What’s new with CentOS at Facebook

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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
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Kernel

- Upstream kernel (or as close as possible)
- Development in master
- btrfs, cgroup2, PSI, eBPF
- Testing and rollout automation
- Blog: https://tinyurl.com/sftvy7v
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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
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Network management

- Using network-scripts fleetwide
  - GitHub: fedora-sysv/initscripts
- Hook support
- Control on network restarts
- Troubleshooting
- Feature development and bug fixes
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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
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Provisioning

- Hosts are netbooted
- Installer: Anaconda => Image-based installer
- Leverage the containers build system
- Chef is used to configure the image
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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!

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