facebook
INFRASTRUCTURE

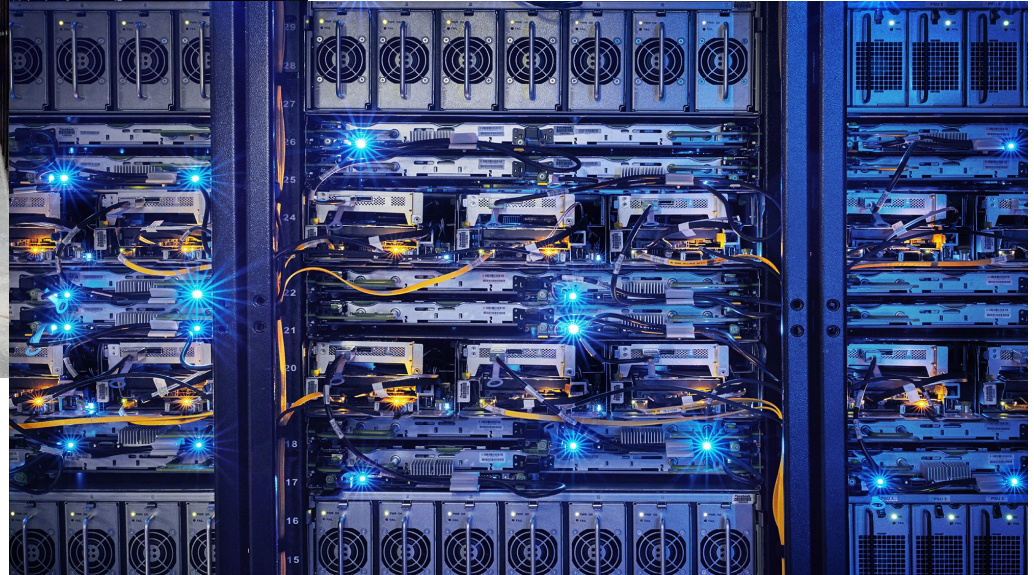# What's new with CentOS at Facebook

Davide Cavalca, Naomi Reeves
Production Engineers - Operating Systems

Agenda

- Infrastructure
- CentOS at Facebook
- Deployment and management

Infrastructure

Infrastructure
How does it work?

- OS team manages the fleet bare metal experience

- OS as a platform

- Individual teams are responsible for their own hosts

- Built on an Open Source foundation

- Linux, CentOS, rpm/yum/dnf, Chef, systemd

Infrastructure
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

- DevConf.CZ 2017 talk: https://tinyurl.com/y7gx6nro

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

Kernel

- Upstream kernel (or as close as possible)

- Development in master

- btrfs, cgroup2, PSI, eBPF

- Testing and rollout automation

- Blog: https://tinyurl.com/sftvy7v

CentOS at Facebook

systemd

- systemd backport tracking upstream

- Internal CI/CD pipeline for regression testing

- Feature development

- GitHub: facebookincubator/systemd-compat-libs

- GitHub: facebookincubator/pystemd

- All Systems Go 2019 talk: https://tinyurl.com/v7lxmq3

CentOS at Facebook
Network management

- Using network-scripts fleetwide

    - GitHub: fedora-sysv/initscripts

- Hook support

- Control on network restarts

- Troubleshooting

- Feature development and bug fixes

CentOS at Facebook
Packaging

- Standard packaging stack: rpm, dnf/yum

- rpmdb at scale

  - dcrpm to mitigate corruption and remediate

  - GitHub: facebookincubator/dcrpm

  - Using an alternate rpmdb: ndb

- Feature development

  - RPM: fsync, CoW experiments

  - Yum: Torrent plugin, package cleanup

CentOS at Facebook
Provisioning

- Hosts are netbooted

- Installer: Anaconda => Image-based installer

- Leverage the containers build system

- Chef is used to configure the image

CentOS at Facebook

Containers

- More workloads moving to containers over the years

- FB-specific container manager

- cgroup2, btrfs, systemd

- Blog: https://tinyurl.com/y68evmjy

Deployment and management

Deployment and management
Chef

- Chef for config management
- Philosophy: https://tinyurl.com/mgxb923
  - Layered configuration through attribute-based APIs
  - Separation of policy and mechanism
  - Idempotency
  - Configuration as programming
- GitHub: facebook/chef-utils
- GitHub: facebook/chef-cookbooks

Deployment and management
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

Deployment and management
Minor OS upgrades

- Incremental Rolling OS upgrades

- Every two weeks we sync down the latest updates…

- …and roll them out over two weeks

- 'yum upgrade' kicked off via fb_yum in Chef

- High level monitoring of rollout health

- Easy stop button and opt out for individual packages

Deployment and management
Where are we now

- Most of the fleet is on CentOS 7

- Rolling out CentOS Stream

  - Easier rolling updates

  - Contributing to upstream

- CentOS 7 EOL targeted by end of the year

- DevConf.CZ 2020 talk: https://tinyurl.com/tu5gbvk

Questions

Thank you!

Davide Cavalca <dcavalca@fb.com>
Naomi Reeves <nreeves@fb.com>