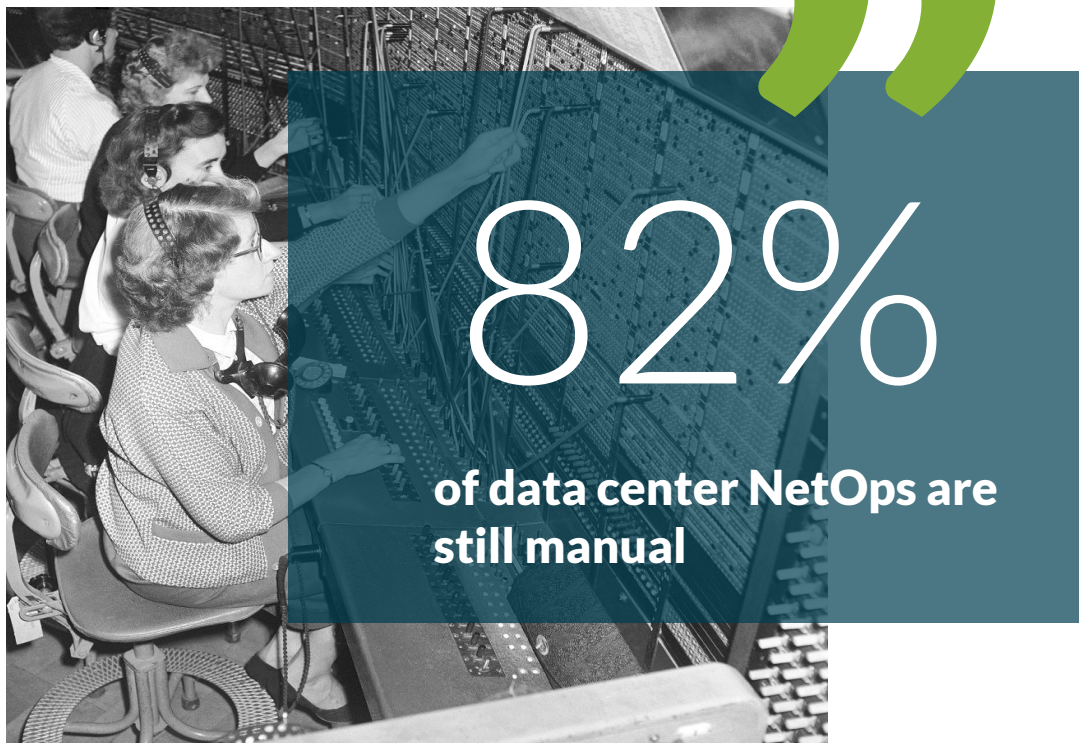


Interop19

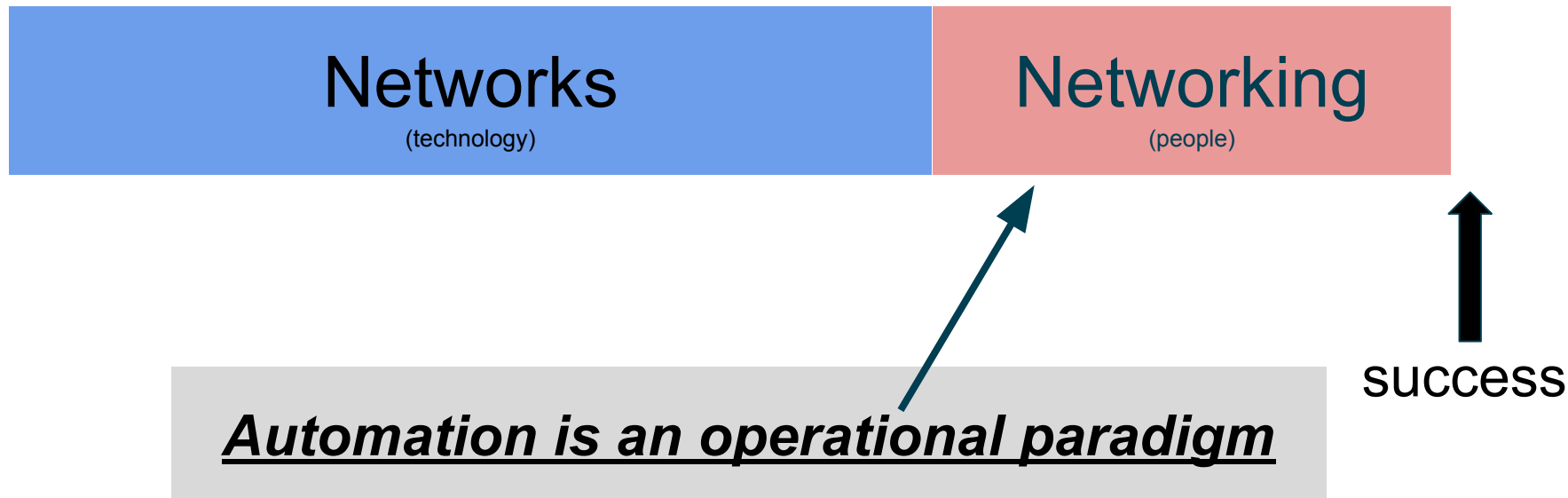
MAY 20 - 23
THE MIRAGE, LAS VEGAS

Highlighting Automation Bright Spots with NRE Labs

Matt Oswalt - Juniper Networks
@Mierdin



The Automation Last Mile



Network Reliability Engineering

Nre

Core networking
fundamentals still matter.
It's right in the name.

nRe

Represents a better way
of doing things.
Emphasizes the true goal
of automation

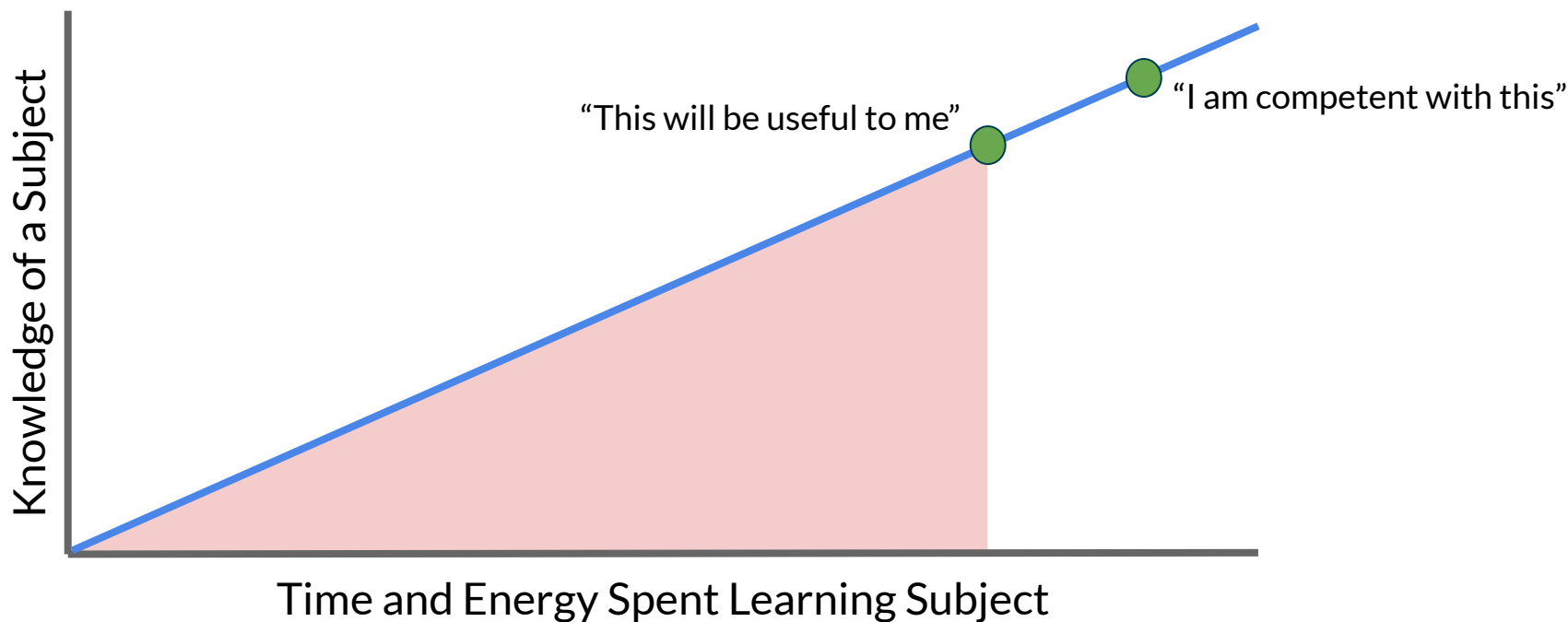
nrE

You can't buy engineering
- you DO it. Sidesteps the
“productization” of
automation

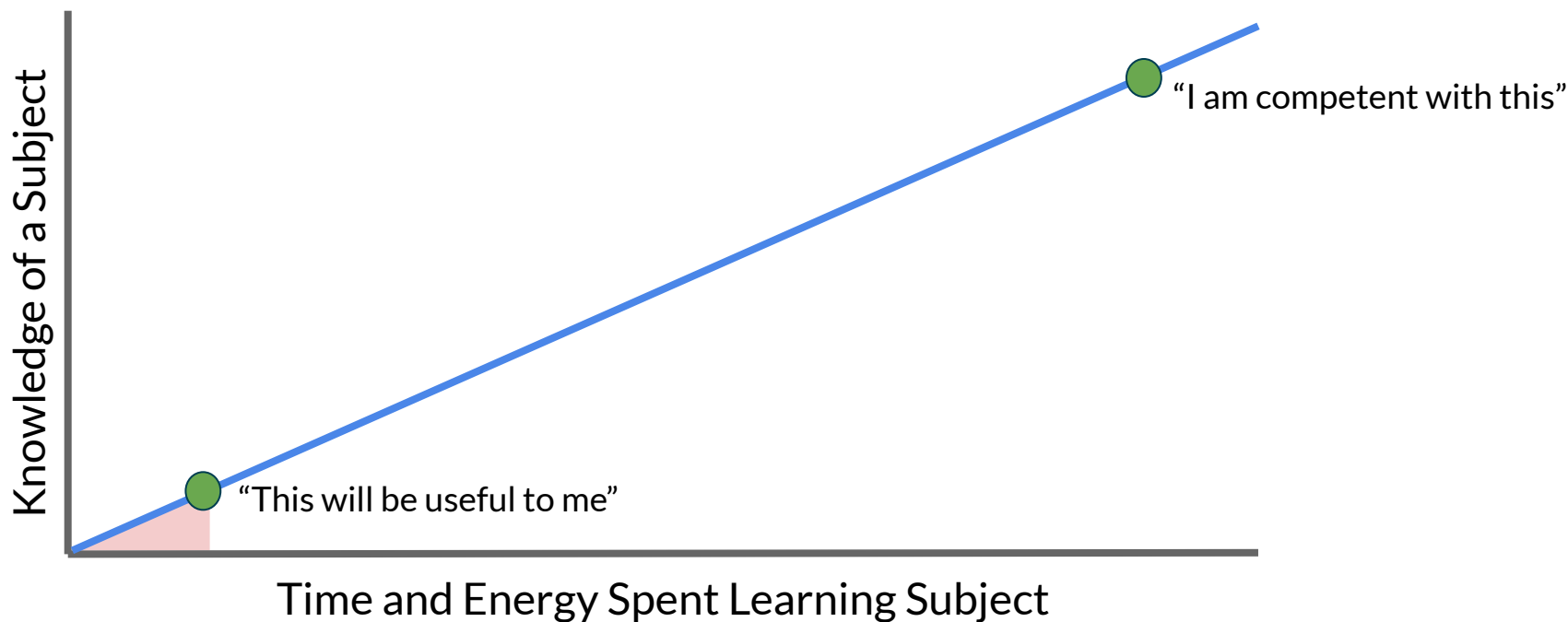
Codify Automate Test

Monitor Measure Simplify

Time Investment Minimum (TIM) - HIGH



Time Investment Minimum (TIM) - LOW





Jerry Sternin

Mission: Bright Spot Evangelism

Get the success of the
few into the hands of
the many



NRE Labs

Community platform for learning and teaching automation and Network Reliability Engineering



- Totally browser-based
- Free - no login, paywall or creepy trackers
- Vendor-neutral
- Open Source (curriculum too!)

DEMO - Advisor and Lesson Catalog

- (might want to just show this while browsing Github)
- Workflow-specific scripts or playbooks - limited in scope but powerful solution to a given use case.
- Tools like NAPALM, Netmiko, Nornir, etc - “indie” projects like that
- Fundamental skills like data modeling, templating, shell scripting, etc.

DEMO - StackStorm and NAPALM Lessons

- [StackStorm](#)
- [NAPALM](#)

2 - Correct BGP config - tests pass

Lesson Diagram

No Lesson Video

Copy

Paste

Tech Preview

```
cd /antidote/lessons/lesson-12/
cat jsnapy_tests.yaml
```

Run this snippet

To review, these tests assert:

- There must be one BGP group configured
- There must be two BGP peers configured
- There must not be any "down" BGP peers

In this part (Part 2), our routers have been configured with the correct BGP peers. We can verify this by checking on the current BGP summary:

show bgp summary

Run this snippet

It *looks* good, but as they say, "successful tests or it didn't happen". Let's re-run JSNAPy to make sure our tests are passing with the new configuration:

jsnapy --snapcheck -f jsnapy_config.yaml1 -v

Run this snippet

This time, our network is behaving the way we've declared in the tests, so they pass. It's important to note that our tests not only assert that the right configuration exists, but that the operational state of each router's BGP peer status is correct. This is a nice feature of JSNAPy - it can make assertions over anything in the entire Junos data model.

This was a lightning-quick introduction to JSNAPy. Please see the [wiki](#) for more details - there's a lot more capability than we covered here.

That's it for this lesson!

Use the tabs below to use this lesson's resources. Play around and explore, they're yours!

linux1

vqfx1

vqfx2

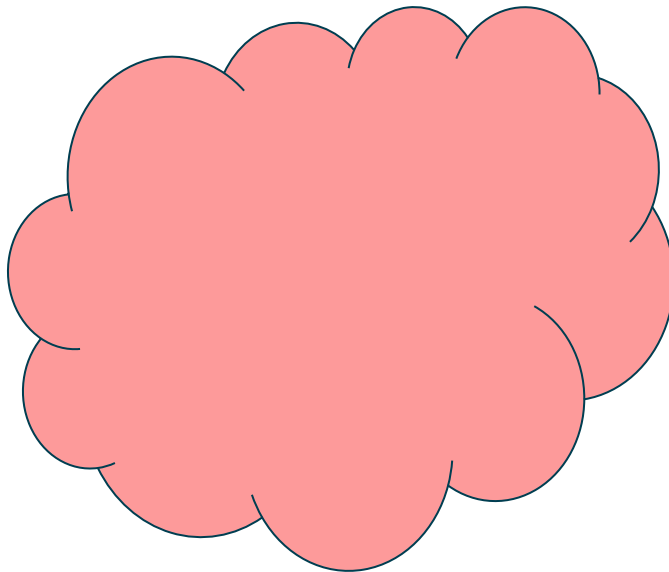
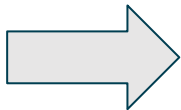
vqfx3

```
*****RPC is get-bgp-summary-information*****
-----Performing is-equal Test Operation-----
Test succeeded!! BGP group count is: <1>
PASS | All "group-count" is equal to "1" [ 1 matched ]
-----Performing is-equal Test Operation-----
Test succeeded!! BGP group configured peer count is: <2>
PASS | All "peer-count" is equal to "2" [ 1 matched ]
-----Performing is-equal Test Operation-----
Test succeeded!! BGP down peer count is: <0>
PASS | All "down-peer-count" is equal to "0" [ 1 matched ]
----- Final Result!! -----
test_rpc_bgp : Passed
Total No of tests passed: 3
Total No of tests failed: 0
Overall Tests passed!!!
Connecting to device vqfx1 .....
Tests Included : test_rpc_bgp
Taking snapshot of RPC: get-bgp-summary-information
***** Device: vqfx1 *****
Tests Included: test_rpc_bgp
*****RPC is get-bgp-summary-information*****
-----Performing is-equal Test Operation-----
Test succeeded!! BGP group count is: <1>
PASS | All "group-count" is equal to "1" [ 1 matched ]
-----Performing is-equal Test Operation-----
Test succeeded!! BGP group configured peer count is: <2>
PASS | All "peer-count" is equal to "2" [ 1 matched ]
-----Performing is-equal Test Operation-----
Test succeeded!! BGP down peer count is: <0>
PASS | All "down-peer-count" is equal to "0" [ 1 matched ]
----- Final Result!! -----
test_rpc_bgp : Passed
Total No of tests passed: 3
Total No of tests failed: 0
Overall Tests passed!!!
antidote@linux1:/antidote$
```

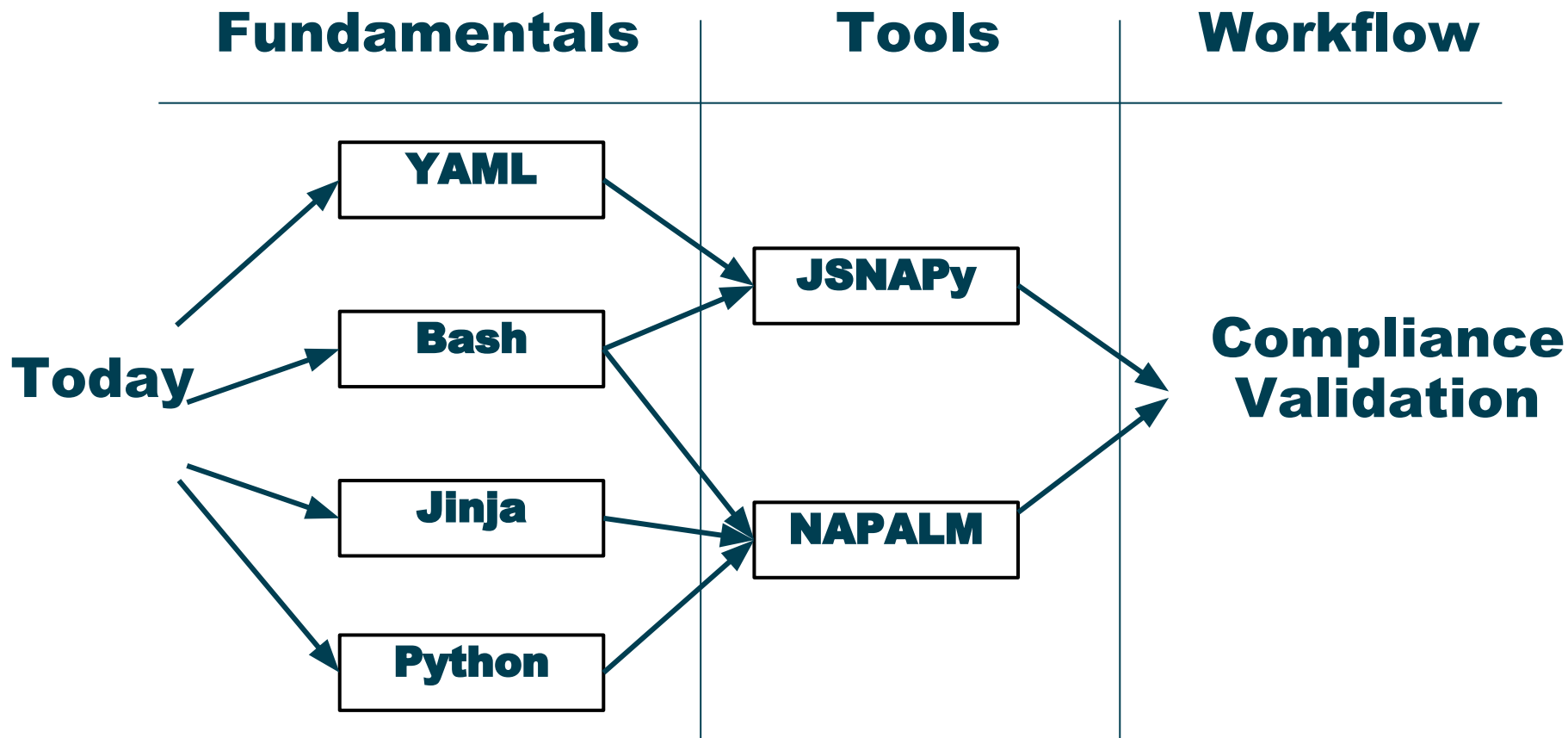
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NRE Labs Public Test Realm. Curriculum: 4bd8282 | Antidote-Web: ba28877 | Syringe: 356c529

Today



**Automated
Workflow**



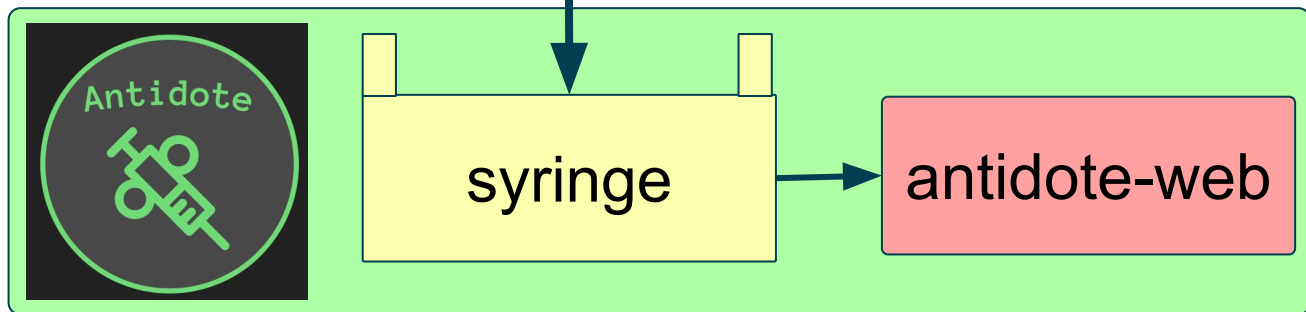
Antidote Architectural Overview

Curriculum

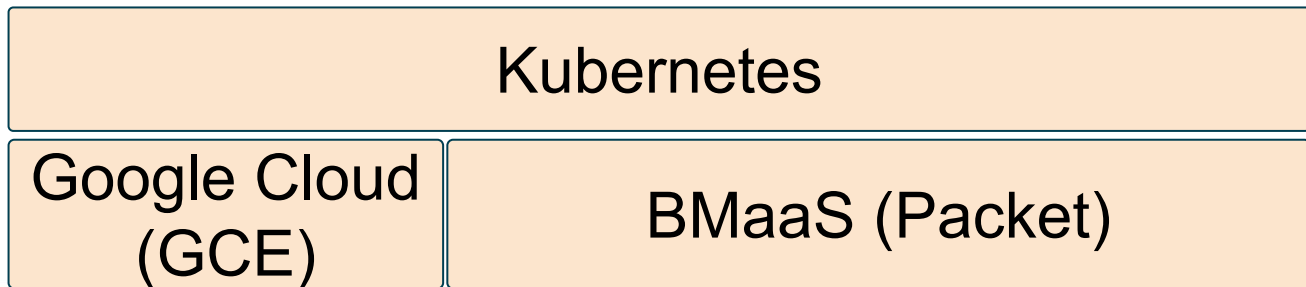


or others...

Platform



Infrastructure



DEMO - Github source

- All lesson resources defined in [Github](#)
- No web skills needed.
 - 10% providing metadata so Antidote knows how to handle your content
 - 90% the content itself, which you already know
- Contribute via PRs

The Barrier-Busting Formula

Network Devices as QEMU in Docker

Fully web-based presentation layer

+ Automated Configuration and Prep

GREATLY reduced Time Investment Minimum (TIM)

Network Devices in Docker

- Originally inspired by vrnetlab (name) but currently a bit more bespoke. Hoping to get more standardized soon.
- Images packaged straight into docker and executed by the kubelet on the scheduled host
- ANY vendor is feasible as long as it runs in a VM and talks on a port

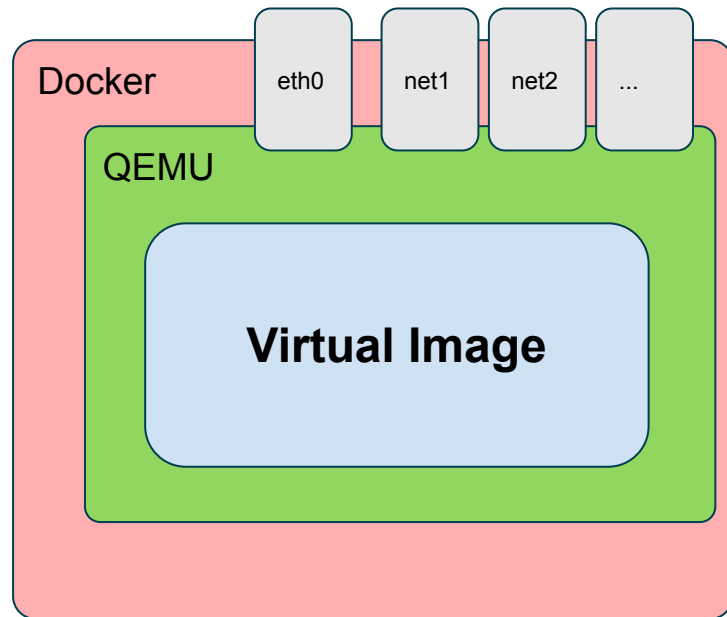
Image Catalog

Current

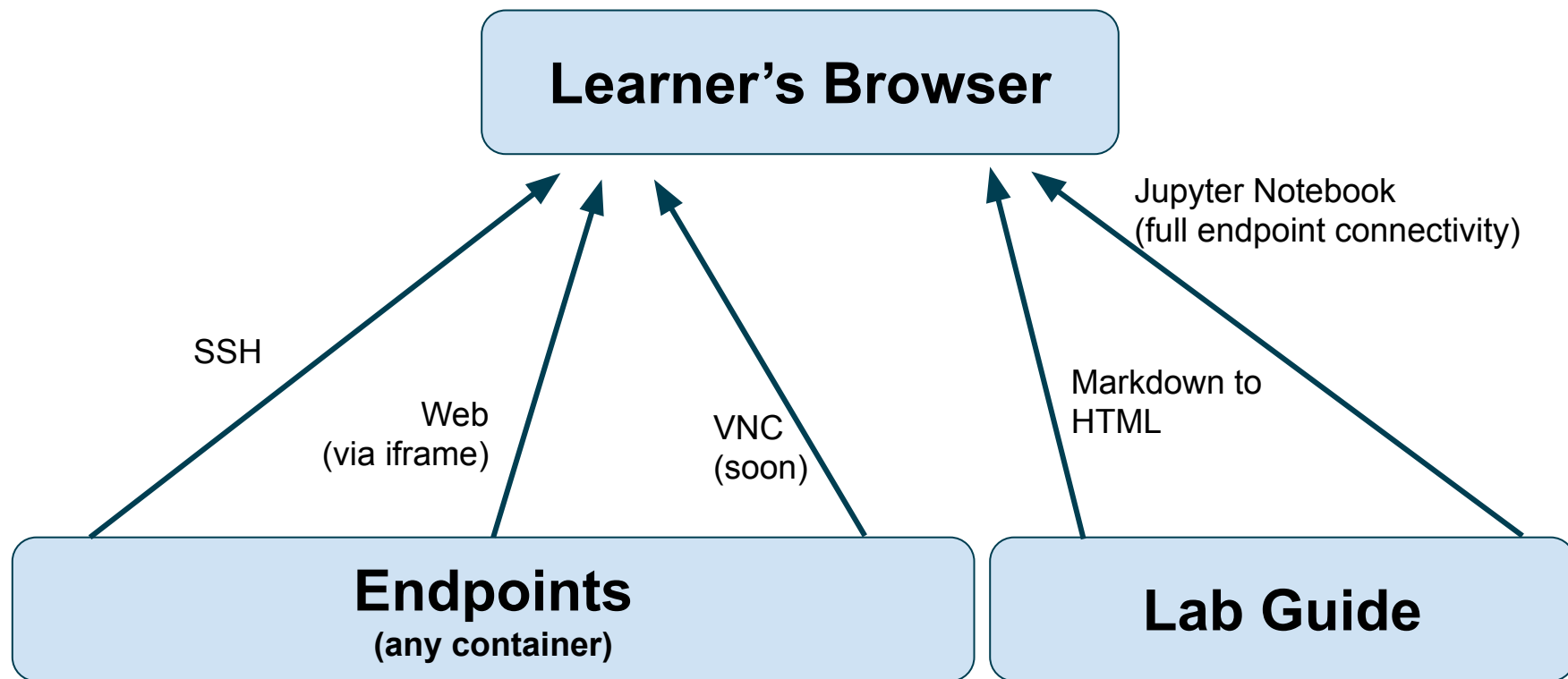
- vQFX
- vMX

Soon

- Cumulus VX
- VyOS
- ExtremeXOS
- Yours?



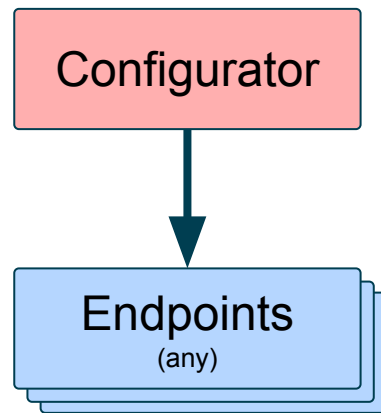
Flexible Presentation Layer



Inter-Stage Configuration

- Hands-Free environment prep while moving within a lesson
- “Configurator” image currently runs NAPALM but will soon support Netmiko, Ansible, or Custom Python or Bash scripts.

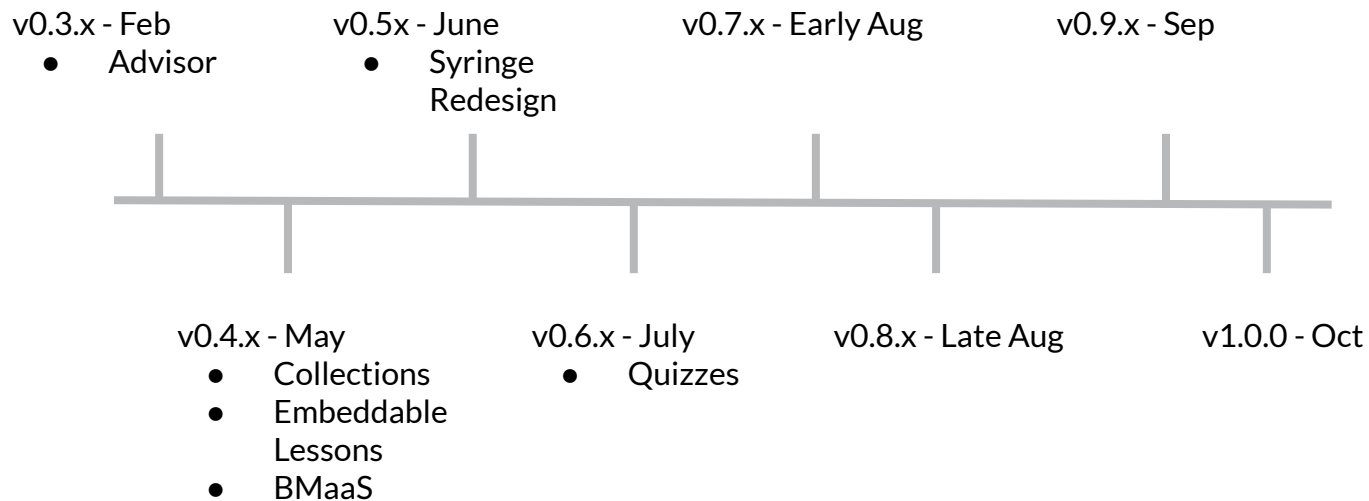
Lesson Namespace



Collections

([Example](#))

The Road to 1.0



Resources

Labs - labs.networkreliability.engineering

Community - community.networkreliability.engineering

Open Source - github.com/nre-learning

Antidote Docs - antidoteproject.rtf.d.io

Twitter - [@NRELabs](https://twitter.com/NRELabs)

No Contribution Too Small!

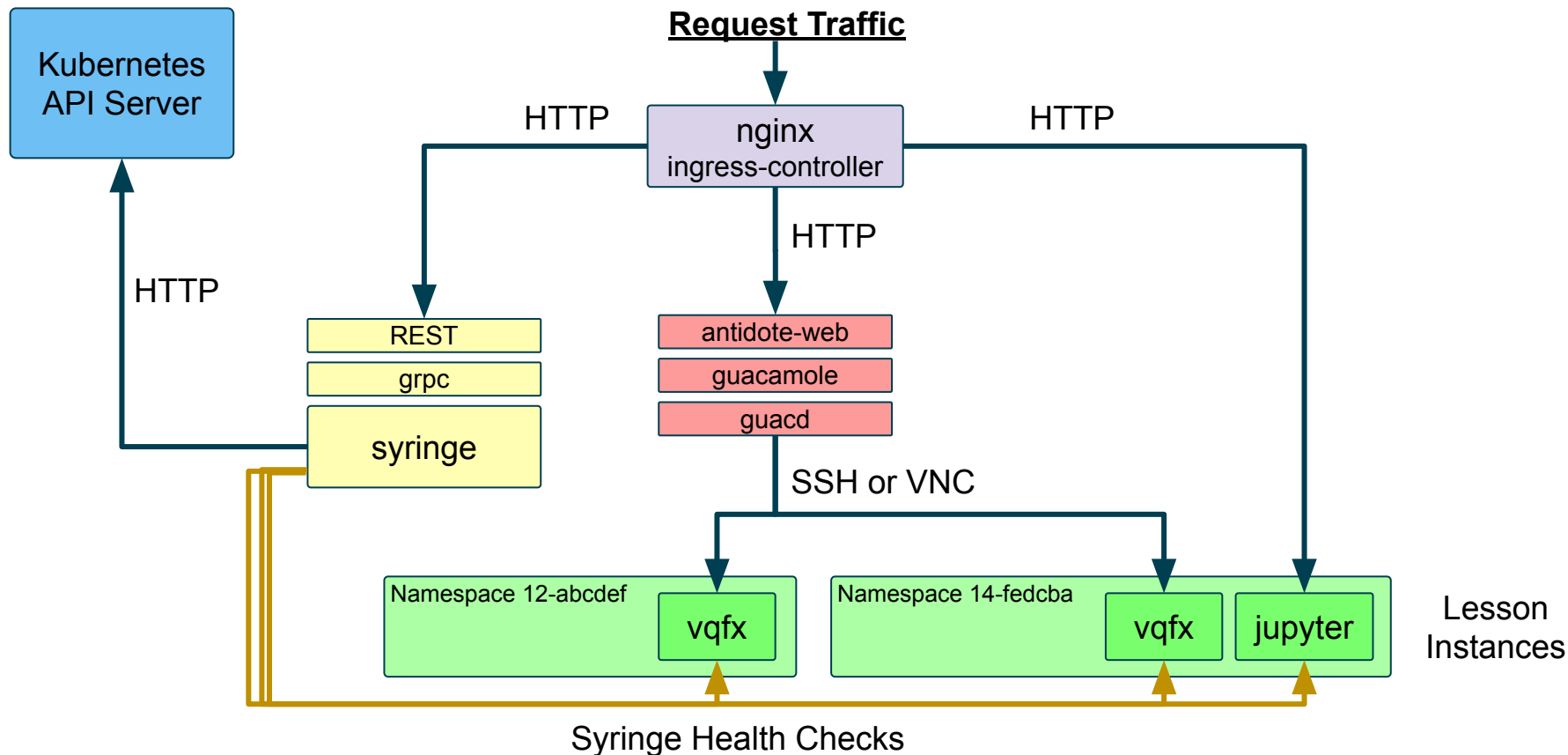
- Use NRE Labs and open issues!
- Lesson Contributions - new or existing
- Platform enhancements/fixes



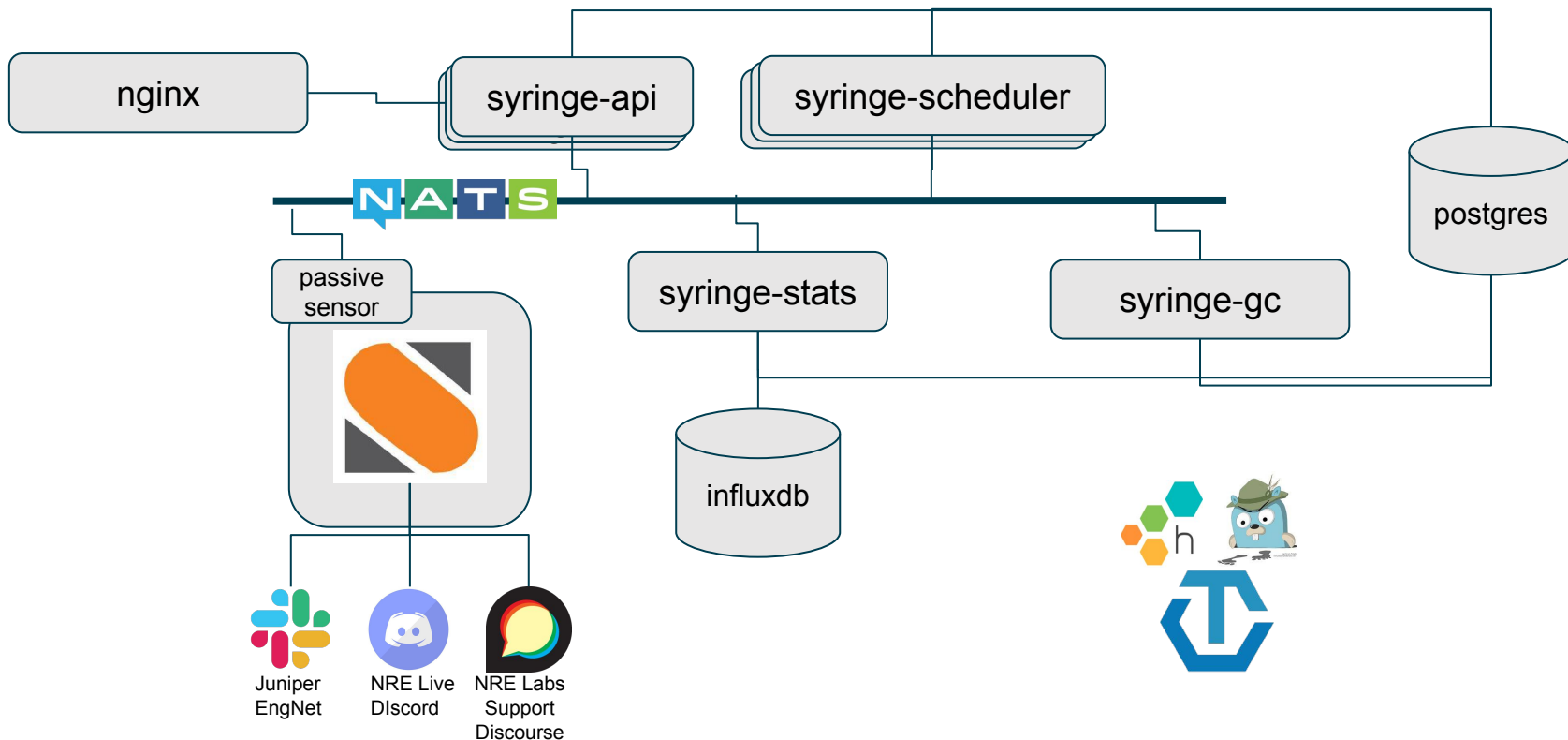
Tumble Down the Rabbit Hole



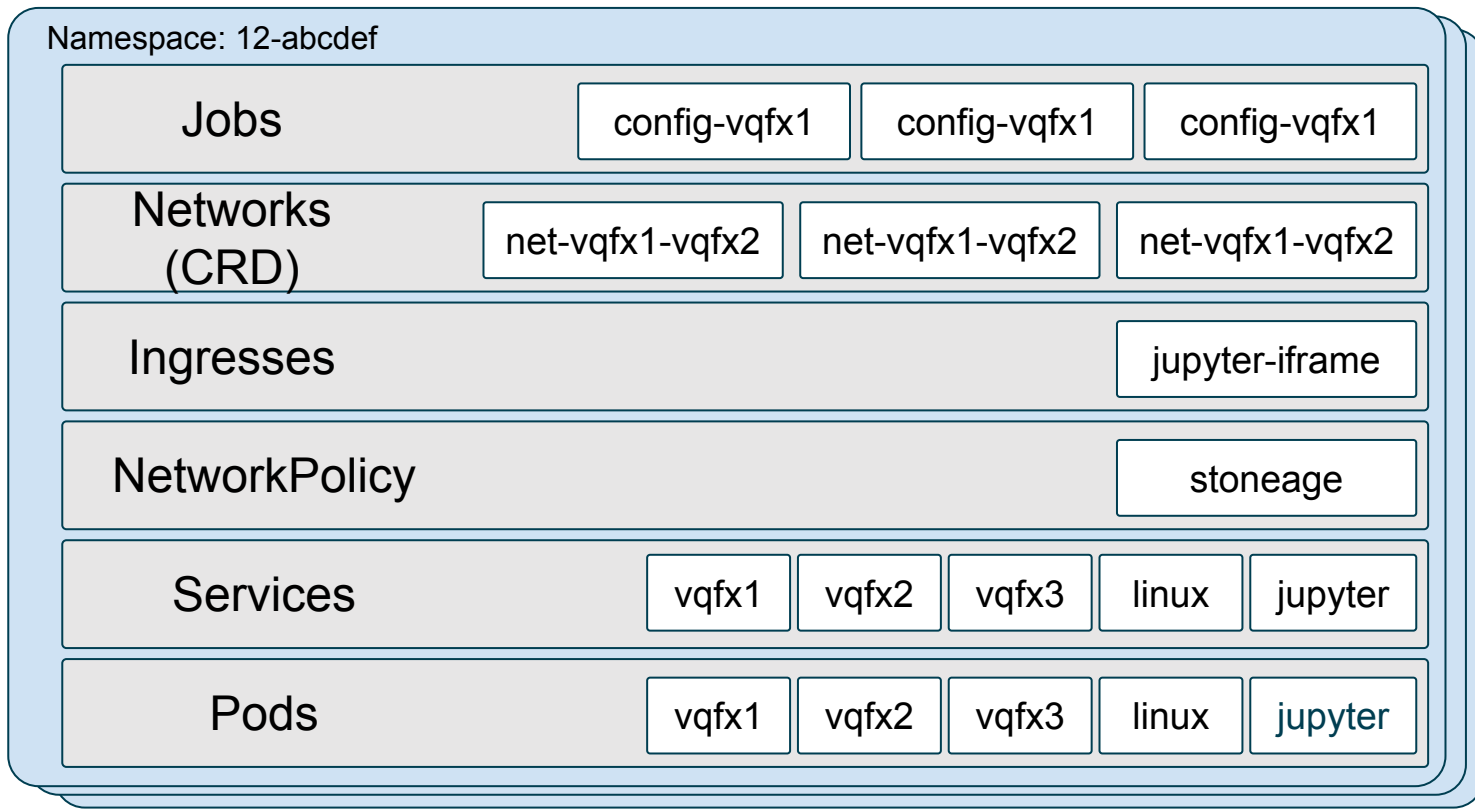
Antidote as Deployed in Kubernetes



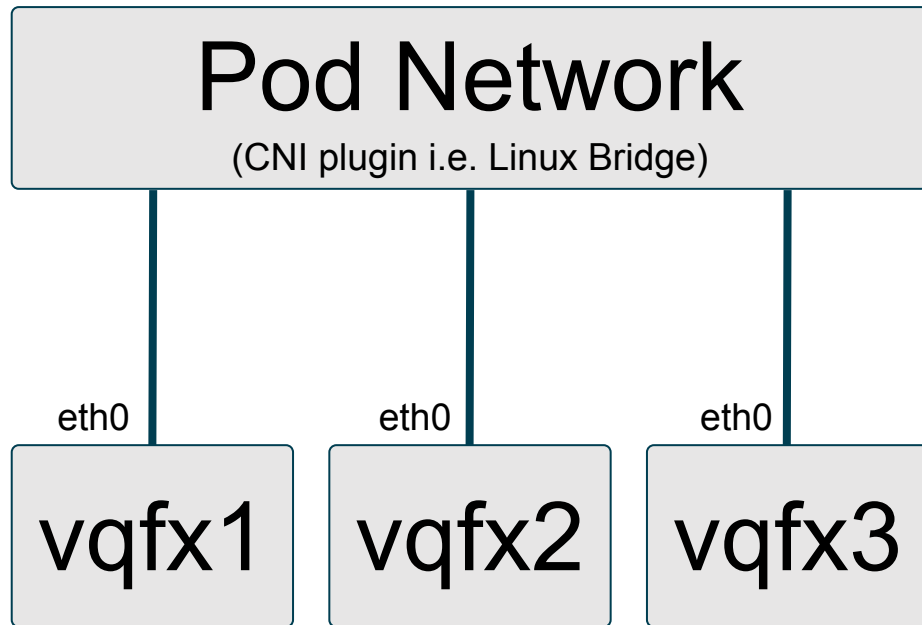
Future Syringe Design



Anatomy of a Lesson



Normal Kubernetes Pod Networking



Using Multus for Advanced Network Topologies

Alternatives:

- QEMU L2TP
- NetworkServiceMesh

