What’s new and what’s next in Fedora CoreOS

Fedora 37 Release Party 🎉

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Agenda

- What is Fedora CoreOS?
- What’s new since last year?
- What’s coming soon?
What is Fedora CoreOS?
An official Fedora edition

- We’re now an official Fedora edition! 🎉

- Focused on **single node** and **clusters** use cases

- Successor to two *container-first* OSes:
  - CoreOS Inc’s Container Linux
  - Fedora Atomic Host (from Project Atomic)

- **Incorporates ideas** from both:
  - Provisioning stack & cloud native expertise (CL)
  - Fedora foundation, update stack & SELinux (FAH)
Philosophy behind Fedora CoreOS

- **Automatic updates** by default
  - No interaction for administrators

- **Automated provisioning**
  - All nodes start from **same starting point**
  - Use Ignition to provision a node on **first boot**

- **Immutable infrastructure**
  - **Automate** deployment and system configuration
  - Update configs and **re-provision** to apply changes
None of this happens without... Passing Tests!

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>kola-aws</td>
<td>13 hr</td>
<td>4 days 0 hr</td>
<td>1 hr 11 min</td>
</tr>
<tr>
<td>kola-azure</td>
<td>13 hr</td>
<td>12 days</td>
<td>45 min</td>
</tr>
<tr>
<td>kola-gcp</td>
<td>13 hr</td>
<td>3 days 14 hr</td>
<td>15 min</td>
</tr>
<tr>
<td>kola-kubernetes</td>
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<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>kola-openstack</td>
<td>13 hr</td>
<td>1 day 10 hr</td>
<td>45 min</td>
</tr>
</tbody>
</table>

- Every single build is **extensively tested in CI** before it’s released
- Required to make automatic updates **safe**
Fedora CoreOS is available across 3 different release streams:

**Stable**
- v 35.20220424.3.0
- JSON — 2 days ago

The Stable stream is the most reliable version of Fedora CoreOS. Releases are battle-tested within the Testing stream before being promoted.

**Testing**
- v 36.20220505.2.0
- JSON — 2 days ago

The Testing stream contains the next Stable release. Mix a few Testing machines into your cluster to catch any bugs specific to your hardware or configuration.

**Next**
- v 36.20220507.1.0
- JSON — 2 days ago

The Next stream represents the future. It provides early access to new features and to the next major version of Fedora. Run a few Next machines in your cluster, or in staging, to help find problems.
Supported platforms

● Available for a plethora of **cloud/virt platforms**:
  ○ Alibaba, AWS, Azure, Azure Stack, DigitalOcean, Exoscale, GCP, IBM Cloud, OpenStack, Nutanix, Vultr, VirtualBox, VMware, QEMU/KVM
  ○ Directly launchable on AWS & GCP

● Several options for **Bare Metal**
  ○ Live ISO (automated or interactive installations)
  ○ PXE (network) boot
  ○ Raw and 4K native disk images
Supported architectures

- Multiple Architectures:
  - x86_64
  - aarch64
  - s390x
  - ppc64le support coming soon
What’s new in Fedora CoreOS?
(since August 2021)
FCOS as a top level Fedora Edition

- Closer **proximity** to Fedora Releases
- Working closer with **Fedora QA**
- Participating more in the **Fedora Change Process**
- Continuing to deliver Fedora CoreOS **consistently**
Added Platforms

- Added **aarch64** - including AWS images
- Added **s390x** - including s390x IBMCloud images
- Added support for Nutanix
- Became the base for **podman machine**
DNF Count Me support

- Enables **privacy preserving** and reliable system counting
- Only reports a **large approximation** of the age of a system
- Only reaches out to **official** Fedora repositories servers
- **No other information** sent or stored

CountMe Stats - Fedora Release & Architecture

<table>
<thead>
<tr>
<th>Fedora Release</th>
<th>Number of FCOS Instances</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>982</td>
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<tr>
<td>35</td>
<td>3950</td>
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<tr>
<td>36</td>
<td>11612</td>
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<td>37</td>
<td>105</td>
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</table>

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Number of FCOS Instances</th>
</tr>
</thead>
<tbody>
<tr>
<td>ppc64le</td>
<td>2</td>
</tr>
<tr>
<td>s390x</td>
<td>8</td>
</tr>
<tr>
<td>aarch64</td>
<td>3229</td>
</tr>
<tr>
<td>x86_64</td>
<td>13411</td>
</tr>
</tbody>
</table>
iptables now using nftables by default

- **iptables** was using **legacy** backend instead of **nftables** one
- **Unintended** consequence of **alternatives(8)**'s behaviour
  - Configuration stored in a mix of `/var` and `/etc`
  - **Incompatibility** with rpm-ostree strict split between configuration and data
- Full fix requires **adjustments** to **alternatives(8)** or an alternative(!)

[https://github.com/coreos/fedora-coreos-tracker/issues/676](https://github.com/coreos/fedora-coreos-tracker/issues/676)
Building and Testing against Rawhide

- We are now building and testing a **rawhide** stream
  - Suite of **automated tests** now complement rawhide!
  - Helps identify **unexpected breakage** from new features
  - Now participate **closer upstream** with developers and get general problems fixed
And.. a lot of other stuff!

- Investments in
  - Automated Testing
  - Automated builds
What’s coming soon in Fedora CoreOS?
More enablement - More Platforms

- **Azure ARM** instances
- **GCP ARM** instances
- Azure Community Galleries
- Power PC (**ppc64le**) architecture support
- Adding support for **Kubevirt**
- **Secure Execution** support for **S390x**
Fedora CoreOS OSTree is additionally offered as a container.

Customize Fedora CoreOS by performing a container build:
- FROM quay.io/fedora/fedora-coreos:stable

Makes individual derivation and distribution easier:
- Dockerfile/Containerfile & Container registry

Updates managed by administrator rebuilding the image and rpm-ostree upgrade.
CoreOS Layering / OSTree Native Containers

Current Changes:
- https://fedoraproject.org/wiki/Changes/OstreeNativeContainer

Proposed Changes:
- https://fedoraproject.org/wiki/Changes/OstreeNativeContainerStable
CoreOS Layering Example

```
# This is like https://tailscale.com/download/linux/fedora
# except it happens as part of a container build! You then need to do
# `tailscale up` via some other mechanism.

FROM quay.io/fedora/fedora-coreos:stable
    rpm-ostree install tailscale && rpm-ostree cleanup -m && 
    systemctl enable tailscaled && 
    ostree container commit
```

- https://github.com/coreos/coreos-layering-examples
CoreOS Layering Example

- Build machine:
  $ podman build -t myfcos:latest .
  $ podman push myfcos:latest quay.io/$USER/myfcos:latest

- Host system:
  $ rpm-ostree rebase --experimental \
  ostree-unverified-registry:quay.io/$USER/myfcos:latest
Questions
Get involved!

- Web: https://getfedora.org/coreos
- Issues: https://github.com/coreos/fedora-coreos-tracker/issues
- Forum: https://discussion.fedoraproject.org/tag/coreos
- Mailing list: coreos@lists.fedoraproject.org
- IRC: #fedora-coreos on Libera.Chat
- Matrix: #coreos:fedoraproject.org