Fedora CoreOS at the Fedora 36 Release Party

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Today's Talk

- What is Fedora CoreOS?
- Recent Developments
- Future Developments
- Challenge!
- Your Questions!

What is Fedora CoreOS?

Features: Automatic Updates

- Fedora CoreOS features Automatic Updates by default
  - Automatic updates → Reliable updates
    - Extensive tests in automated CI pipelines
    - Several update streams to preview what's coming
      - Users run various streams to help find issues
    - Managed upgrade rollouts over several days
      - Halt the rollout if issues are found
  - For when things go wrong
    - rpm-ostree rollback can be used to go back
    - future: automated rollback
   - based on user specified health checks
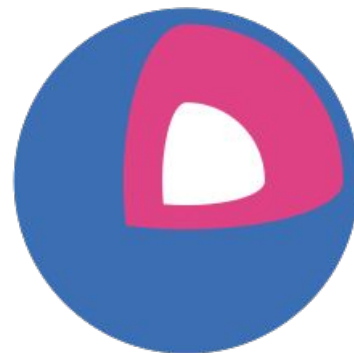
Features: Automated Provisioning

- Fedora CoreOS uses [Ignition](#) to automate provisioning
  - Any logic for machine lifetime is encoded in the config
    - Very easy to automatically re-provision nodes
  - Same starting point whether on bare metal or cloud
    - Use Ignition everywhere as opposed to kickstart for bare metal and cloud-init for cloud

Features: Cloud Native & Container Focused

- Software runs in containers
  - podman or moby engine container runtimes
- Ready for clustered deployments
  - Spin up 100 nodes and have them join a cluster
    - Ignition configs used to automate cluster join
  - Spin down nodes when no longer needed
  - Spin up nodes again when load increases
- Offered on (or for) a plethora of cloud/virt platforms
  - Alibaba, AWS, Azure, Azure Stack, DigitalOcean, Exoscale, GCP, IBM Cloud, Nutanix, Openstack, QEMU/KVM, VirtualBox, VMWare, Vultr
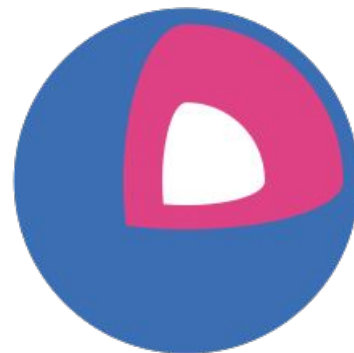
Features: OS Versioning & Security

- Fedora CoreOS uses RPM-OStree technology
  - "Like git for your Operating System"
    - ***36.20220505.2.0*** – ad362a9
    - A single identifier tells you all software in that release
  - Uses read-only filesystem mounts
    - Prevents accidental OS corruption (rm -rf)
    - Prevents novice attacks from modifying system
- SELinux enforcing by default
  - Prevents compromised apps from gaining further access
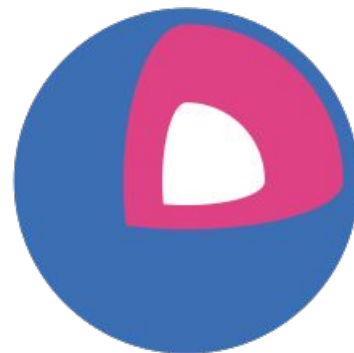
What's in the OS?

- Latest **Fedora Linux** base components (built from RPMs)
- Hardware support
- Basic administration tools
- Container engines: podman, moby
- Sometimes different policy decisions
  - based on target user base

Multiple Update Streams

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.

Show Downloads

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.

Show Downloads

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.

Show Downloads

Multiple Update Streams

- Offered update streams with automatic updates
    - ***next*** – experimental features, Fedora major rebases
    - ***testing*** – preview of what's coming to stable
        - point in time snapshot of Fedora stable rpm content
    - ***stable*** – most reliable stream offered
        - promotion of testing stream after some bake time
- Goals
    - Publish new releases into update streams every two weeks
    - Find issues in next/testing streams before they hit stable

Fedora CoreOS Release Promotion

Release Nomenclature

35.20220323.3.0

Fedora Release   OS content date   Release Stream   Revision
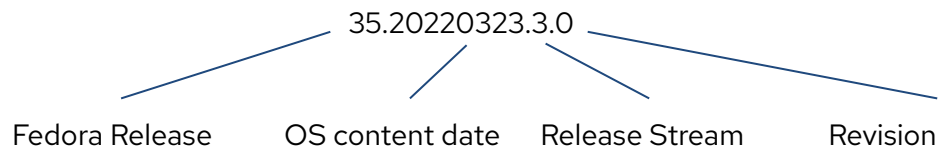
1) OS content is snapped by date
   e.g. 20220323

Fedora rpmdb

2) Releases are promoted to testing & reflect the rpmdb date
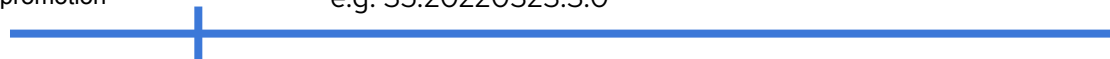   e.g. 35.20220323.2.0

Testing Stream

~2 week promotion

3) Testing is then promoted to stable & shows the same rpmdb date
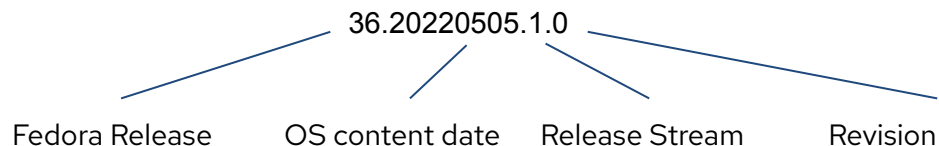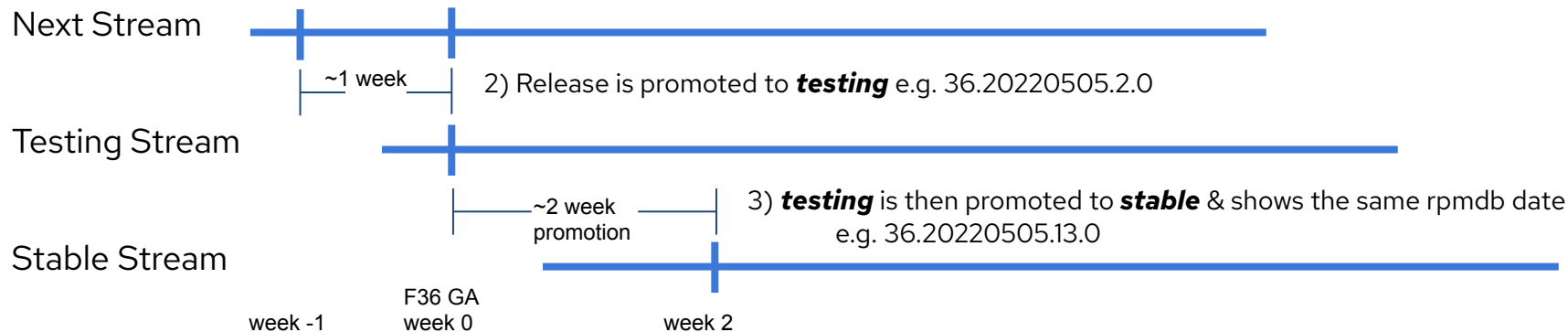   e.g. 35.20220323.3.0

Stable Stream

The Fedora 36 Rebase

- Fedora Beta Release
  - The *next* stream is switched over to the new release.
- Fedora Final Freeze
  - The *next* stream switches to weekly releases to closely track GA content set.
- Fedora General Availability
  - Fedora CoreOS re-orients its release schedule in the following way:
    - Week -1 (Fedora "Go" Decision): *next* with latest F36 GA content
    - Week 0 (GA release): *testing* promoted from previous week's *next*
    - Week 2: *stable* release promoted from previous *testing*

Fedora 36 Release Promotion

36.20220505.1.0

Fedora Release OS content date Release Stream Revision

1) OS content is snapped by date **20220505** and promoted to ***next*** in 36.20220505.1.0

Next Stream

~1 week

2) Release is promoted to ***testing*** e.g. 36.20220505.2.0

Testing Stream

~2 week promotion

3) ***testing*** is then promoted to **stable** & shows the same rpmdb date
e.g. 36.20220505.13.0

Stable Stream

week -1

F36 GA
week 0

week 2

None of this happens without...
Passing Tests!

✓	☼	**kola-aws**	13 hr - **#325**	4 days 0 hr - **#312**	1 hr 11 min
✓	☼	**kola-azure**	13 hr - **#80**	12 days - **#57**	45 min
✓	☼	**kola-gcp**	13 hr - **#169**	3 days 14 hr - **#164**	15 min
⊙	☼	**kola-kubernetes**	N/A	N/A	N/A
✓	☁	**kola-openstack**	13 hr - **#340**	1 day 10 hr - **#337**	45 min

Recent Developments

What have we been up to lately?

- Fedora 36 rebase
  - Podman 4.0
  - switch to iptables-nft by default
- Added a Virtualbox artifact and updated documentation
- Added a Nutanix artifact
- Added support for creating a minimal ISO image
- Updated the VMWare OVA to use UEFI/SecureBoot by default
- Added CI testing for Azure
- Fedora CoreOS is now the basis for 'podman machine'

Future Developments

What are we working on soon?

- Proposing new Fedora Changes
- Adding ppc64le/s390x support
- Integrating better with Kubernetes distributors
- Additional Cloud Platforms and CI on Cloud Platforms
- Making SELinux policy updates safer/more reliable
- CoreOS Layering

CoreOS Layering / OSTree Native Containers

- Fedora CoreOS OSTree is additionally offered as a container
- Customize Fedora CoreOS by performing a container build
  - FROM: quay.io/fedora/fedora-coreos
- Makes individual derivation and distribution easier
  - Dockerfile & Container registry

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/coreos-assembler/fcos:testing-devel
RUN cd /etc/yum.repos.d/ && curl -LO https://pkgs.tailscale.com/stable/fedora/tailscale.repo && \
    rpm-ostree install tailscale && rpm-ostree cleanup -m && \
    systemctl enable tailscaled && \
    ostree container commit
```

- https://github.com/coreos/coreos-layering-examples

CoreOS Layering Example

- podman build –t myfcos:latest .
- podman push myfcos:latest quay.io/$USER/myfcos:latest
- rpm–ostree rebase ––experimental \
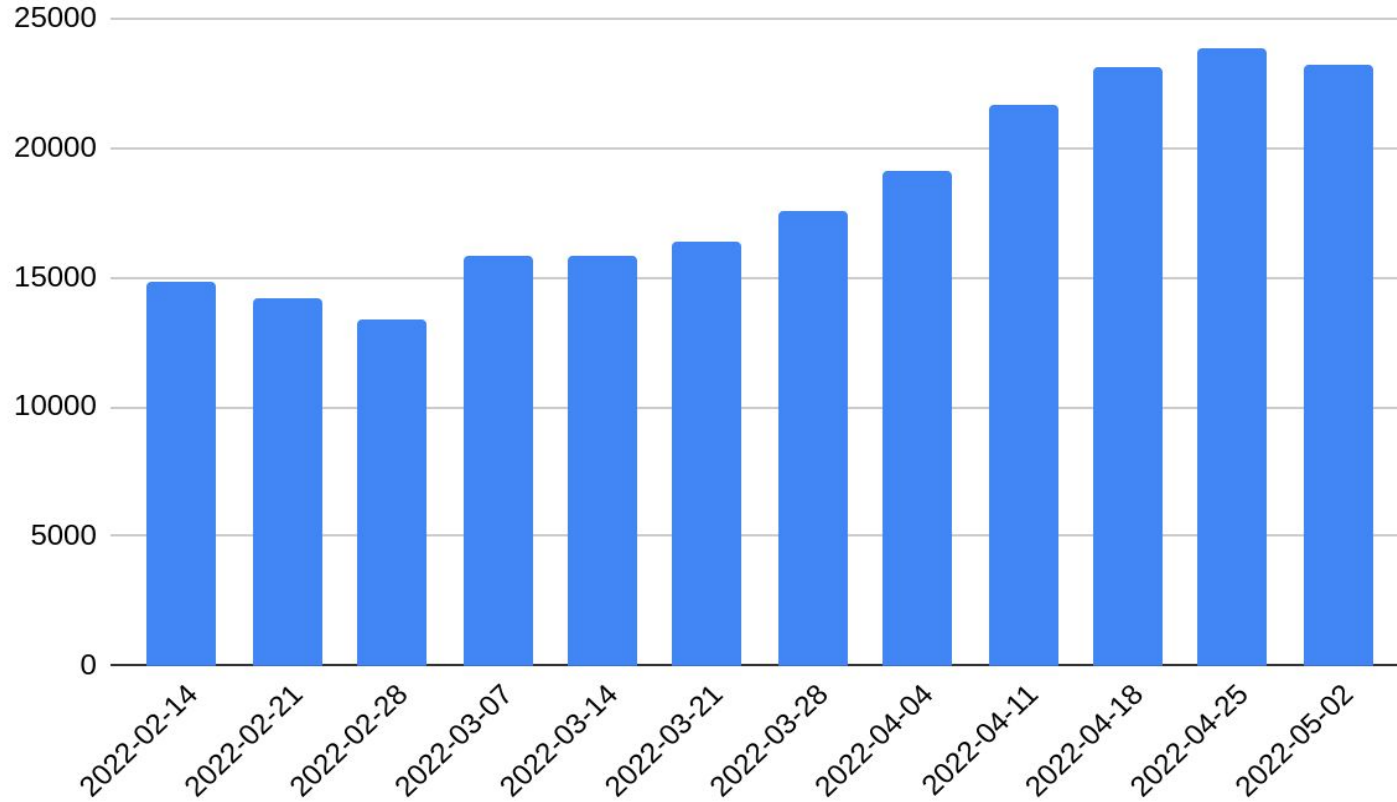 ostree-unverified-registry:quay.io/$USER/myfcos:latest

Community Growth

- User engagement has been increasing
  - IRC/Matrix
  - Weekly Meetings
  - Issue Tracker/Forum
- CountMe pings
  - Stats based on yum repo hits
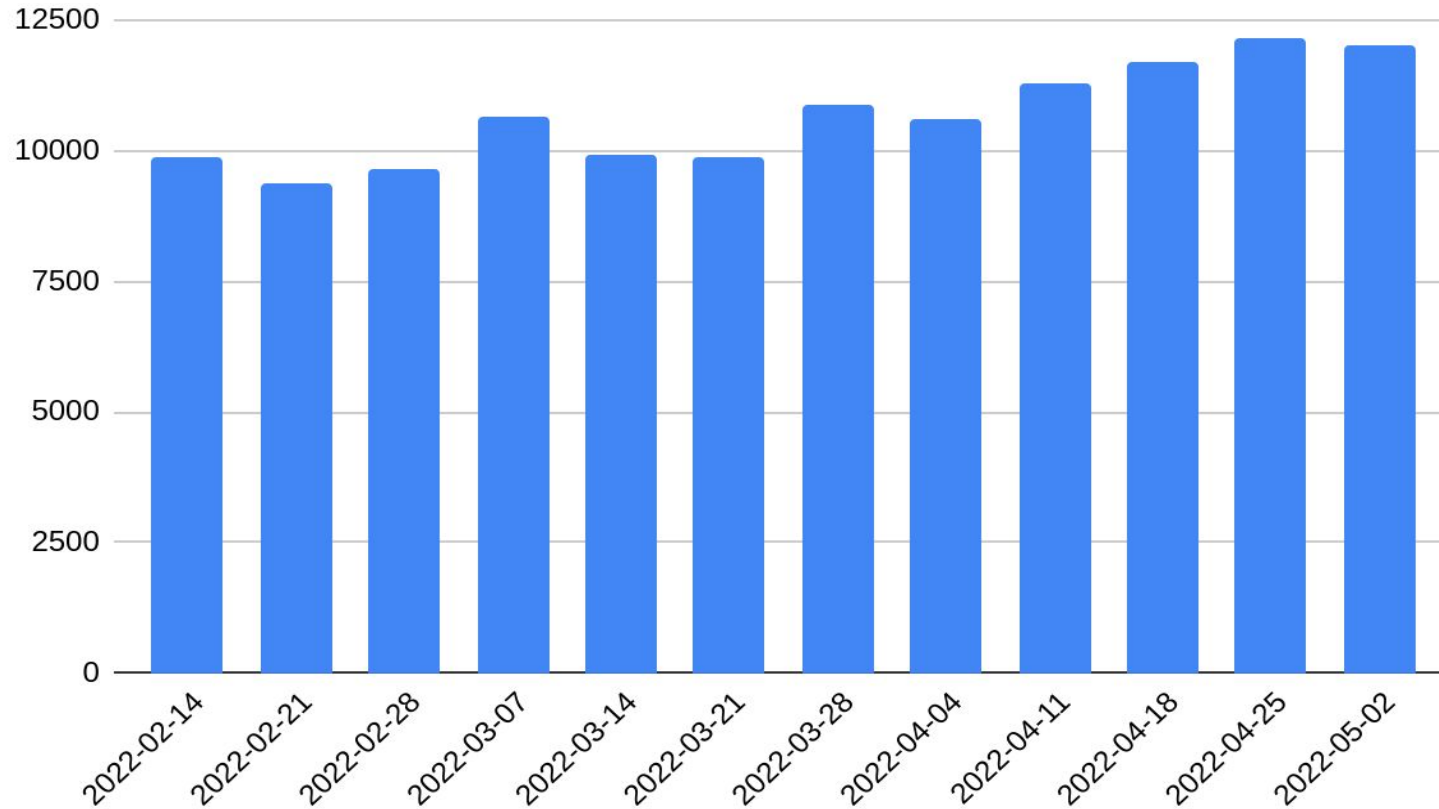- Update Server pings
  - Stats based on update server hits
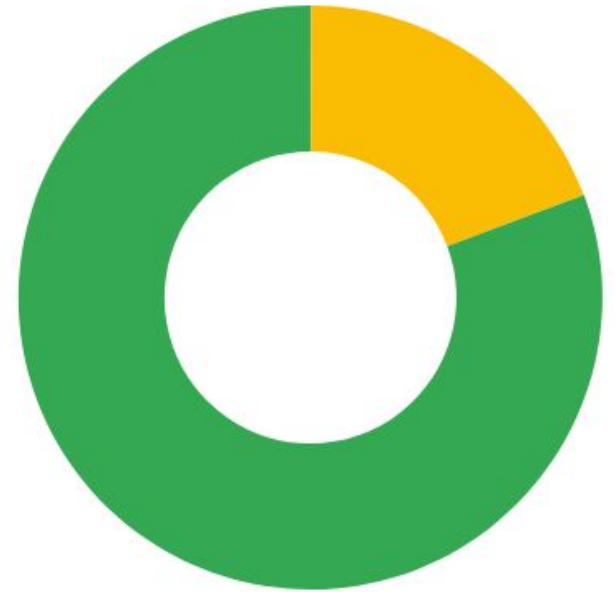
Update Server Stats
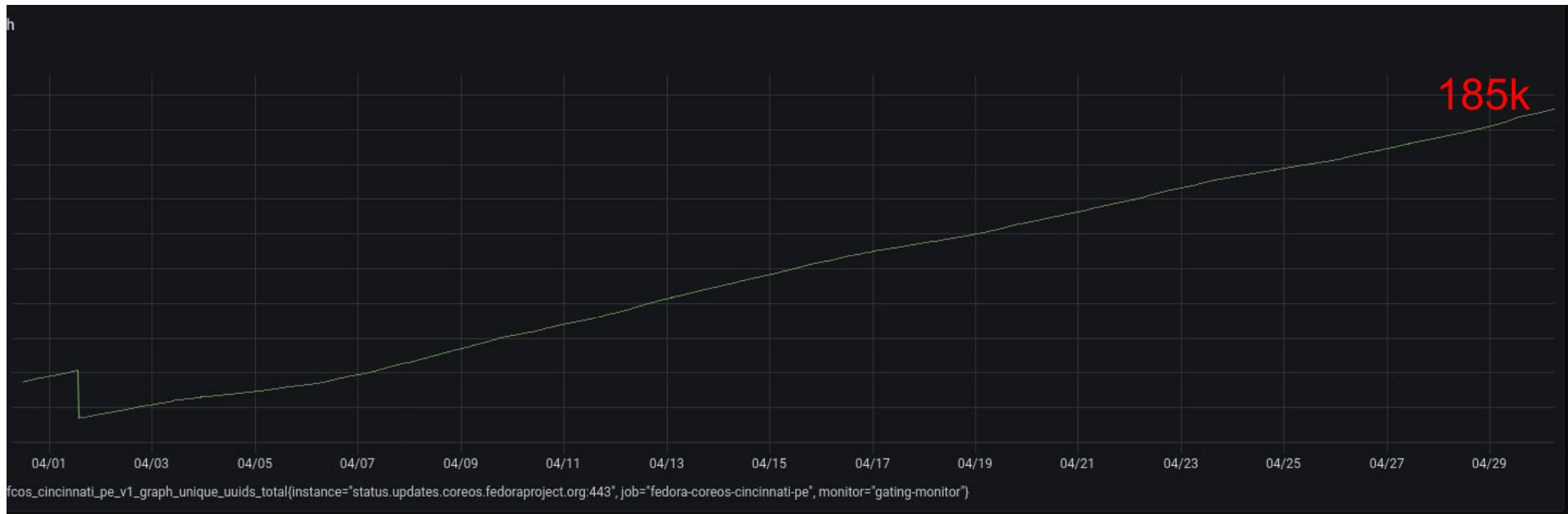
CountMe Stats - All Nodes

CountMe Stats - Older than 1 week

CountMe Stats - By Fedora Release Version and Architecture

- 32
- 34
- 35
- 36

- ppc64le
- s390x
- aarch64
- x86_64

Data Conclusions

- Many very short lived nodes (~20k weekly)
  - spin up, do work, shut down
  - don't stay up long enough for countme ping
- Some longer but still short lived nodes (~10k weekly)
  - spin up, accept requests for work for a few days, shut down
- 1/2 longer running nodes don't contact update server
  - node updates outside of zincati
  - Live PXE - update server disabled by default

Data Conclusions

WE HAVE USERS!

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Challenge! Try out Fedora CoreOS and join our Community!

Get involved!

- Web: https://getfedora.org/coreos
- Issues: https://github.com/coreos/fedora-coreos-tracker/issues
- Forum: https://discussion.fedoraproject.org/tag/coreos
- Docs: https://docs.fedoraproject.org/en-US/fedora-coreos/
- Mailing list: coreos@lists.fedoraproject.org
- IRC: libera.chat #fedora-coreos
- Matrix #coreos:fedoraproject.org

Go checkout the tutorials:

- https://docs.fedoraproject.org/en-US/fedora-coreos/tutorial-setup/

Questions

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Thank you!

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