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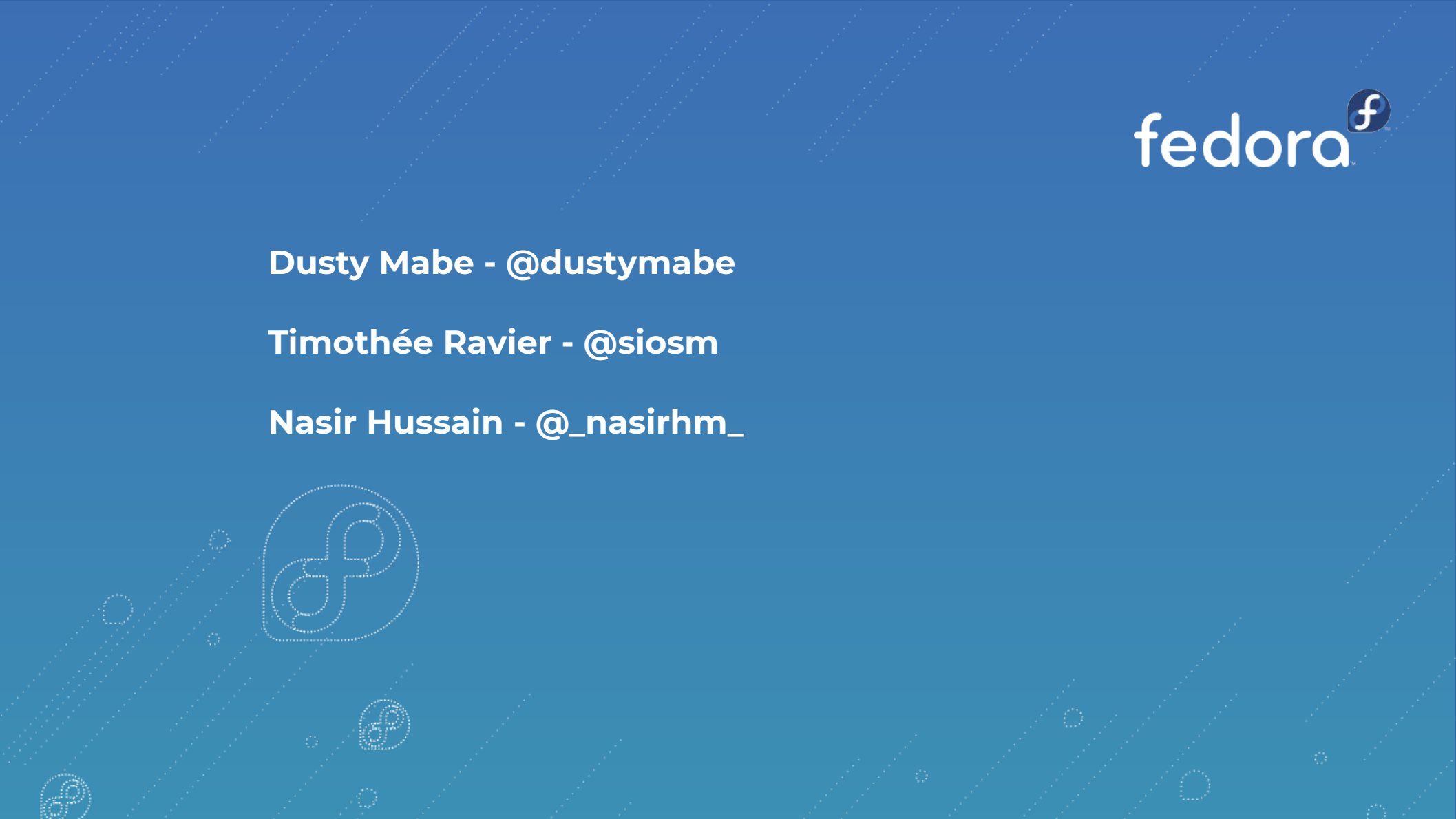
Getting Started with Fedora CoreOS

A Hands-On Workshop



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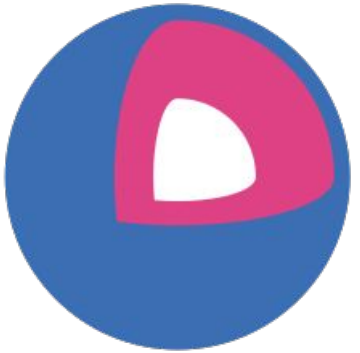
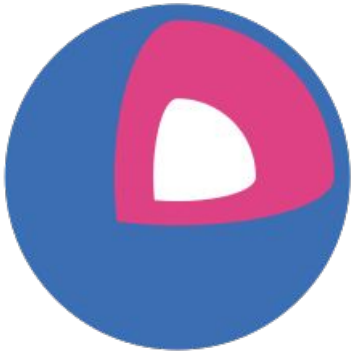
Fedora CoreOS - Emerging Fedora Edition

- 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



Fedora CoreOS Features



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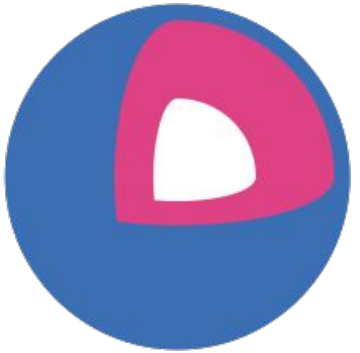
Features: Automatic Updates

- 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

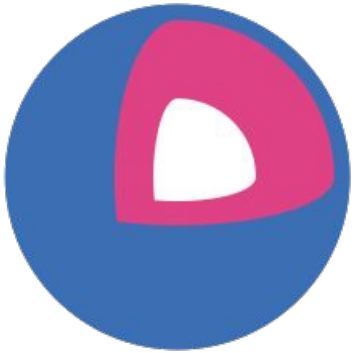


Multiple Update Streams

- 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

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": {}
}
```

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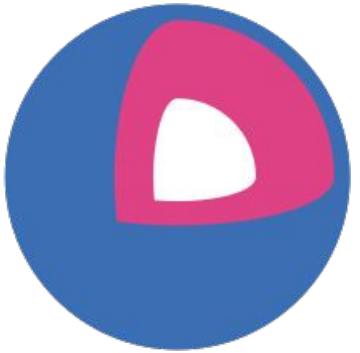
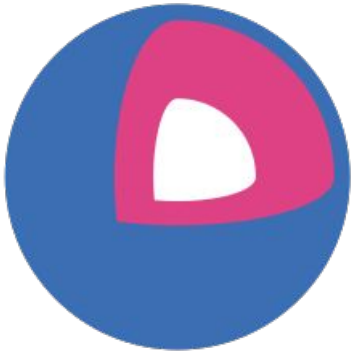
Features: Cloud Native & Container Focused

- 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 Next

- 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

Workshop

- Composed of 5 Tutorials
  - Initial Setup
    - Setup instructions that must be completed first
  - Enabling autologin and custom hostname
    - Write your first Ignition config and start a Fedora CoreOS instance
  - Starting a service on first boot
    - Learn how to start a custom script via a systemd unit on the first boot
  - SSH access and starting containers
    - Learn how to automatically start a container on first boot and to SSH in
  - Testing Fedora CoreOS updates
    - Learn how updates are handled and how to rollback if needed

Workshop Options

- Execute on your own, ask questions when you have them
  - Self Guided
- Ride along with us
  - On the video stream we'll share our screen and run through the workshop
  - Please interrupt us and ask questions when you have them
    - This is intended to be a learning experience

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

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

Thank you!

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