OpenStack Services

Docker All The ~~Things~~

and Kubernetes

and Atomic

@brentholden
@jameslabocki

Agenda

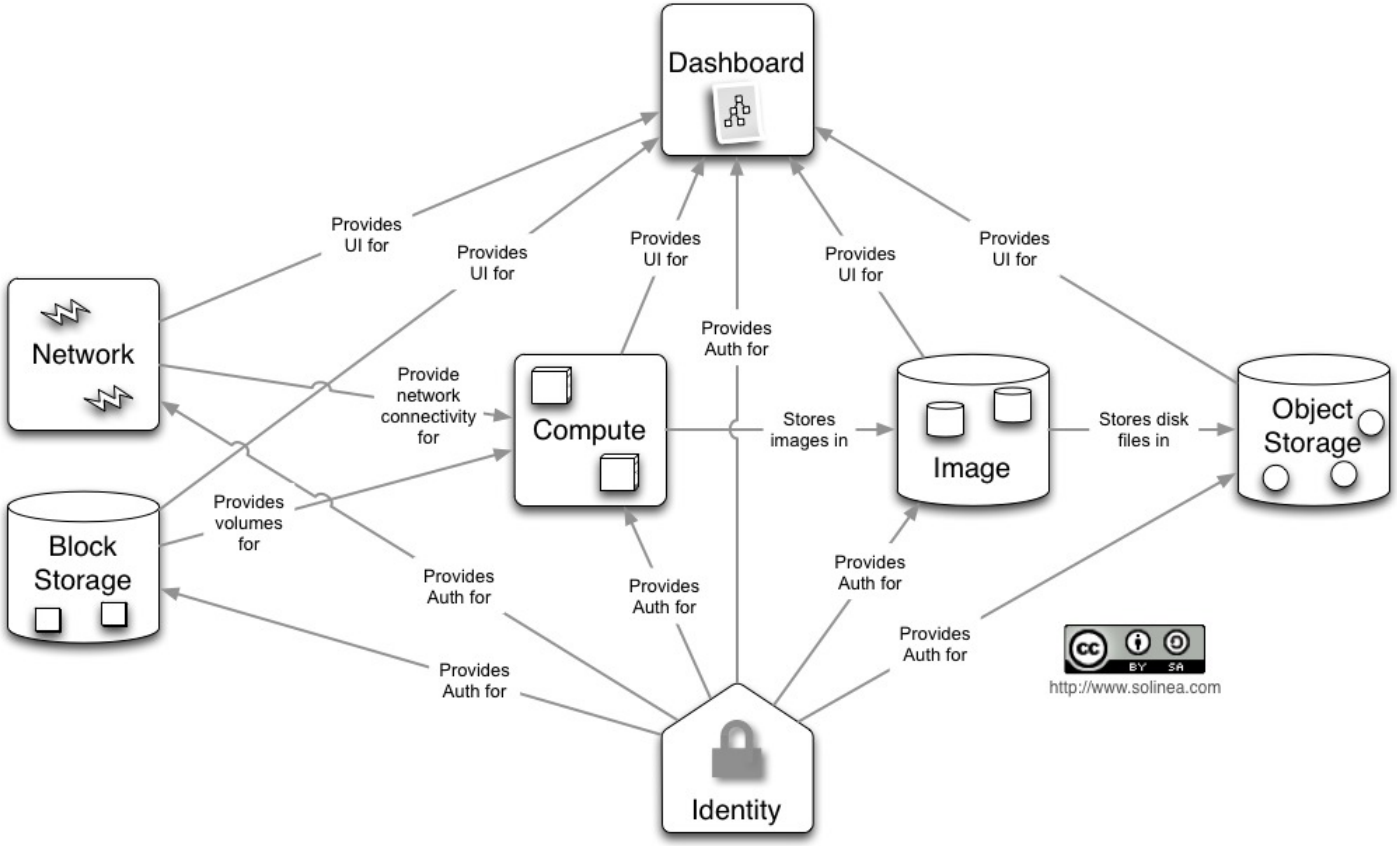
The Problem

Current Solutions

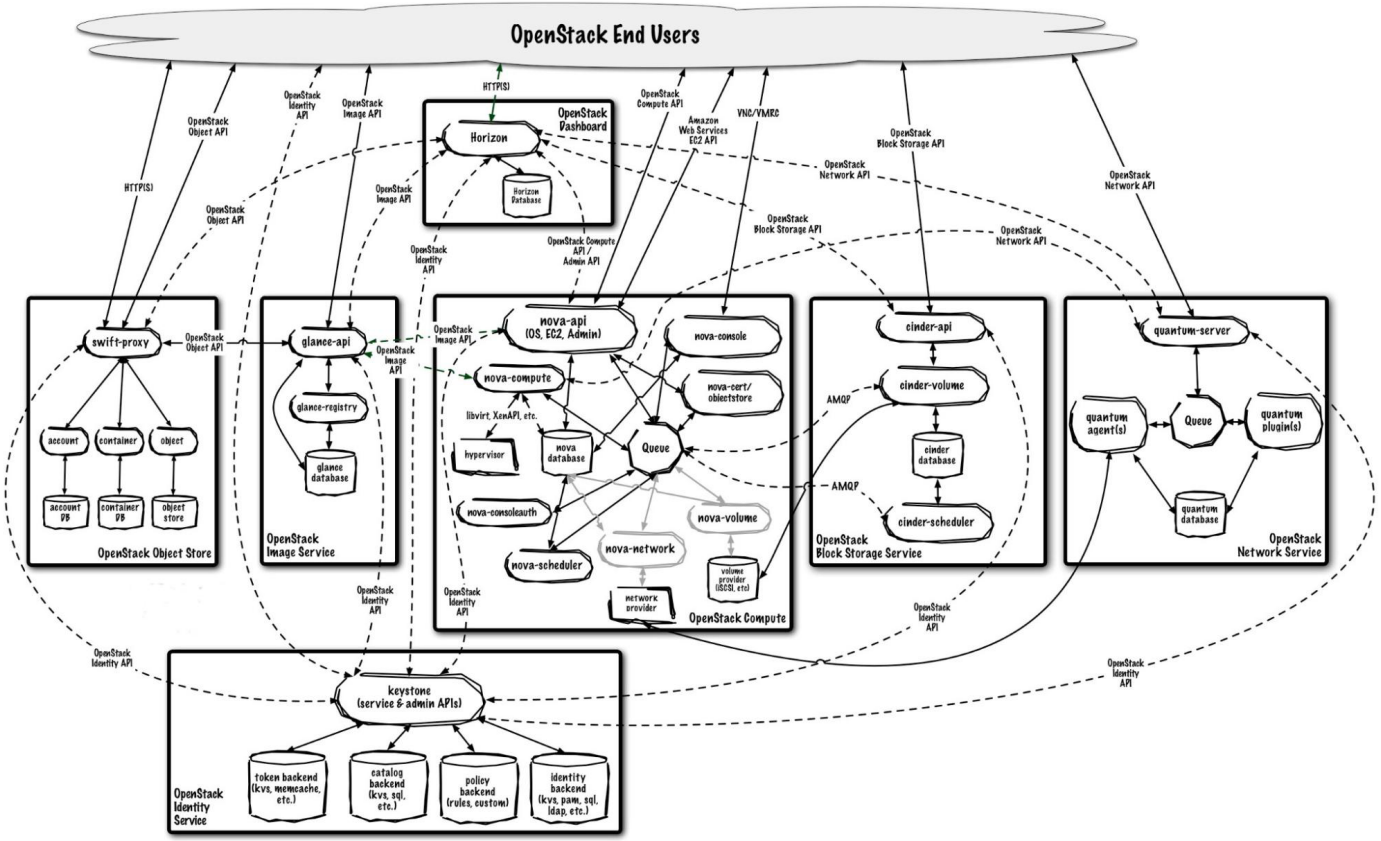
Tomorrow’s Improvements

Demonstration

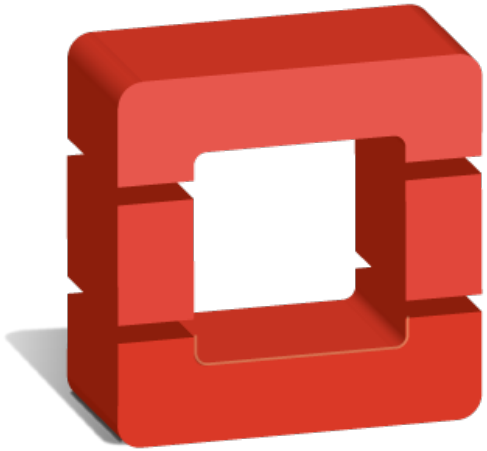
A Thing of Beauty



The Reality


OpenStack End Users
HTTP(S)
OpenStack Dashboard
Horizon
Horizon Database
OpenStack Object API
OpenStack Identity API
OpenStack Image API
OpenStack Compute API
Amazon Web Services EC2 API
VNC/VMRC
OpenStack Block Storage API
OpenStack Network API
OpenStack Compute API / Admin API
swift-proxy
account
container
object
account DB
container DB
object store
OpenStack Object Store
glance-api
glance-registry
glance database
OpenStack Image Service
nova-api (OS, EC2, Admin)
nova-console
nova-compute
nova-cert/ objectstore
libvirt, XenAPI, etc.
hypervisor
nova database
Queue
nova-consoleauth
nova-volume
nova-network
nova-scheduler
volume provider (iSCSI, etc)
network provider
OpenStack Compute
cinder-api
cinder-volume
AMQP
cinder database
cinder-scheduler
OpenStack Block Storage Service
quantum-server
quantum agent(s)
Queue
quantum plugin(s)
quantum database
OpenStack Network Service
keystone (service & admin APIs)
token backend (kvs, memcache, etc.)
catalog backend (kvs, sql, etc.)
policy backend (rules, custom)
identity backend (kvs, pam, sql, ldap, etc.)
OpenStack Identity Service

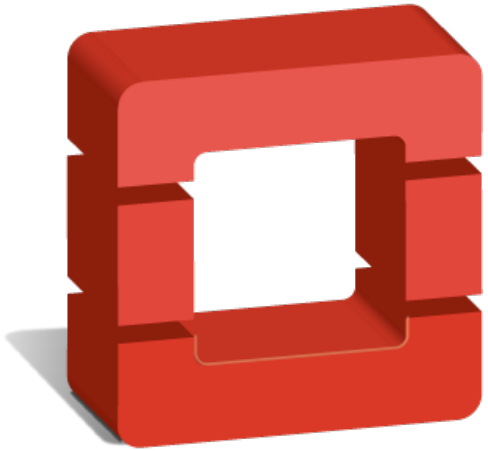
All Infrastructure Platforms Face This Problem



openstack™

!=

All Infrastructure Platforms Face This Problem



openstack™

oVirt

FOREMAN

GlusterFS

pulp

Puppet

And Developers Lives Aren’t Easy Either

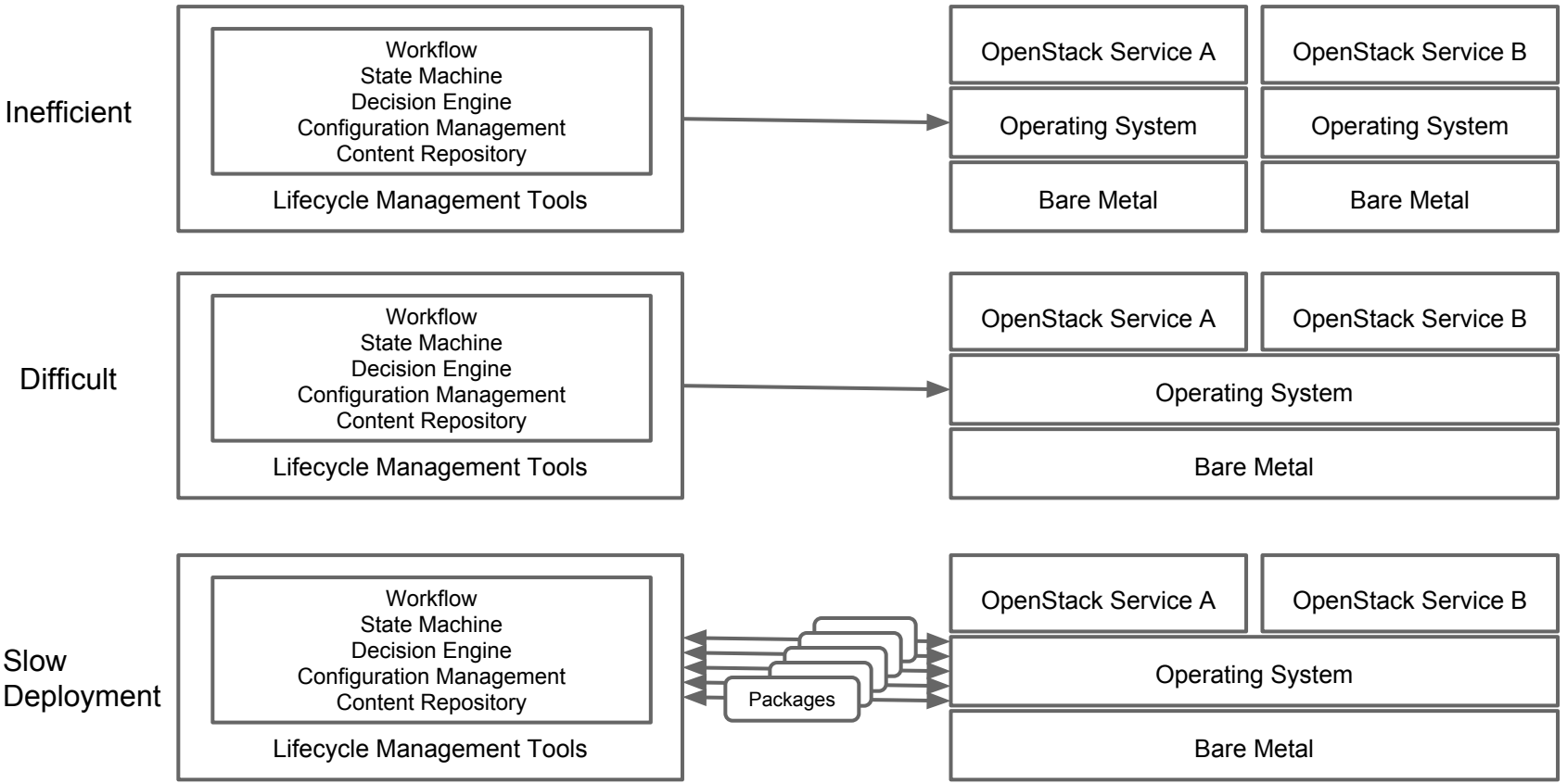
Reproducible Environment

Separation between Operating System and Application

Description of Deployment Pattern w/o lots of code

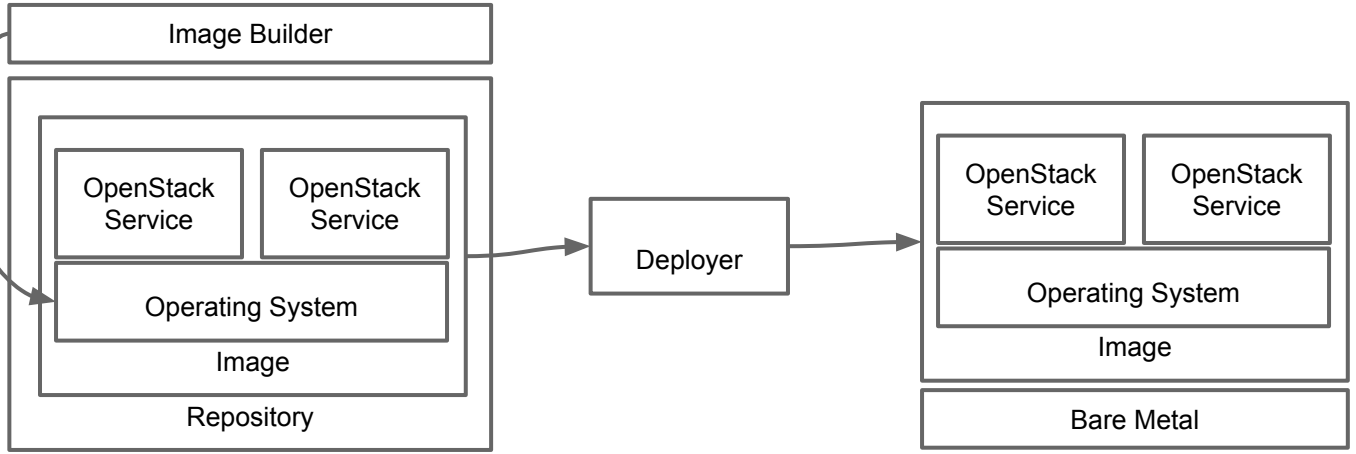
Current Solutions

Present Solutions - Build Based + Config Management

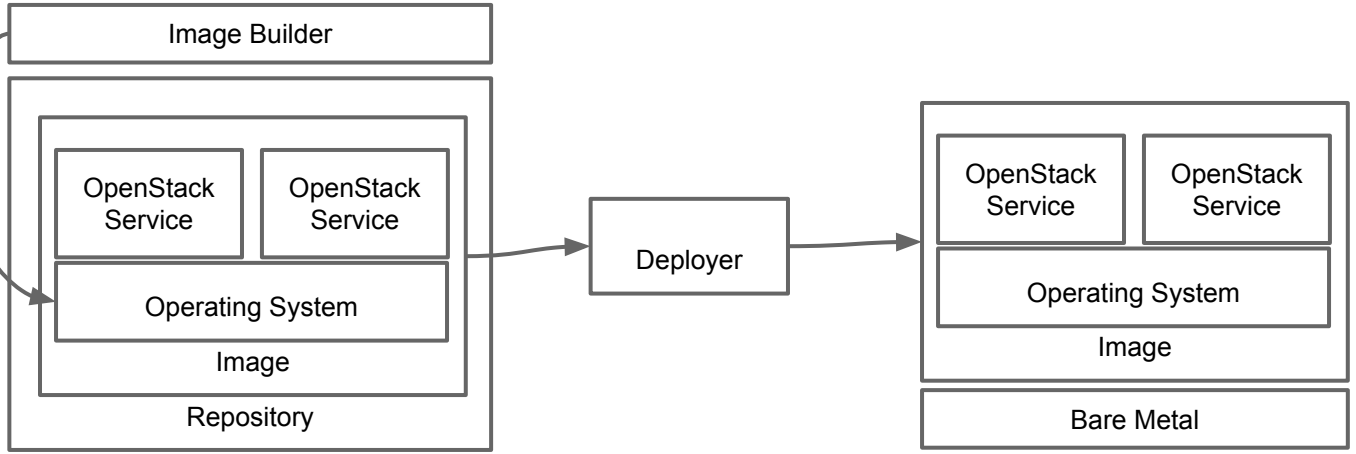


Present Solutions - Image Based + Declarative

Still Difficult



Expensive (updates)



Tomorrow’s Improvements

What If …

Isolated, lightweight, and portable

Pre-integrated

Easily describe run-time relationships

Run on something thin and easy to update

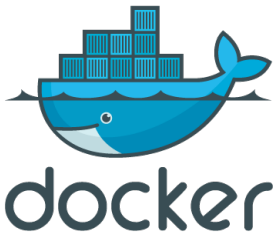
What If …

Isolated, lightweight, and portable

Pre-integrated

Easily describe run-time relationships

Run on something thin and easy to update



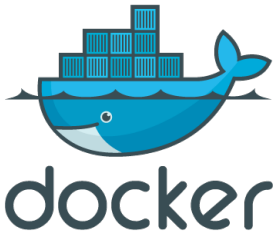
What If …

Isolated, lightweight, and portable

Pre-integrated

Easily describe run-time relationships

Run on something thin and easy to update



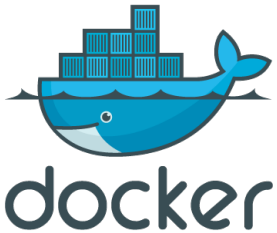
What If …

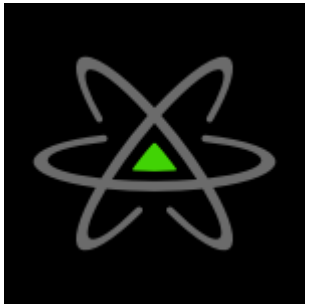
Isolated, lightweight, and portable

Pre-integrated

Easily describe run-time relationships

Run on something thin and easy to update





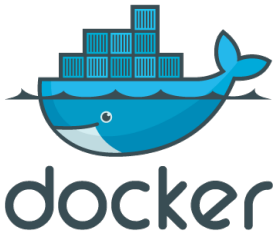
What If … Develop locally and run in production with less friction

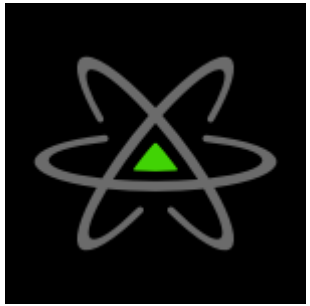
Isolated, lightweight, and portable

Pre-integrated

Easily describe run-time relationships

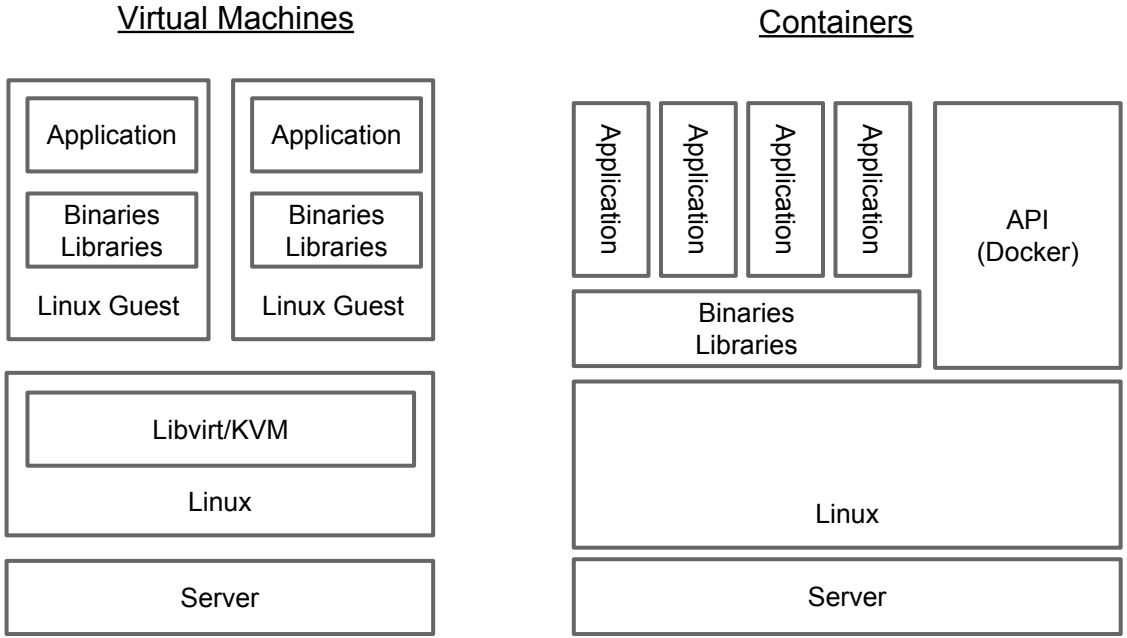
Run on something thin and easy to update





Docker

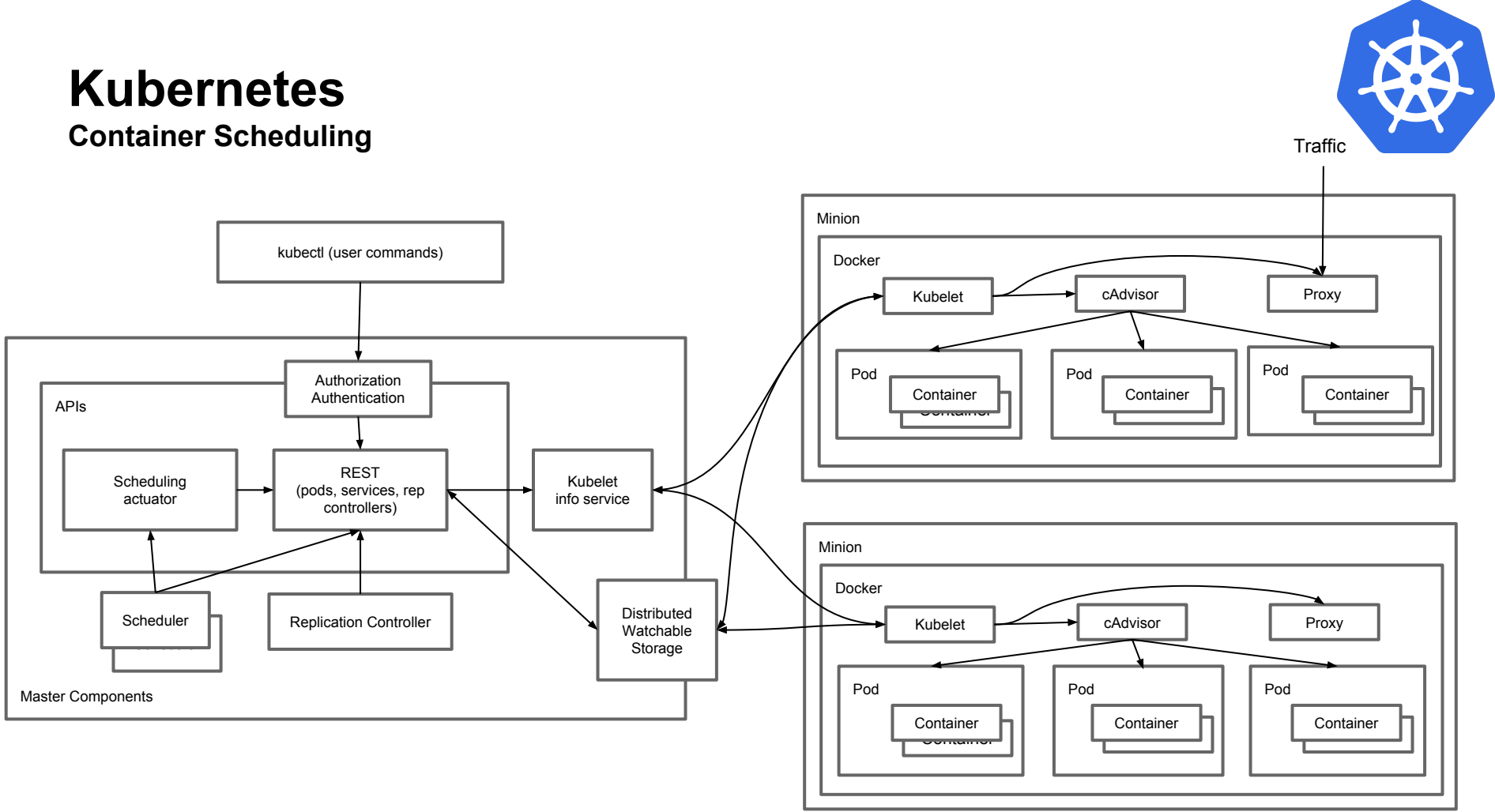
Isolated, Lightweight, and Portable



- Develop
- Build
- Push
- Enjoy!

Kubernetes

Container Scheduling



Kubernetes

Container Scheduling + Easily describe run-time relationships

Imperative

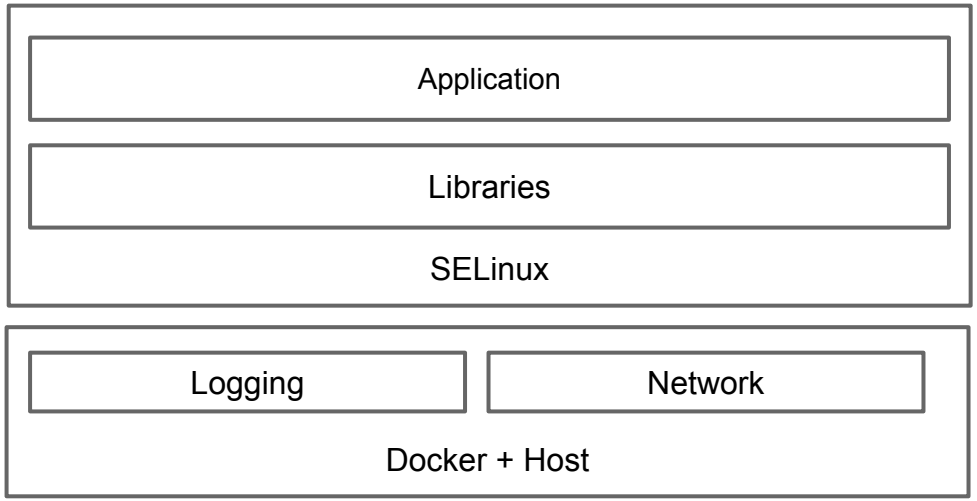
```
service mongod start


chkconfig mongod on


mongo --host controller --eval '
db = db.getSiblingDB("ceilometer");
db.addUser({user: "ceilometer",
            pwd: "mypassword",
            roles: [ "readWrite", "dbAdmin" ]})'


....
```

Declarative

```
{
  "id": "mongodb",
  "desiredState": {
            "manifest": {
            "version": "v1",
            "id": "mongodb",
            "containers": [{
            "name": "mongodb",
            "image": "dockerfile/mongodb",
            "ports": [{
            "containerPort": 6379,
            "hostPort": 6379
            }]
            }]
            }
  },
  "labels": {
            "name": "mongodb"
  }
}
```

Atomic

Run on a thin and easy to update OS

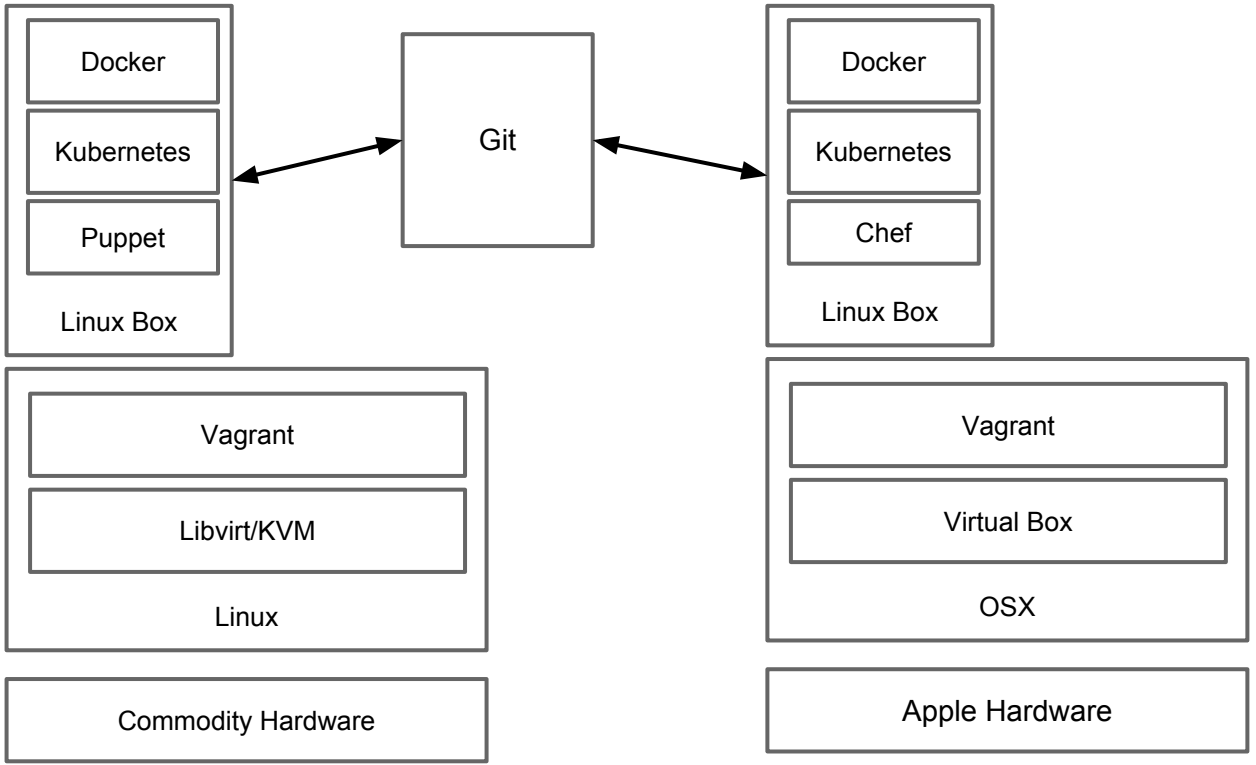


`rpm-ostree upgrade`

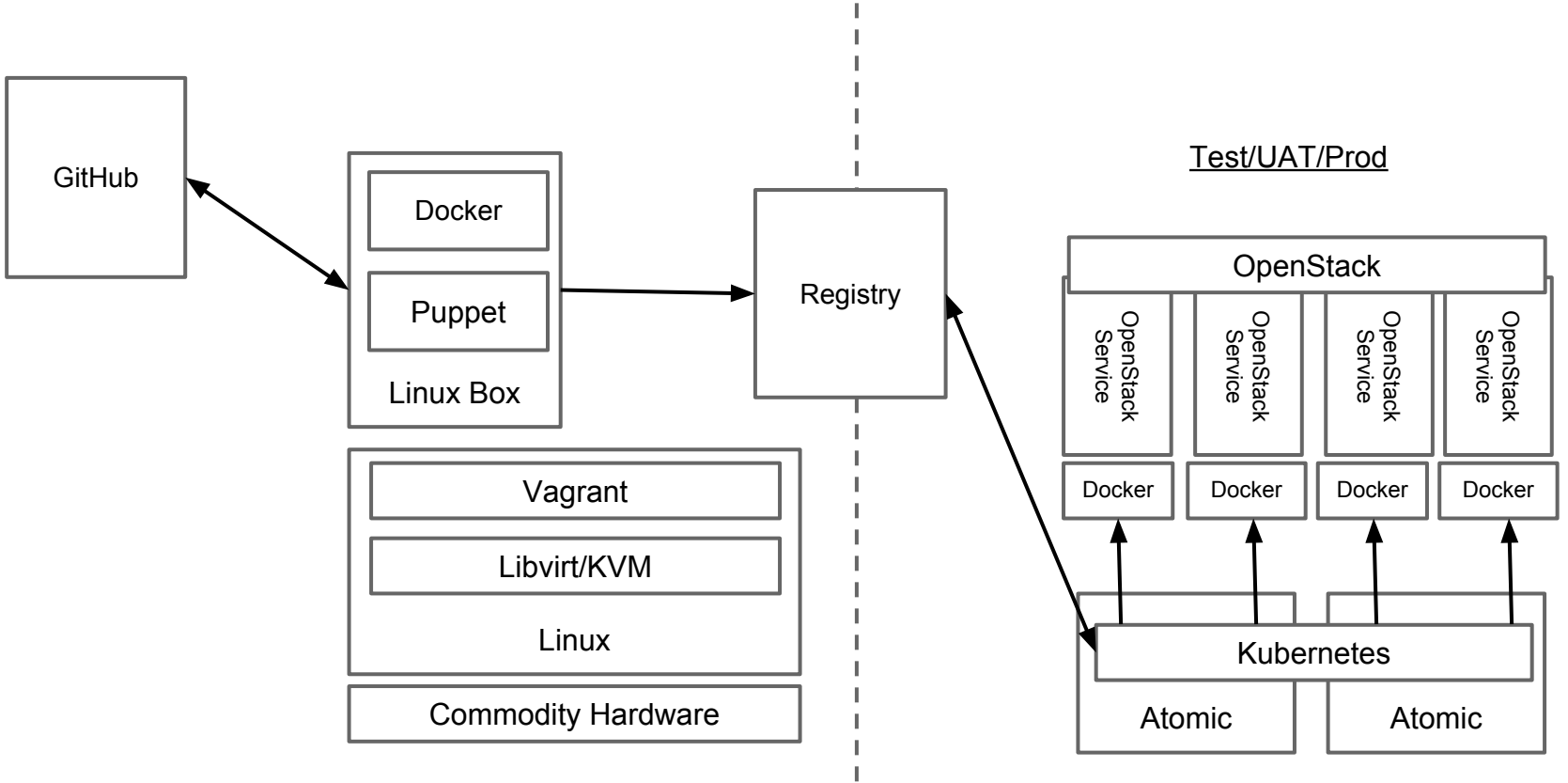
`rpm-ostree rollback`

How does it change your life?

Developer Workstation(s)

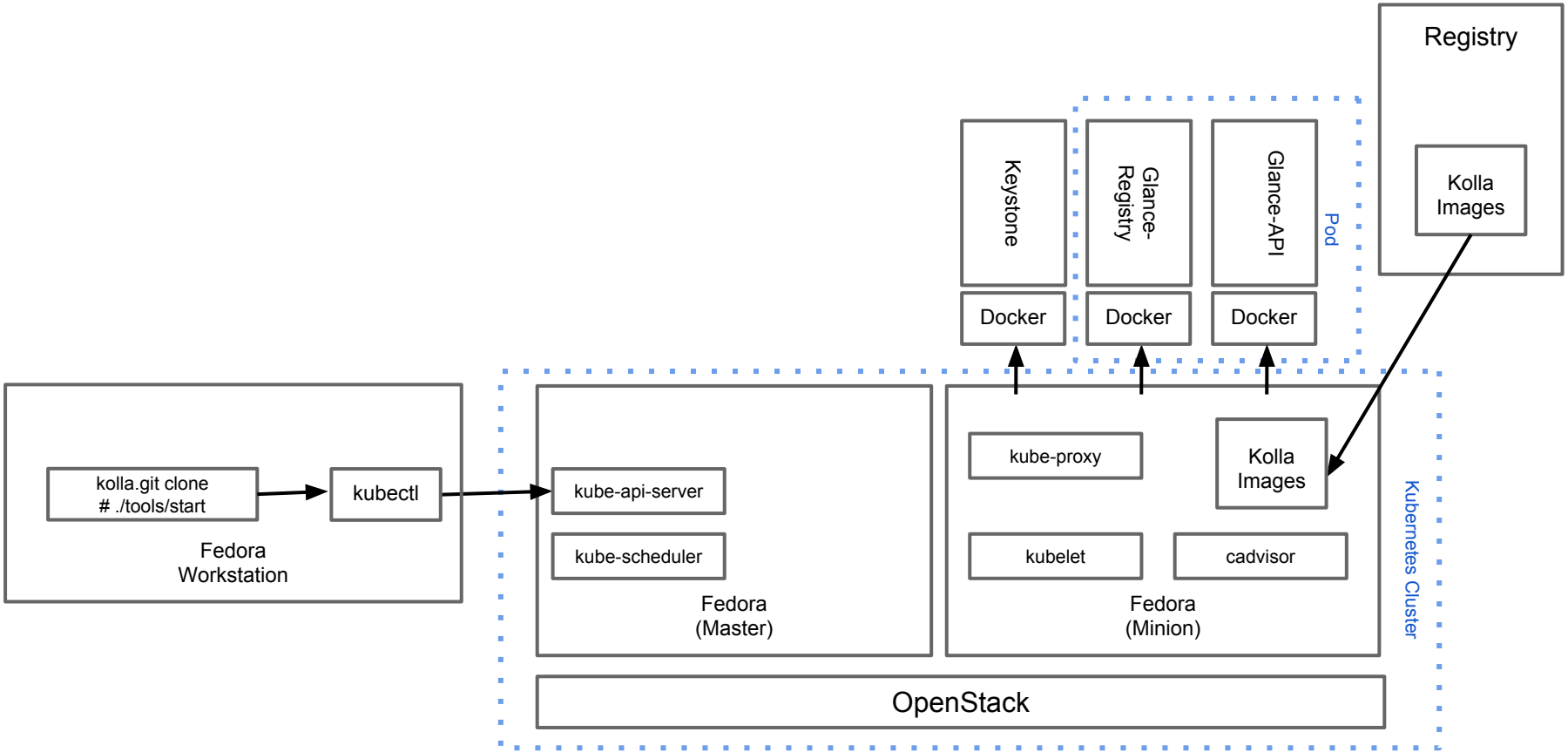


From Development to Operations



Demonstration Time!

Demonstration - Operate



Challenges

External Connectivity

Multi-Host Networking

Privileged Containers

Run-Time Configuration

Persistent Storage (for Services and Exposing Cinder)

Monitoring

Early Days for Kubernetes

Communities

https://github.com/docker/docker

https://github.com/GoogleCloudPlatform/kubernetes

https://github.com/projectatomic/

https://github.com/openshift/origin-server

https://blueprints.launchpad.net/kolla/

https://github.com/larsks/heat-kubernetes

Design Summit Session for Kolla

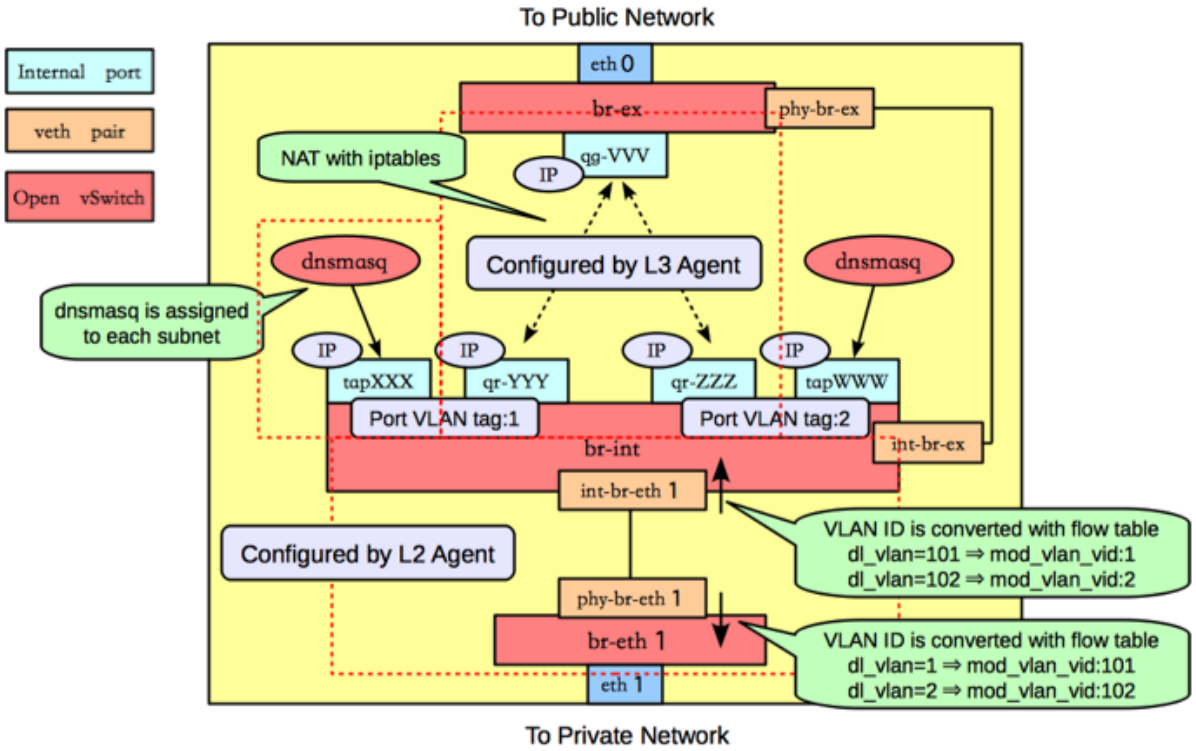
Tuesday November 4 17:30 - 18:10

Duffy (Le Meridien)

Read the notes :)

Slides @ www.allthingsopen.com

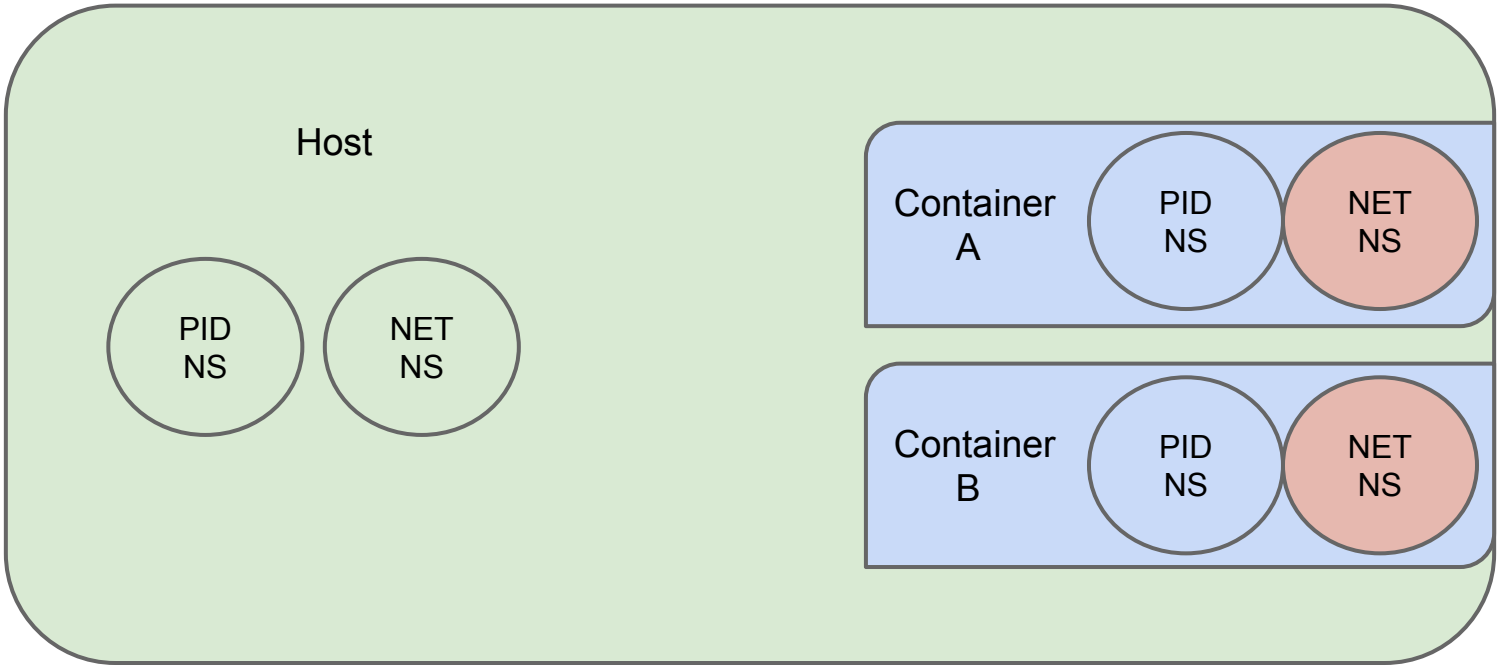
Neutron L3 Networking Review



Source: http://docs.openstack.org/havana/config-reference/content/under_the_hood_openvswitch.

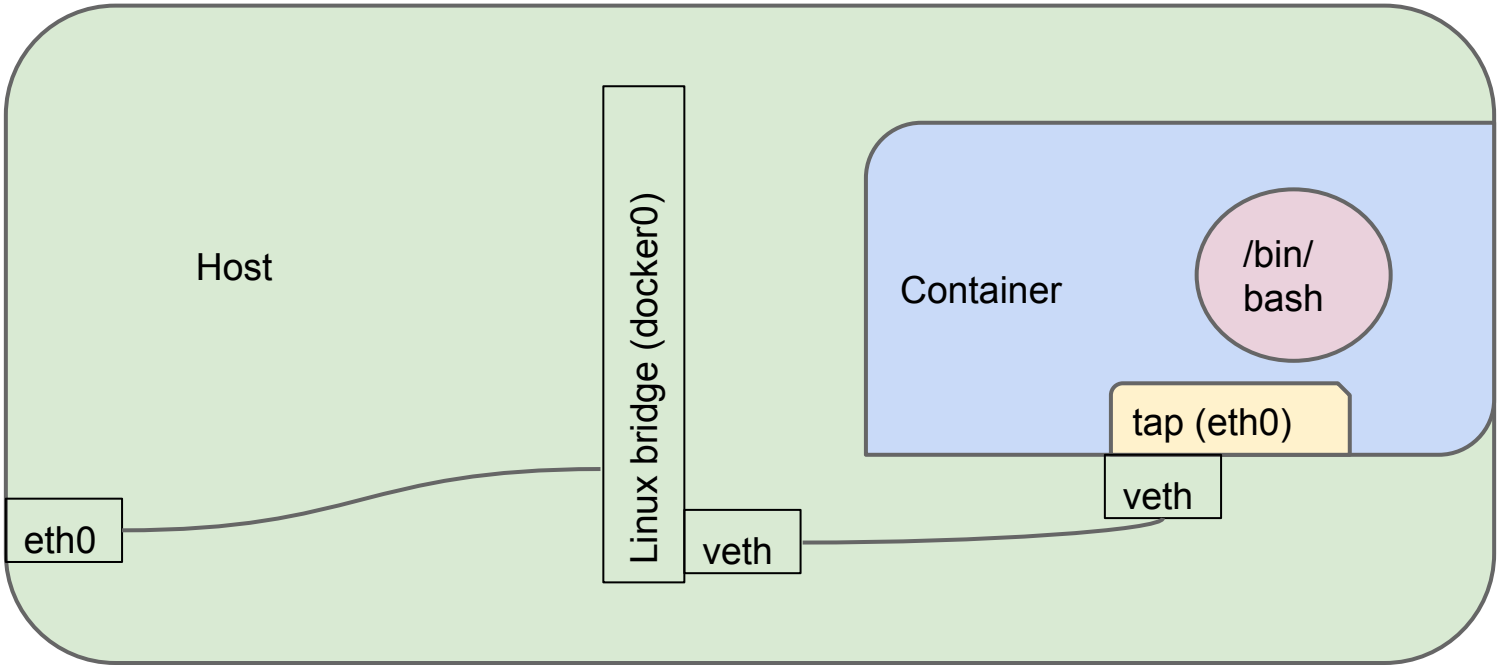
Container Networking Difficulties

Stock Docker Configuration



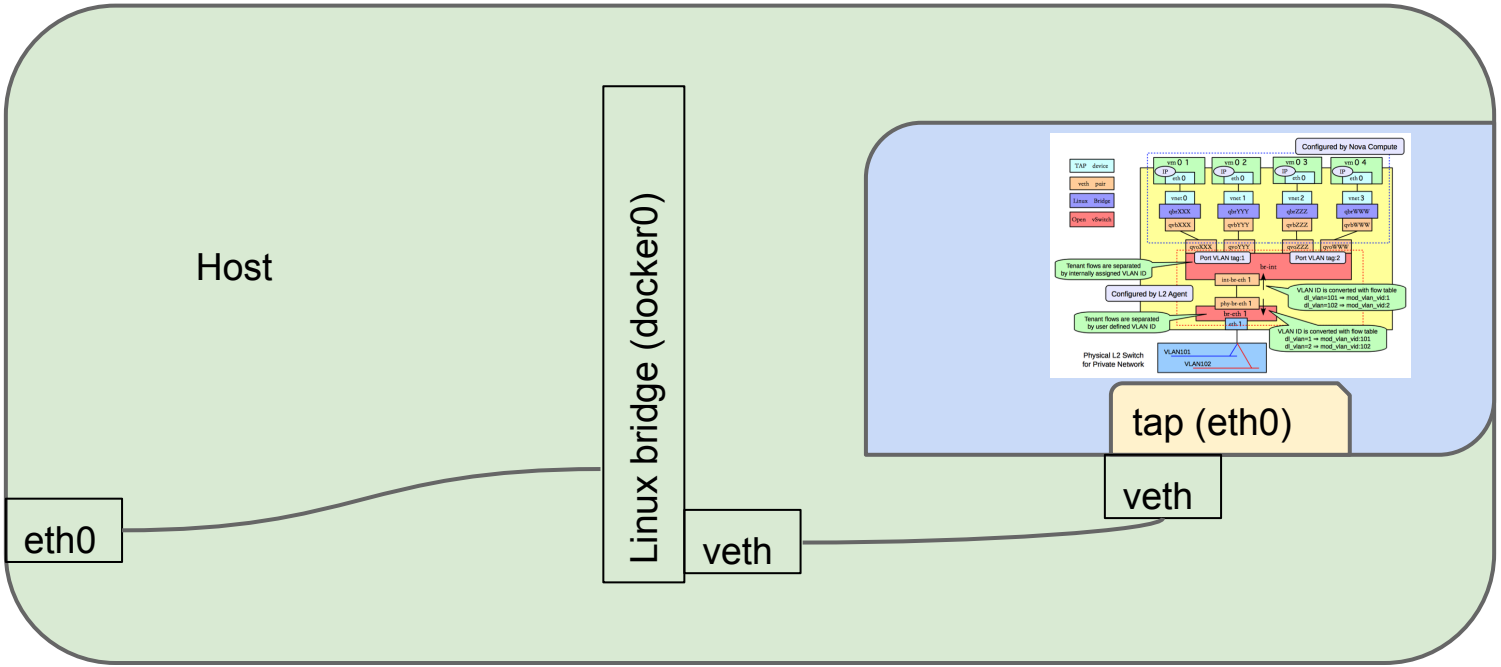
Container Networking Difficulties (2)

Stock Docker Configuration



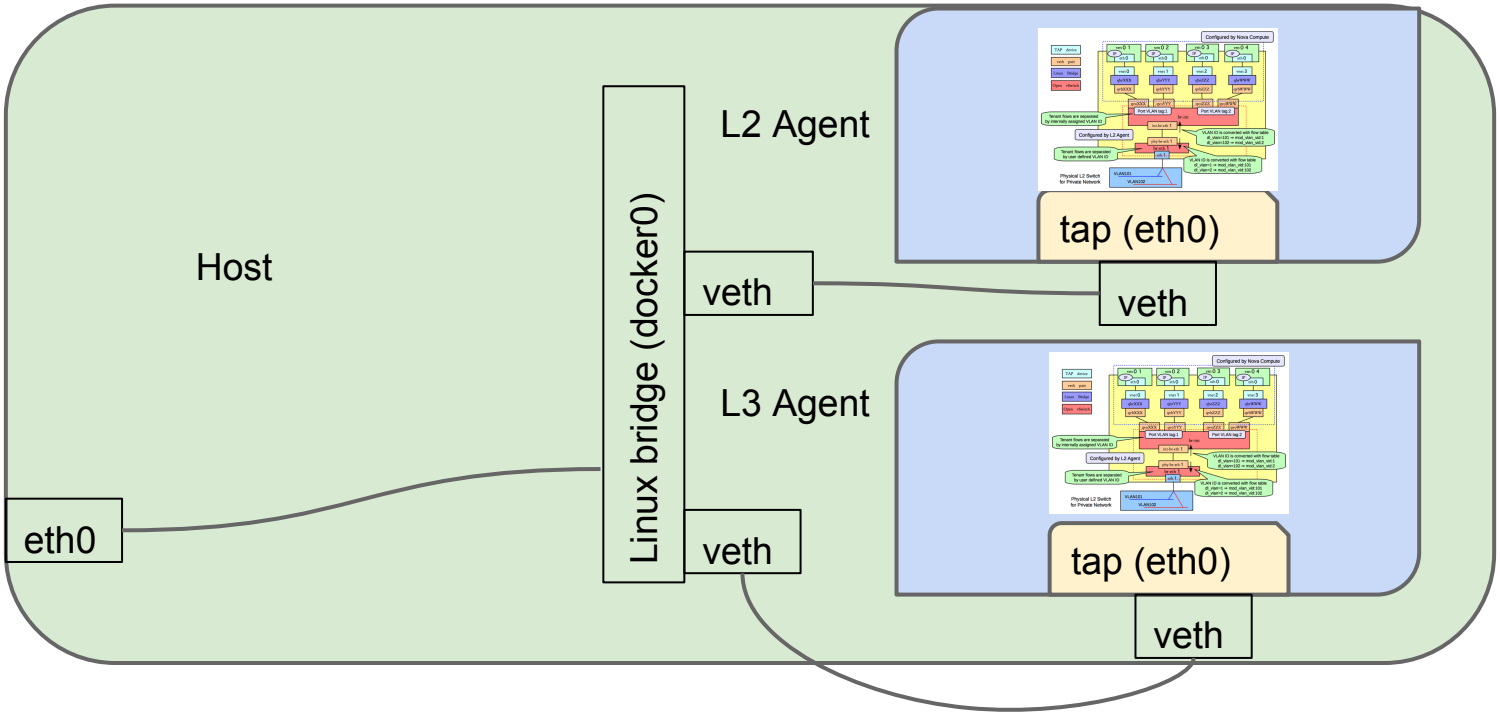
Container Networking Difficulties (3)

Stock Docker Configuration



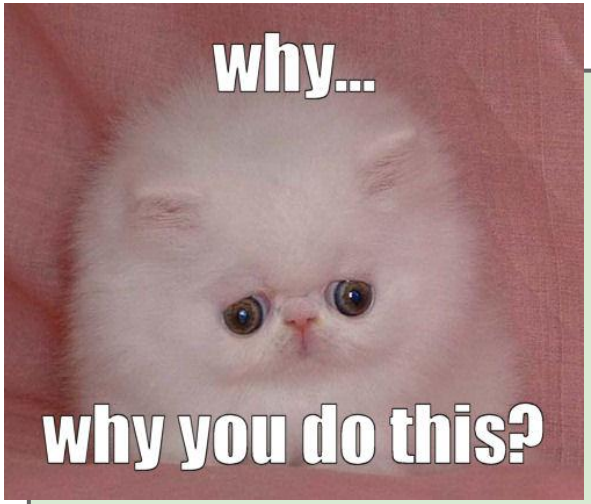
Container Networking Difficulties (4)

Stock Docker Configuration

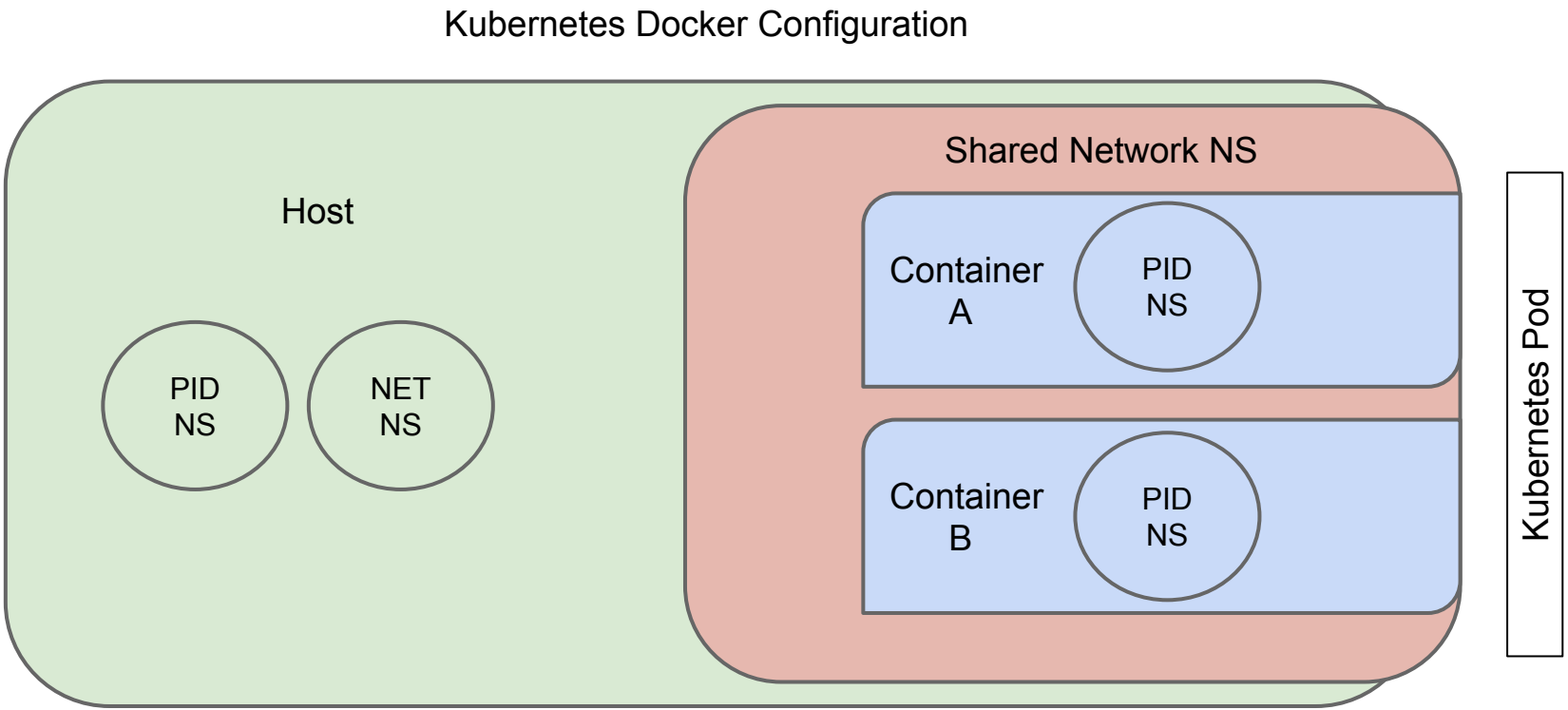


Container Networking Difficulties (4)

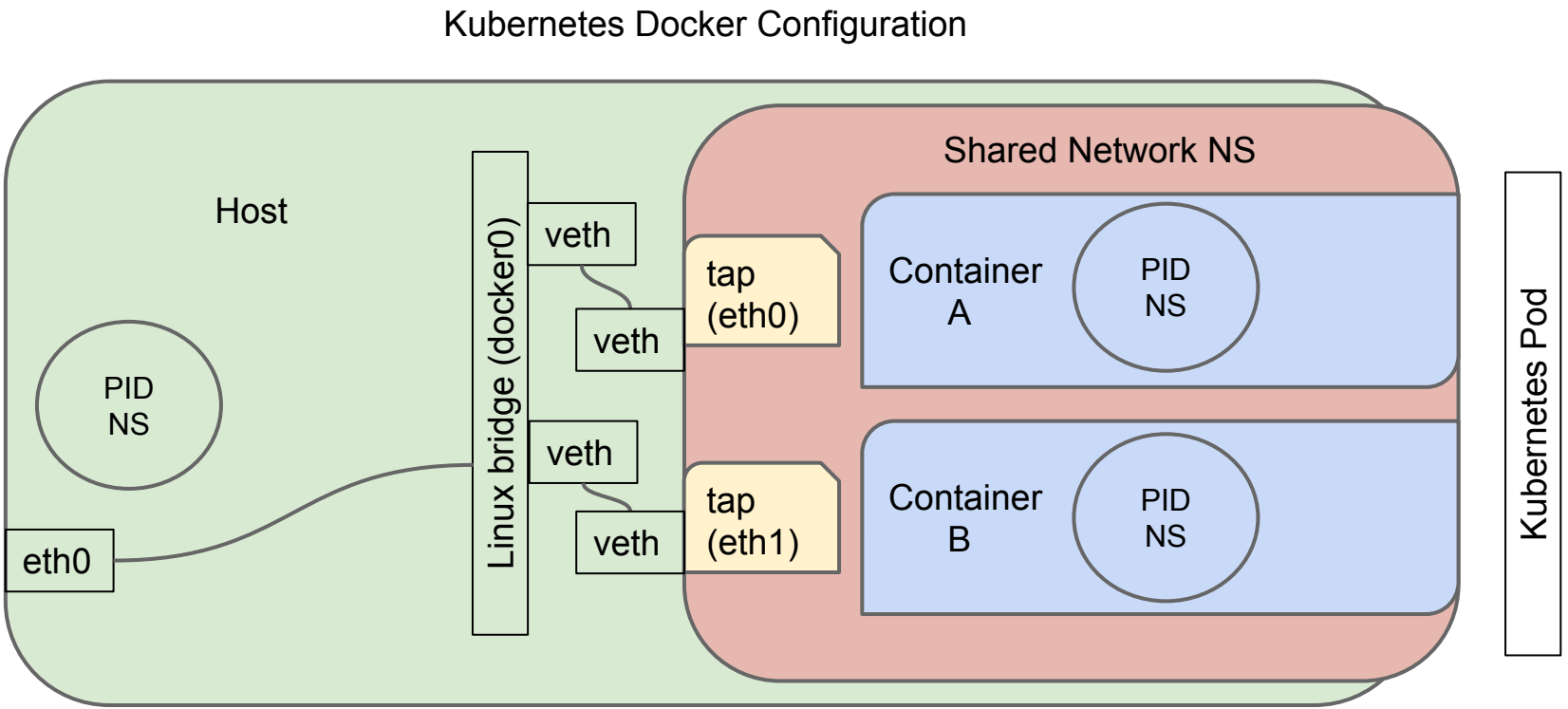
Stock Docker Configuration



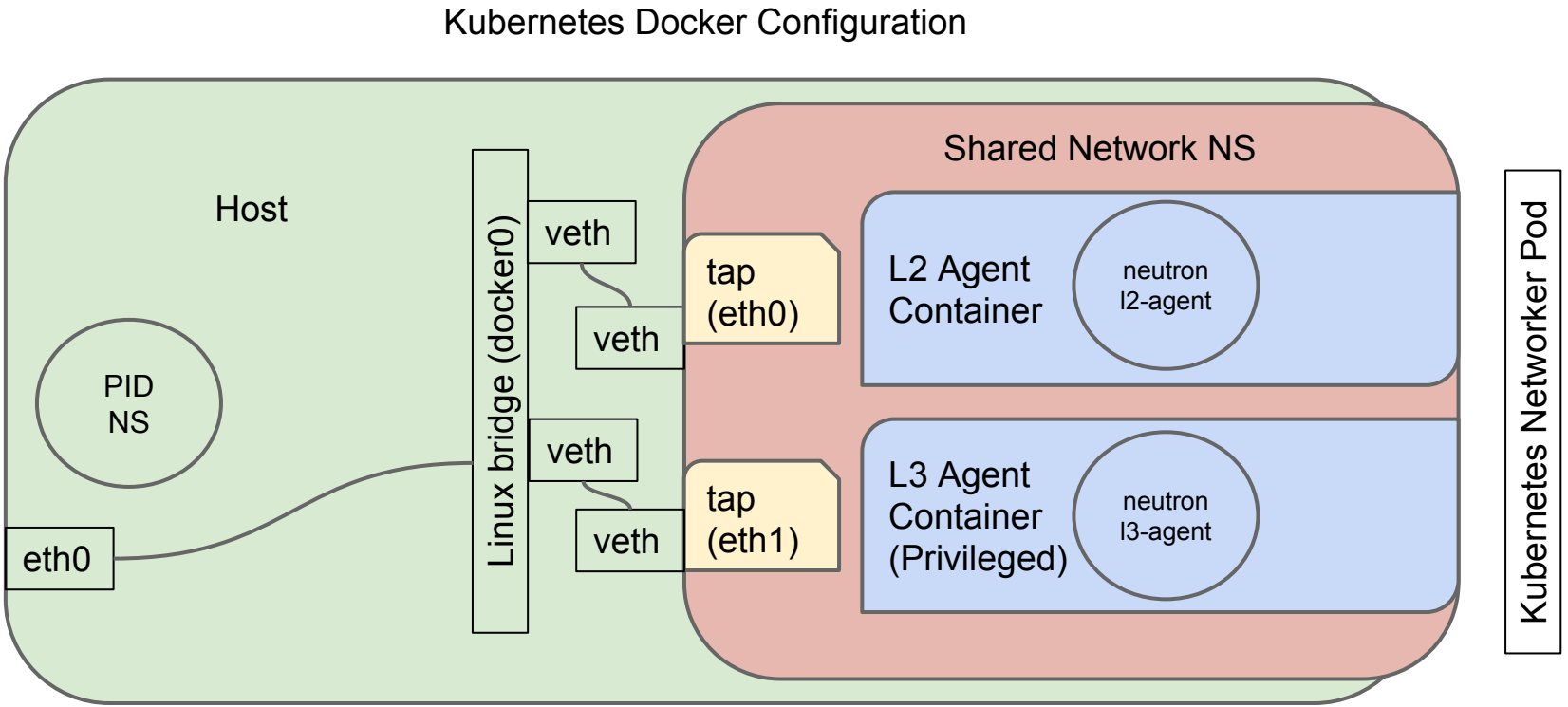
Container Networking Difficulties (5)



Container Networking Difficulties (6)



Container Networking Difficulties (7)



“If I had an hour to solve a problem and my life depended on the solution, I would spend the first 55 minutes determining the proper question to ask, for once I know the proper question, I could solve the problem in less than five minutes.”

Albert Einstein