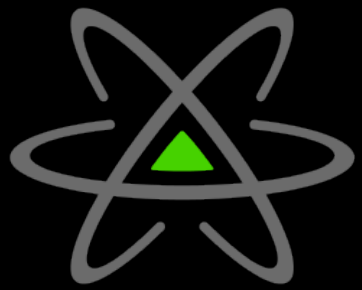

Project Atomic and Atomic Host

Dusty Mabe - 2018-01-27
Software Engineer – Atomic Host
dusty@dustymabe.com

Who am I?

- Engineer
- Open Source Nut
- Employed by Red Hat

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What is Project Atomic

- Umbrella project for container related open source initiatives
  - Atomic Host
  - Atomic CLI
  - Atomic Developer Bundle → Minishift
  - Kompose
  - Fedora Layered Image Build System / CentOS Container Pipeline
  - OCI
  - System Containers
  - buildah/podman/libpod/crio

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Atomic Host

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What is an Atomic Host?

- Lightweight Operating System
- A Tree, Not a Disk Image
- git for your operating system
- Built from RPMs
- Atomic Upgrades
- Atomic Rollbacks
- Good Host Platform for Containers

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First - Why do you care?

- Containers
  - Low overhead
    - Similar to running a process natively
  - Chroot on steroids
    - Leverages kernel namespaces to achieve isolation
    - Uses container image as root filesystem
  - By using container images
    - You can "BYOE" (bring your own environment)
    - Should be able to easily export environment and run anywhere

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Atomic Host

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Lightweight Operating System

- As a result of containers:
  - Host has less responsibility
  - Needs to be able to run containers and do it well
  - Throw in some management tools and you're done
  - Try to remove things from the base OS if not needed

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A Tree, Not a Disk Image

- Not an entire disk image
  - Only parts of the filesystem are immutable
    - /usr mounted as read-only
      - Helps prevent binaries from being tampered with
    - Can edit configuration in /etc, /var
  - Multiple trees can be staged on the system
    - Ex: “rebase” between a CentOS tree and a Fedora tree
  - Can have multiple “deployments” from each tree
    - Can upgrade/rollback between “deployments”
  - Read more here on ostree website

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git for your OS

- At any time you can check what is present vs what was delivered:

```
# ostree admin config-diff | grep fstab
A    fstab

# ostree admin config-diff | head -n 4
M    sysconfig/docker-storage-setup
M    sysconfig/docker-storage
M    adjtime
M    selinux/config

# diff -ur /etc/ /ostree/deploy/fedora-
atomic/deploy/3492546bc1ef6bca1bc7801ed6bb0414f90cc96668e067996dba3de
e0d83e6c3.0/usr/etc/ 2>/dev/null | less
```

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Built From RPMs

- Trees are built from RPMs
- These are the same RPMs that compose Fedora or CentOS
- You can see exactly what versions of RPMs are installed
  - rpm-foo-2.2.2.rpm should behave the same on atomic as it does anywhere else
- You can also layer in other needed RPMs

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Atomic Upgrades

- When an update is available:
  - **rpm-ostree upgrade**
    - Downloads new update on the branch being followed
      - Only downloads diff from what is currently deployed
    - Stages update as deployment for next boot
    - No software ever runs in half upgraded state

```
# rpm-ostree upgrade
5 delta parts, 4 loose fetched; 154372 KiB transferred in 34 seconds

Copying /etc changes: 24 modified, 0 removed, 53 added
Transaction complete; bootconfig swap: yes deployment count change: 1
Upgraded:
  NetworkManager 1:1.4.4-3.fc25 -> 1:1.4.4-4.fc25
```

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Atomic Upgrades (after reboot)

- "rpm-ostree status" shows state of the system

```
# rpm-ostree status
State: idle
Deployments:
● fedora-atomic:fedora-atomic/25/x86_64/docker-host
                Version: 25.113 (2017-04-25 01:47:29)
                 Commit: 3492546bc1ef6bca1bc7801ed6bb0414f90cc96668e067996dba3dee
                 OSName: fedora-atomic

  fedora-atomic:fedora-atomic/25/x86_64/docker-host
                Version: 25.108 (2017-04-17 20:47:14)
                 Commit: 9f0b576461f4baa2b5749003a8628fbf0a456942f37e17a9ceabdb29f
                 OSName: fedora-atomic
```

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Atomic Rollbacks

- New deployment doesn't work?
  - The old tree is still there (Nothing has changed)
  - Rpm-ostree rollback
    - Stages old deployment.. reverts configuration changes

```
# rpm-ostree rollback
Moving '9f0b576461f4baa2b57490456942f37e17a9ceabdb29f.0' to be first deployment
Transaction complete; bootconfig swap: yes deployment count change: 0
Downgraded:
  NetworkManager 1:1.4.4-4.fc25 -> 1:1.4.4-3.fc25
```

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Atomic Host's Role

- Provide a stable base
  - Run Containers.. Do it well
    - Ship container runtime and optimal defaults
    - Configure sane defaults for container storage
    - The rest is history

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It's not all rainbows

- Traditionally:
  - Not as flexible
    - Can install new rpms with package layering
  - Must reboot to apply update
    - That's why it's "atomic"
    - Experimental feature to address this: "livefs"
- All the mounts/chroots can be confusing
  - It's a necessary evil

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Links and Pointers

- Website: projectatomic.io
- Github: github.com/projectatomic

- Facebook.com/projectatomic
- Twitter @projectatomic

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Thank you :-)

Any questions please?

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