

# Riot Direct Network

## Infrastructure as Code Journey

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# League of Legends

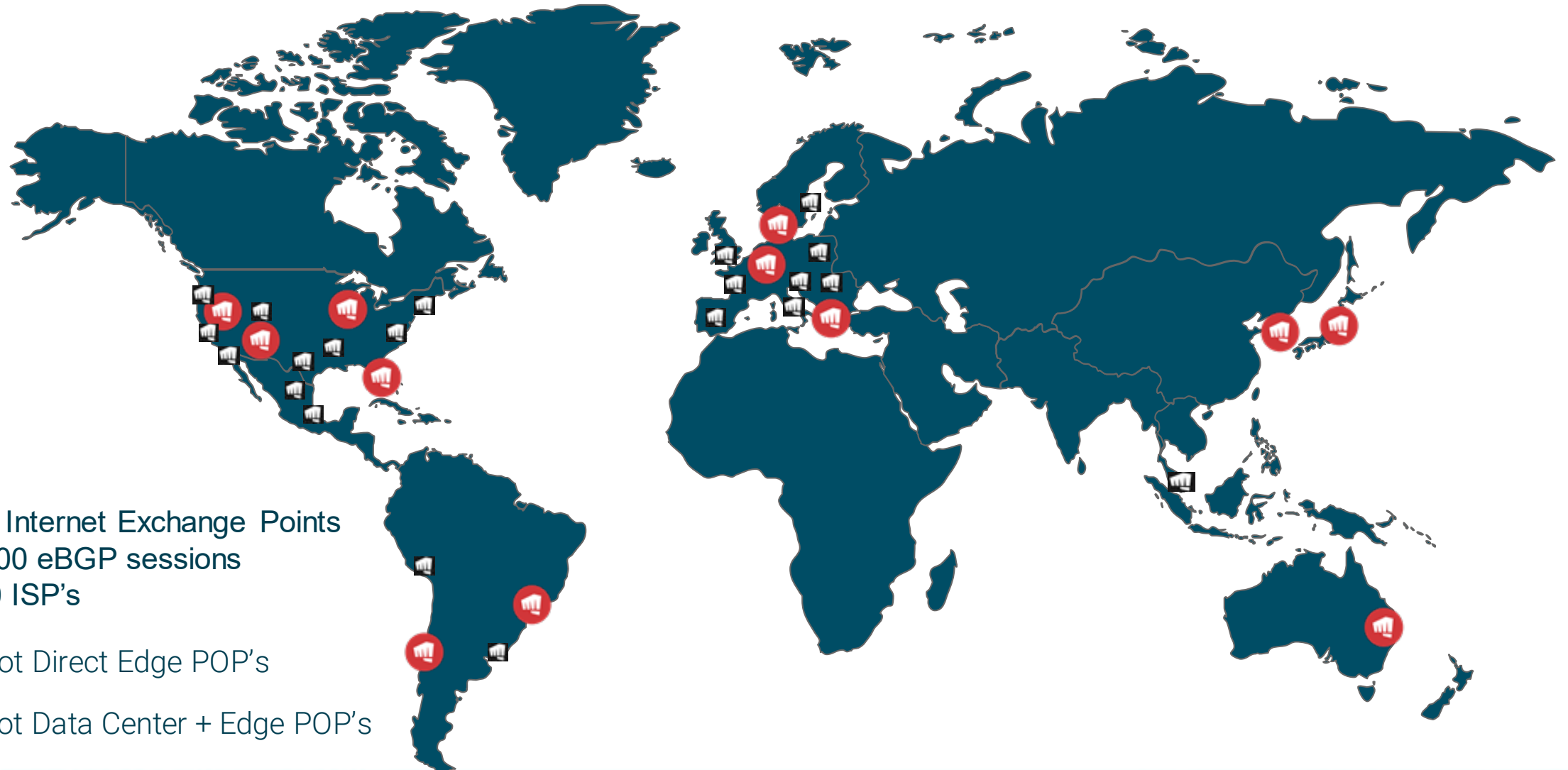




# And **more** games...



# Riot Games Infrastructure



# Riot **Direct** Network as Code

*“Is how we define and **manage** riot direct network infrastructure via machine **friendly declaratives** using software **versioning** control and delivering changes via continuous integration and continuous **delivery** pipelines (CI/CD)”*

# Riot Direct **Network** as Code

## *Key Design Principles*

- ☑ **Master** branch is the Single Source of Truth (SSoT) and represents the state of the **Production** Network
- ☑ Minimal level of **abstraction**
- ☑ Full configuration **replace** is OP
- ☑ Jenkins CI/CD **tests** and **deploys** configuration to devices with some fault-tolerance
- ☑ Github Source Control allows easy **versioning** and **rollback**
- ☑ Actively maintained **open source** projects (Nornir, napalm, capirca, etc) are utilized to **speed up** development



# Architecture // Overview

Branch: master **rdnw-as-code-training** / sites / euw / lab01 / rr /

Create new file Upload files Find file History

Phillip Simonds and svc-github Add initial BGP schema Latest commit 8489203 on Jun 15

bgp.yaml Add initial BGP schema 3 months ago

Branch: master **rdnw-as-code-training** / sites / euw / lab01 / rr / routing.yaml Find file Copy path

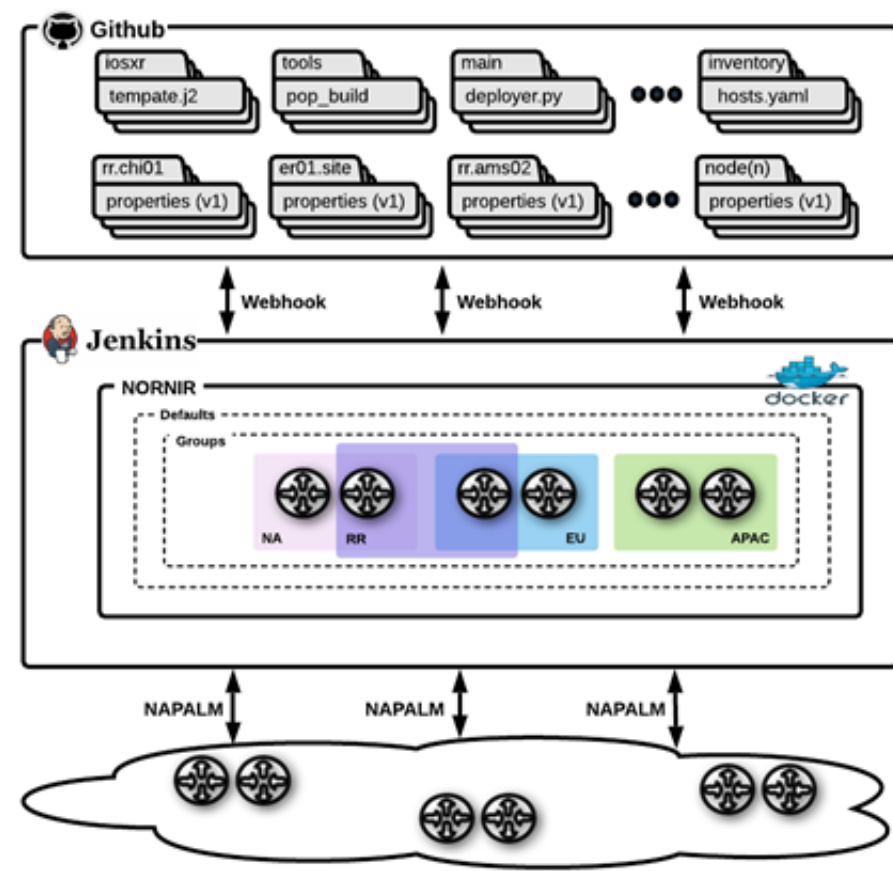
jbotello Adding loopback100 and include it in isis (#20) 5bf22a9 11 days ago

1 contributor

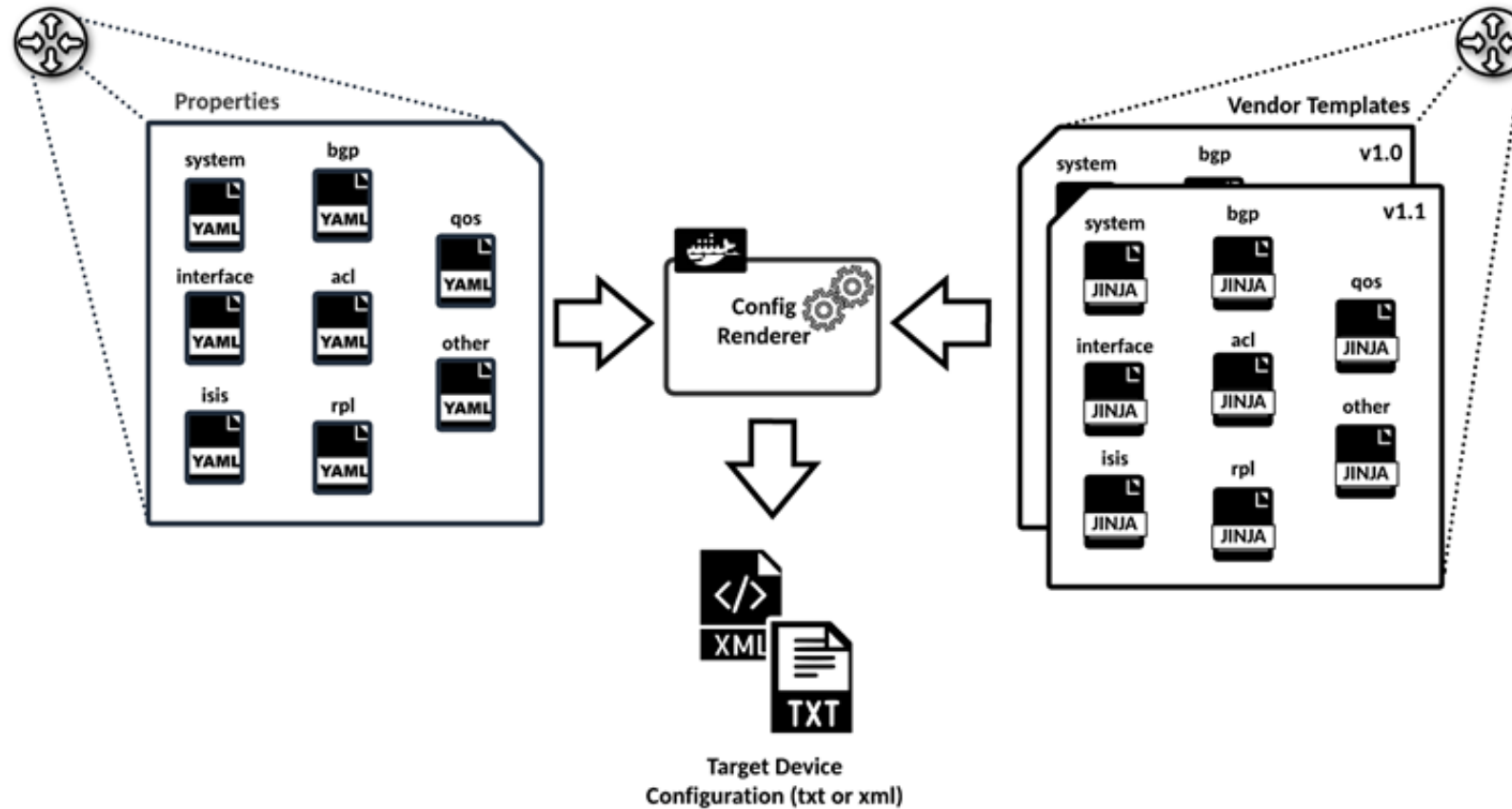
22 lines (19 sloc) 465 Bytes

Raw Blame History

```
1 ---
2 global:
3   asn: 6507 # Use 6507 as standard design
4
5 isis:
6   net: 49.0001.0010.0012.5510.00 # ex. 49.0001.1921.6825.4001.00
7   interfaces:
8     Loopback0: # ex. Loopback0
9       passive: True # True | False
10      type: p2p # ex. p2p
11     Loopback100:
12       passive: True
13       type: p2p
14     GigabitEthernet0/0/0/1:
15       passive: False
16       type: p2p
17
18 static:
19   10.0.0.0/8: # ex. 10.0.0.0/8
20   # vrf: {{ vrf_name }} # ex. VPN-A
21   nhop: 10.1.255.129 # ex. 10.1.1.1
```



# Device Model





# Tracking changes in 4k (HD)

The screenshot displays a network configuration management interface. On the left is a file explorer showing a directory structure: `sites` (expanded) contains `apac` (expanded), which contains `hkg01`, `se01`, `se02`, and `sin02` (expanded). `sin02` contains `er01` (expanded), which contains `bgp.yaml` (selected), `exception.yaml`, `interfaces.yaml`, `mpls.yaml`, `routing.yaml`, `rpl.yaml`, `vrf.yaml`, and `er02`.

In the center is a commit history table with columns for line number, date, author, and count:

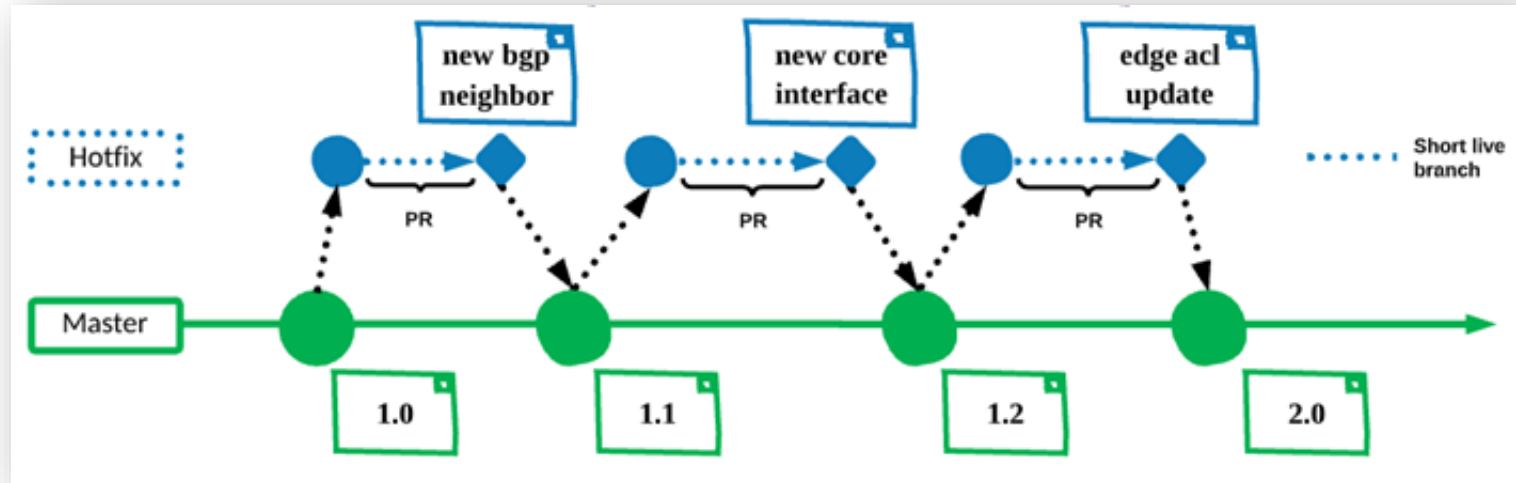
Line	Date	Author	Count
5	9/9/19	jbotello	1
6	9/9/19	jbotello	1
7	9/16/19	Botello	3
8	3/19/20	Botello	30
9	9/9/19	jbotello	1
10	9/12/19	Botello	2
11	9/12/19	Botello	2
12	9/12/19	Botello	2
13	9/12/19	Botello	2
14	9/12/19	Botello	2
15	9/12/19	Botello	2
16	9/9/19	jbotello	1
17	9/12/19	Botello	2
18	4/6/20	Sheikh	31
19	9/9/19	jbotello	1
20	9/12/19	Botello	2
21	9/12/19	Botello	2
22	4/6/20	Sheikh	31
23	9/12/19	Botello	2
24	9/12/19	Botello	2

On the right is a configuration snippet for a group of route reflectors:

```
groups:
  ROUTE_REFLECTORS:
    type: route_reflector # public | transit | customer | internal | vpn
    aft:
      ipv4:
        import: IMPORT_RR_V4 Botello, 9/12/19, 8:27 PM • Updating both production bgp and rpl configuration for er01.lab01
        export: EXPORT_RR_V4
      vpnv4:
        import: PASS
        export: PASS
    update_source: loopback0 # Update source interface
    description: IPv4 and VPNv4 Route Reflectors # Just a description
    enabled: true # True | False
    sessions:
      104.160.157.31:
        description: iBGP session to rr01.sel01
        enabled: true # True | False
      104.160.157.32:
        description: iBGP session to rr01.ty001
```

# How a **network** change looks like

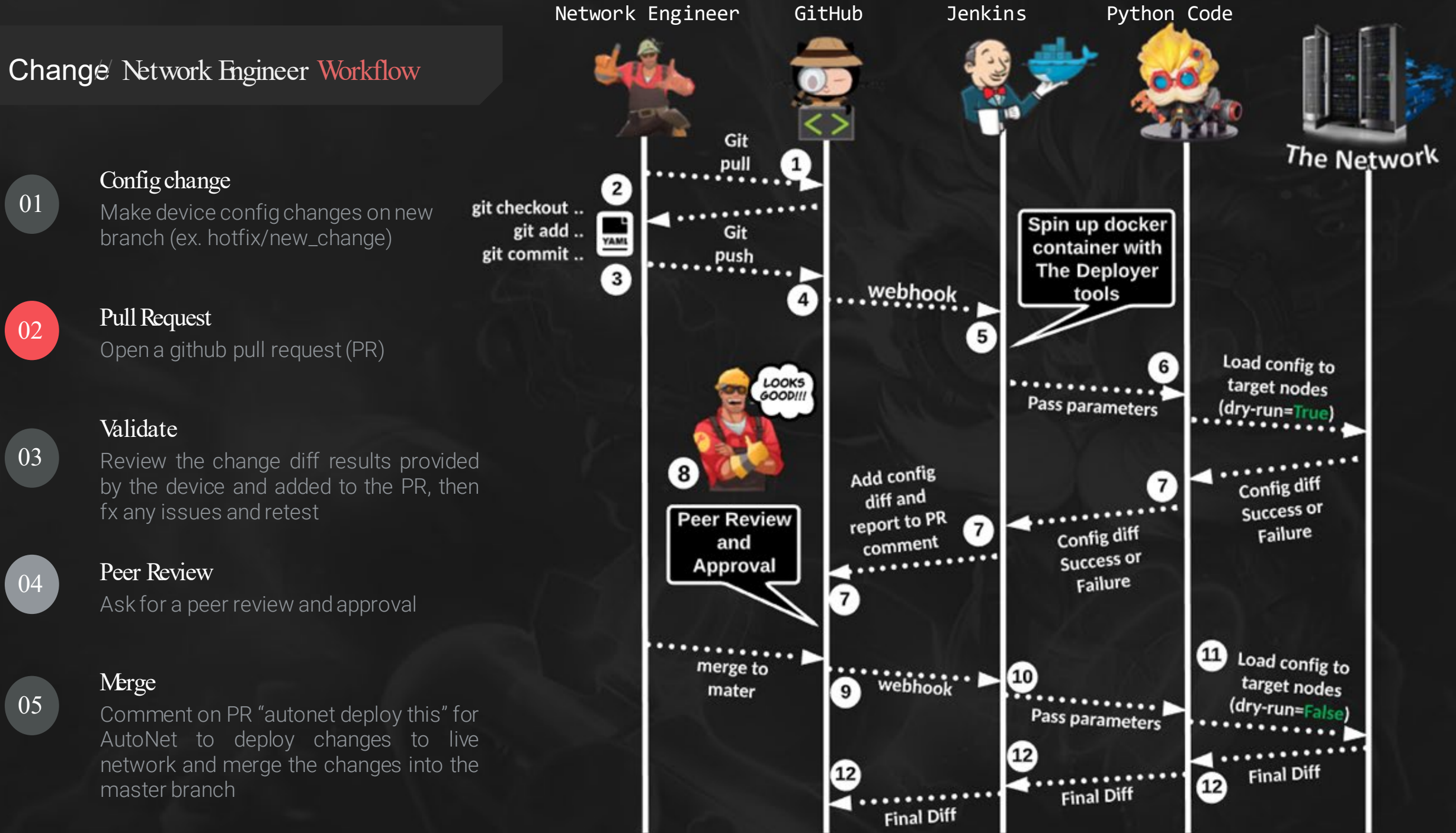
Github



**Hotfix** - These are short live branches with regular changes to the network infrastructure

**Master** - Reflect the production state of the network and is considered the SSoT for the network devices

# Change Network Engineer Workflow





# Stop!!! Demo Time



# Our Production Repository

rdirect / **autonet-production** Private

Unwatch 11 Unstar 6 Fork 1

Code Issues 6 Pull requests 13 Projects 0 Wiki Insights Settings

Filters is:pr is:open Labels 8 Milestones 0 New pull request

13 Open ✓ 2,233 Closed Author Labels Projects Milestones Reviews Assignee Sort

Changes to production since September 2019

# What's **next**...

- ☒ Decouple **core** automation from the **actual** infrastructure as code definitions
- ☒ Implement **network** based **linters** (Batfish, PyATS, others?)
- ☒ End to End pipeline monitoring
- ☒ Unit **Testing**... More unit testing
- ☒ Hire... Team **Composition**



- A** Master Branch = Production Network
- B** Device configuration = software source code
- C** Start with minimal level of abstraction
- D** Full configuration replace has many benefits
- E** Git/Github provides accountability, visibility & history

# Takeaways

# Thank You

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