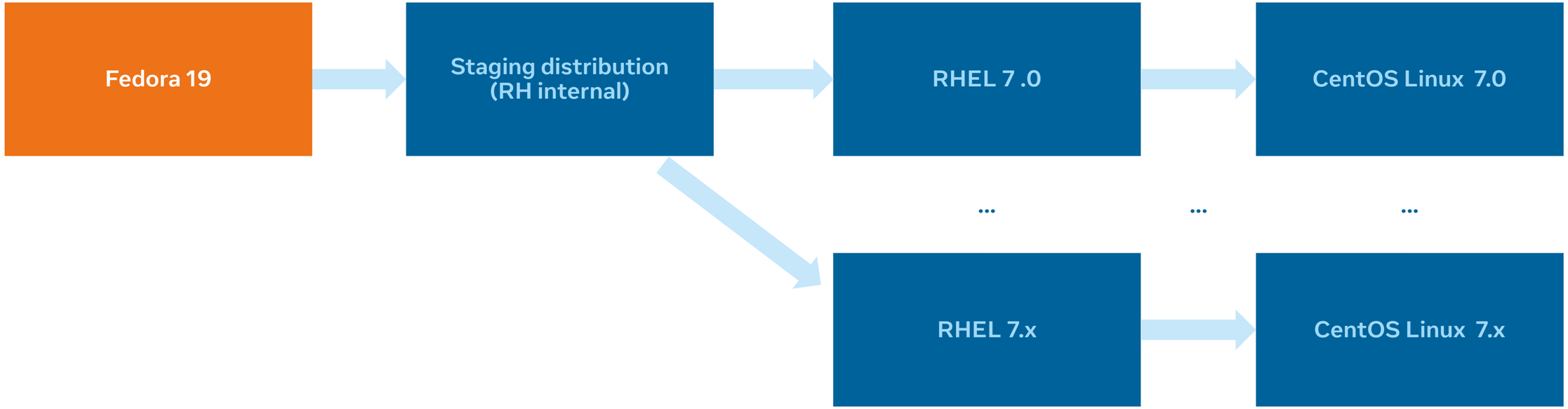
Contributing upstream

How

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

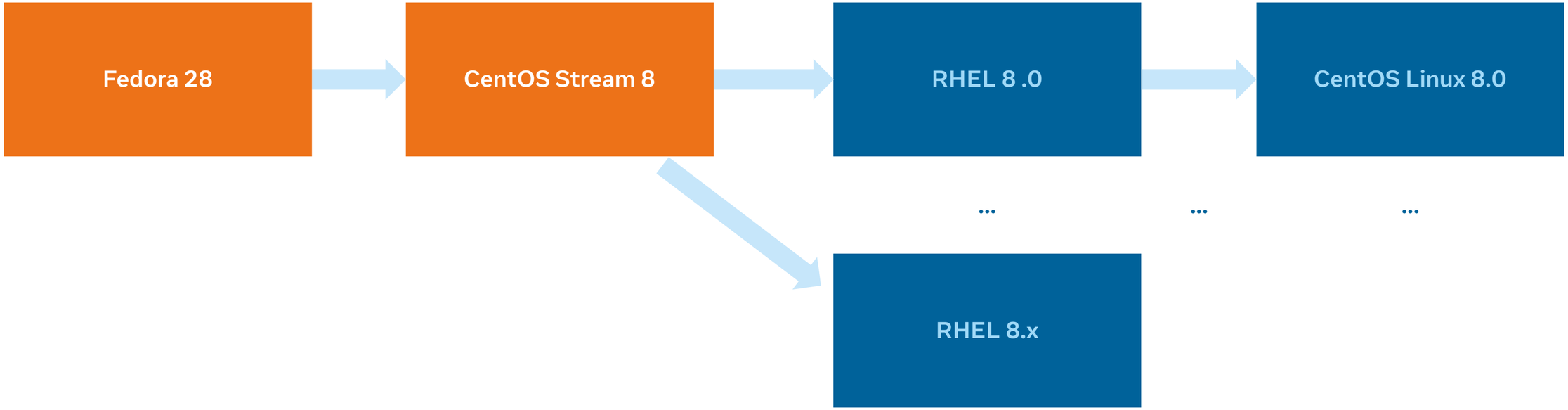
Contributing upstream

CentOS Linux 7



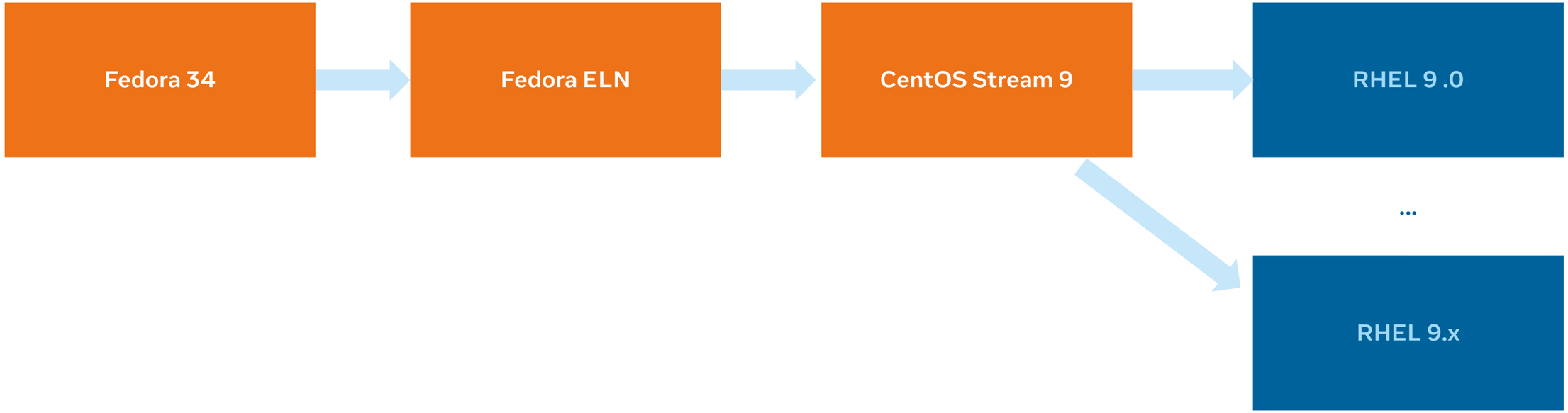
Contributing upstream

CentOS Linux 8 and CentOS Stream 8



Contributing upstream

CentOS Stream 9



CentOS Stream blog post: https://tinyurl.com/ycn29k2c

Contributing upstream

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
- Change proposals
  - F33: Btrfs by default
  - F34: Btrfs with zstd compression by default
  - F34: systemd-oomd by default
  - ~~F34~~ F35: DNF RPM Copy-on-Write
  - F35: Btrfs by default for Fedora Cloud
  - F35: fsverity RPM support

Contributing upstream

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

Contributing upstream

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 to cover more packages via eln-extra
  - https://github.com/fedora-eln
- Continuous testing and integration pipeline
  - Within Facebook: provisioning, Chef, containers
  - Find and fix bugs long before they even make it into CentOS Stream
  - Identify policy and package changes early on

Contributing upstream

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

Hyperscale SIG

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
- #centos-hyperscale on Libera.Chat

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
- 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, ...

Hyperscale SIG

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
- 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

Hyperscale SIG

LLVM 12

- Non-modular LLVM 12 build
- llvm, clang, lld, lldb (+ mesa)
- Modular LLVM 12 is slated for CentOS Steam proper
- https://bugzilla.redhat.com/show_bug.cgi?id=1952248
- https://reviews.llvm.org/D101972

Hyperscale SIG

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

Hyperscale SIG

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

Hyperscale SIG

Work in progress

- Kernel
  - LTS-tracking upstream kernel
  - Feature enablement: btrfs, cgroup2, BPF
- Btrfs
  - Installer support
  - Userspace enablement
  - Transactional updates
- Container images: https://quay.io/centoshyperscale/centos
- Cloud images
- https://pagure.io/centos-sig-hyperscale/sig/issues

Get involved

Get involved

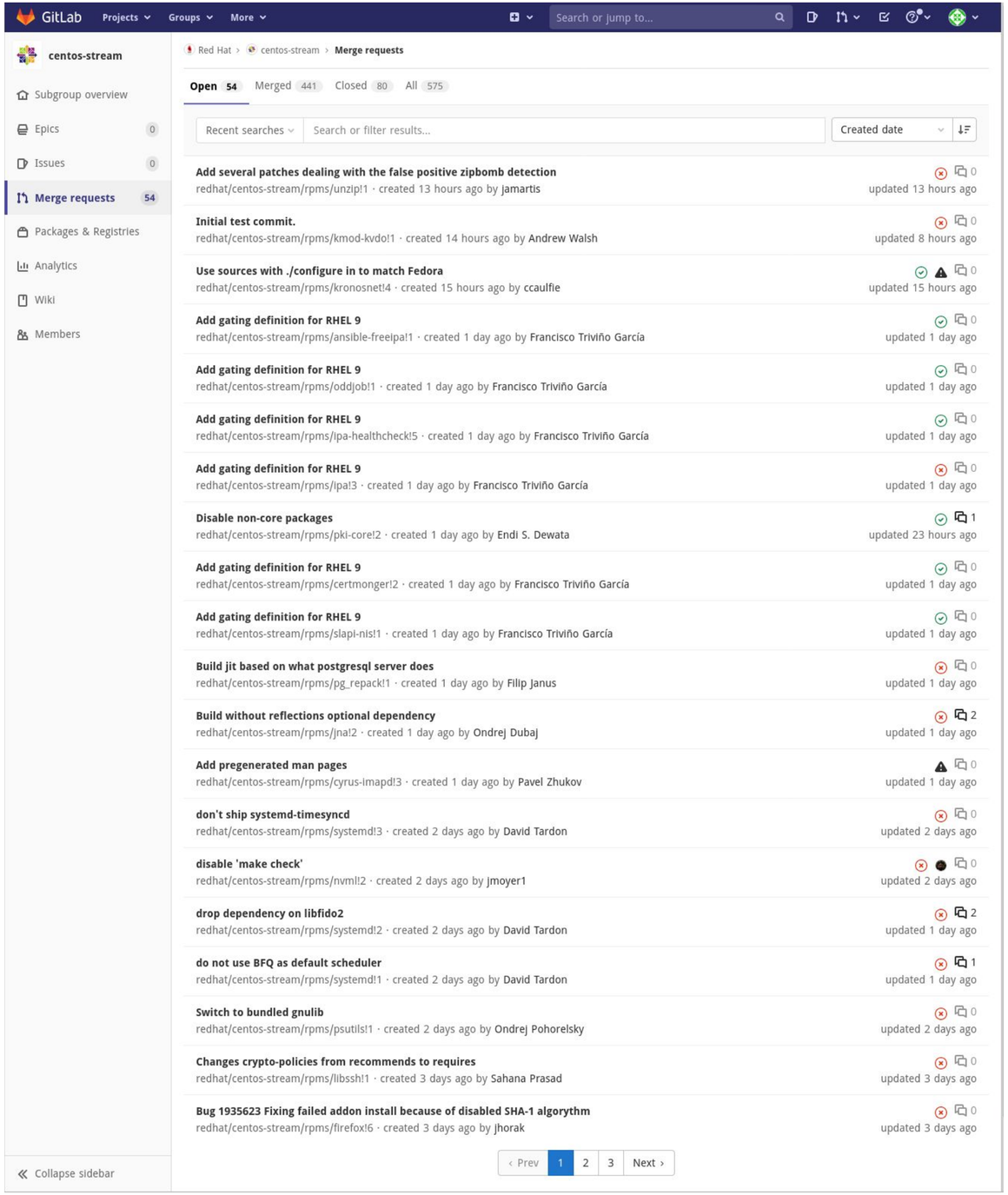
Participate in the CentOS community

- Read and contribute to the blog: https://blog.centos.org
- 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
- 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

Get involved

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/test



Thank you!

Resources

Related talks

- Hyperscale SIG update (CentOS Dojo May 2021): https://tinyurl.com/47av47ye
- CentOS Stream on the desktop (CentOS Dojo May 2021): https://tinyurl.com/36h3zf73
- Hyperscale SIG introduction (CentOS Dojo FOSDEM 2021): https://tinyurl.com/2ez2m6hp
- Speeding up DNF and RPM using Copy on Write (CentOS Dojo FOSDEM 2021): https://tinyurl.com/6ub6ct49
- CentOS Stream at Facebook (DevConf.cz 2021): https://tinyurl.com/jbtw6ska
- Upgrading CentOS on the Facebook fleet (DevConf.cz 2020): https://tinyurl.com/3chkmfz5
- systemd @ Facebook in 2019 (All Systems Go 2019): https://tinyurl.com/vm2fxyfv
- Building better FLOSS community relations (DevConf.cz 2017): https://tinyurl.com/y7gx6nro
- Really large scale system configuration (Atmosphere 2014): https://tinyurl.com/bk4pjm3u

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