

Fedora CoreOS

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Today's agenda

- What is Fedora CoreOS?
- What are some of the features of Fedora CoreOS?
- How does it relate to RHEL CoreOS?
- How does it relate to OKD?
- Demo: Automatically deployed Matrix homeserver on Fedora CoreOS
- Questions!

Fedora CoreOS - Emerging Fedora Edition

- Came from the merging of two communities:
 - CoreOS Inc's Container Linux
 - Project Atomic's Atomic Host
- Incorporates Container Linux
 - Philosophy
 - Provisioning Stack
 - Cloud Native Expertise
- Incorporates Atomic Host
 - Fedora Foundation
 - Update Stack
 - SELinux Enhanced Security

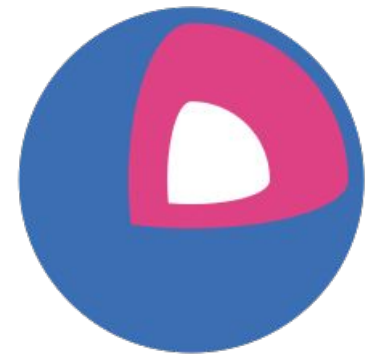


Philosophy behind Container Linux

- Automatic updates
 - no interaction for administrators
 - staying up to date -> security fixes applied
- All nodes start from ~same starting point
 - Use Ignition to provision a node wherever it's started
 - Bare metal and cloud based instances share provisioning
- Immutable infrastructure
 - Need a change? Update configs and re-provision.
- User software runs in containers
 - Host updates are more reliable

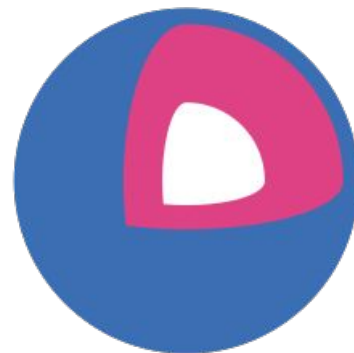


Fedora CoreOS Features



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

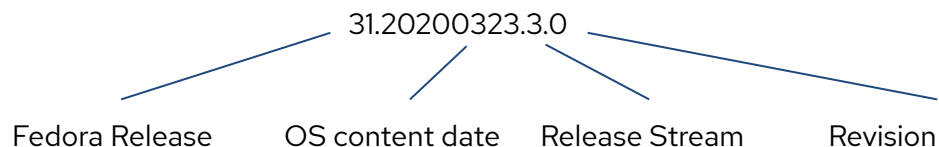


Multiple Update Streams

- 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



1) OS content is snapped by date
e.g. 20200323

Fedora rpmdb



2) Releases are promoted to testing & reflect the rpmdb date
e.g. 31.20200323.2.0

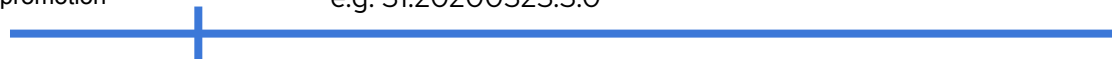
Testing Stream



~2 week
promotion

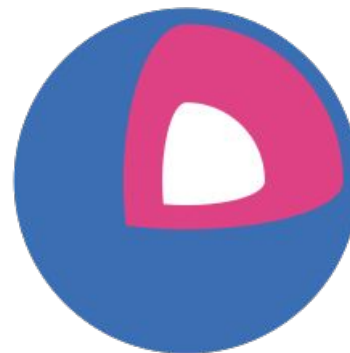
3) Testing is then promoted to stable & shows the same rpmdb date
e.g. 31.20200323.3.0

Stable Stream



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



Ignition: Details

Ignition configs

- Declarative JSON documents provided via user data
- Runs exactly once, during the initramfs stage on first boot
- Can write files and systemd units, create users and groups, partition disks, create RAID arrays, format filesystems
- If provisioning fails, the boot fails (no half provisioned systems)
- Ignition configs are machine-friendly (JSON), currently [spec v3](#)

Writing Configs

- Fedora CoreOS Config Transpiler to translate to Ignition spec
 - Configs are Human friendly (YAML)
 - Ignition semantics, plus sugar for common operations
 - Transpiler catches common errors at build time

```
{
  "ignition": {
    "config": {},
    "timeouts": {},
    "version": "3.0.0"
  },
  "passwd": {
    "users": [
      {
        "name": "core",
        "passwordHash":
"$6$43y3tkl...",
        "sshAuthorizedKeys": [
          "key1"
        ]
      }
    ]
  },
  "storage": {},
  "systemd": {}
}
```

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, DigitalOcean, Exoscale, GCP, Openstack, Vultr, VMWare, QEMU/KVM



Features: OS Versioning & Security

- Fedora CoreOS uses rpm-ostree technology
 - “Like git for your Operating System”
 - 32.20200615.2.0 - 86c0246
 - 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 base components (built from RPMs)
- Hardware support
- Basic administration tools
- Container engines: podman, moby
- No python

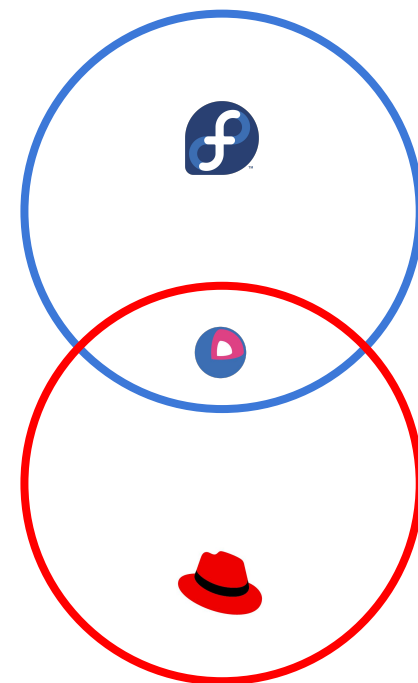
Coming soon

- More Cloud Platforms
- Multi-arch support (aarch64, ppc64le, s390x)
- More FCCT human friendly helper functions
- Host extensions (more reliable package layering)
- More/improved documentation
- Tighter integrations with OKD

Fedora CoreOS and RHEL CoreOS

Common tooling & components - different scope and purpose

- RHEL CoreOS is not intended as a standalone OS
 - Based on RHEL package set
 - Component of OpenShift
 - Updates and configuration controlled by cluster operators
- Fedora CoreOS
 - Based on Fedora package set
 - Shares components and tooling with RHEL CoreOS
 - Standalone OS with auto-updates



OKD on Fedora CoreOS

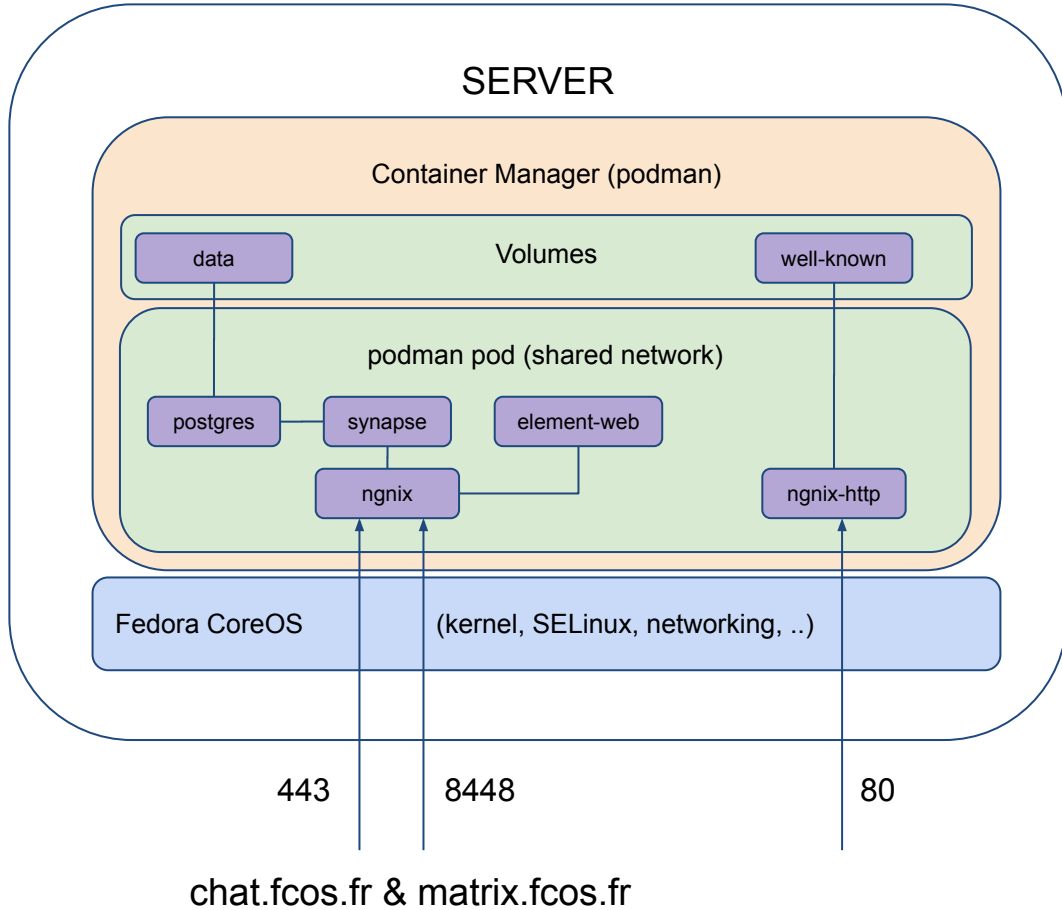
- Installable with OKD's installer (openshift-install)
- Cluster controls OS upgrades with machine-config-operator
- Upgrades are provided as machine-os-content containers
 - includes Fedora CoreOS + cluster dependencies
- Cluster can manage and bring up new machines automatically

Get involved!

- Web: <https://getfedora.org/coreos>
- Issues: <https://github.com/coreos/fedora-coreos-tracker/issues>
- Forum: <https://discussion.fedoraproject.org/c/server/coreos>
- Mailing list: coreos@lists.fedoraproject.org
- IRC: freenode #fedora-coreos
- Devconf.cz
 - [Up and running with Fedora CoreOS](#) (Friday Feb 19)
 - [Getting Started with Fedora CoreOS - A Hands-on lab](#) (Saturday Feb 20)

Demo!





Thank you!