Building blocks of Linux Containers

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UBER

2016-11-18

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Conclusion!

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  - You need to understand infra to successfully troubleshoot infra.
  - There are trade-offs in the configuration.
- Make container engine in 30 minutes.
- Details! $\rightarrow$ You will still pick existing tools.

Why me

My resume: oncall experience.

- 2009 – 2012 Telecom (Dev + Ops).
- 2012 – 2014 Online Gaming (Dev + Ops).
- 2014 – 2016 Amazon (Dev + Ops).
- 2016 – *now* Uber (Dev + Ops):
    - From 2016.02: Dev.
    - From 2016.11: SRE.

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I had to understand how exactly infrastructure works.

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- Namespaces for isolation.

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- User namespaces.
- Pid namespaces.
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- Network namespaces.
- There are more, but not today.

User namespace

Become container-local root.

```
unshare --map-root-user
```

Mount namespace

Hide container mounts.

```
unshare --mount
```

Pid namespace

Hide other pids.

```
unshare --pid --mount-proc --fork
```

Network namespace

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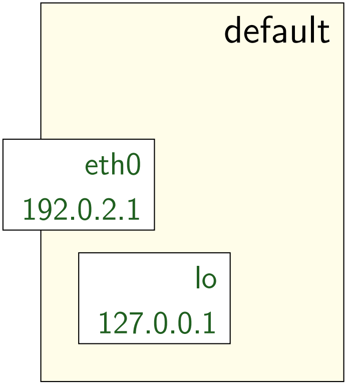
Ever wanted to run `tcpdump` on an *application*?

Network namespace



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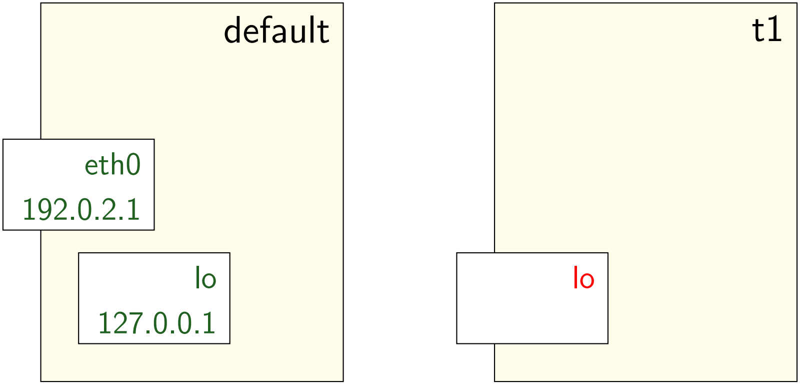

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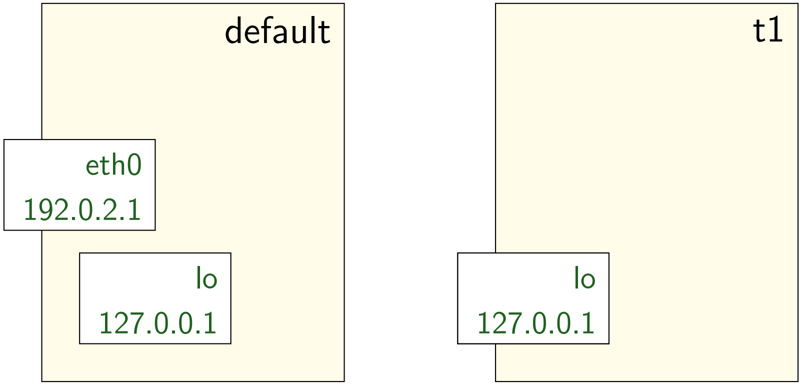

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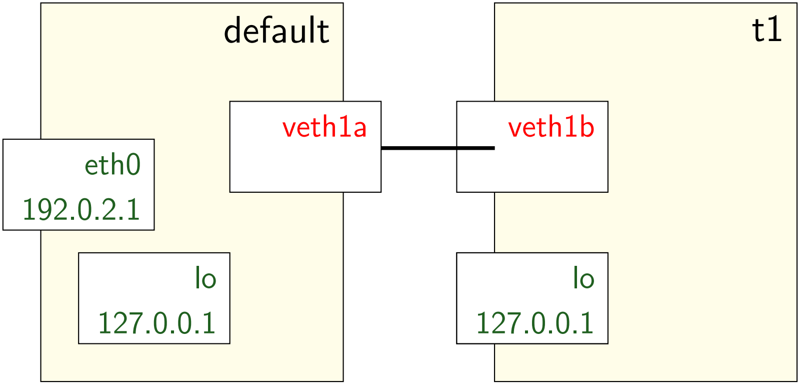

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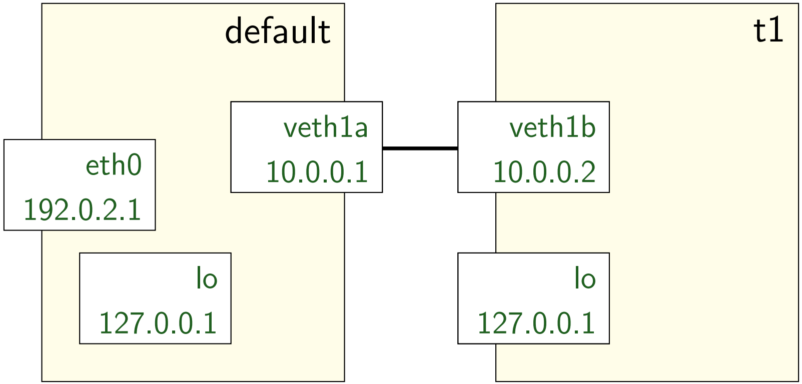

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An improvement over "run and hope it doesn't affect anything else".

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Copy On Write!

lvm? zfs? btrfs?

A quick demo

- Create `tank/images/debian@latest`
- Create `tank/containers/t1` from `@latest`
- `unshare --mount --pid --fork chroot .  bash`

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Should someone else do it?

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- But look at my conclusions again.

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- Tooling companies (Docker, CoreOS, etc) raised $> \$10^8$.

To recap

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- Easy to understand kernel facilities.
- Devil hides in the details.
- Either spend a lot of time and headache, or re-use existing tools.

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We're hiring!

Uber SRE locations: SF, NYC, Seattle, Vilnius.

- Check out join.uber.com
- Also, contact me at motiejus@uber.com