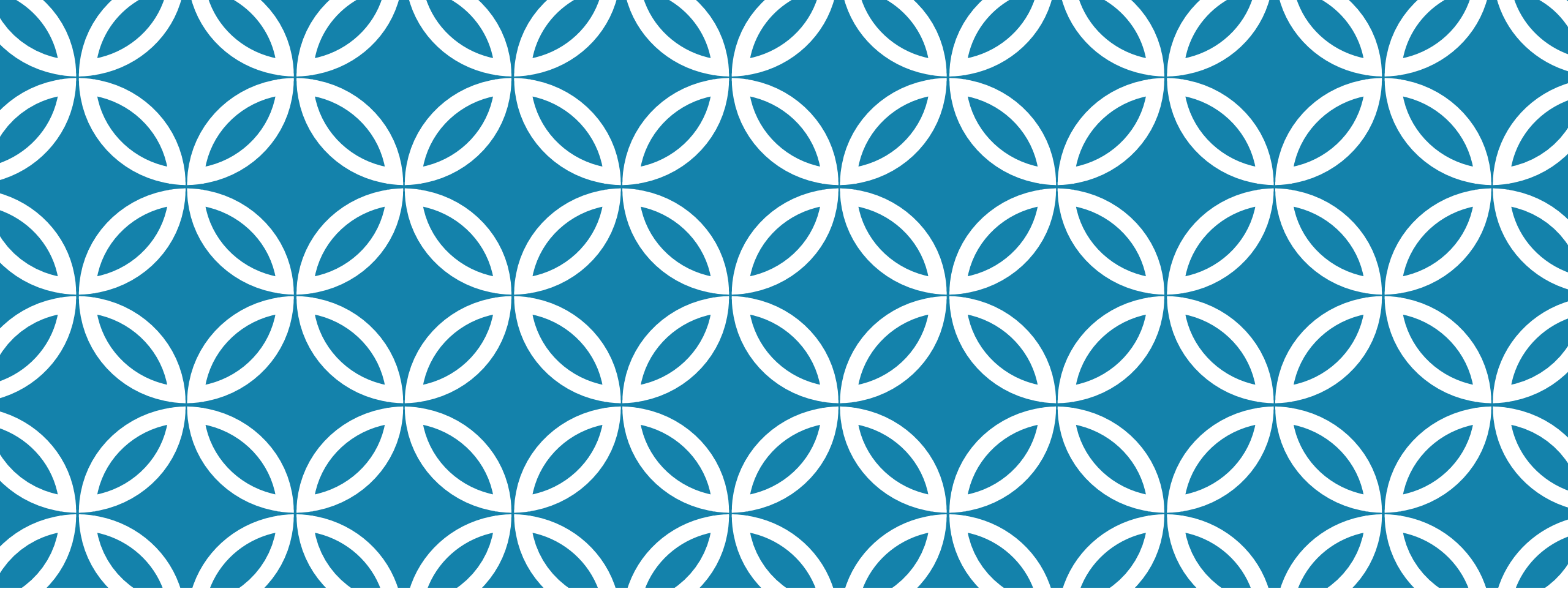




SUNET

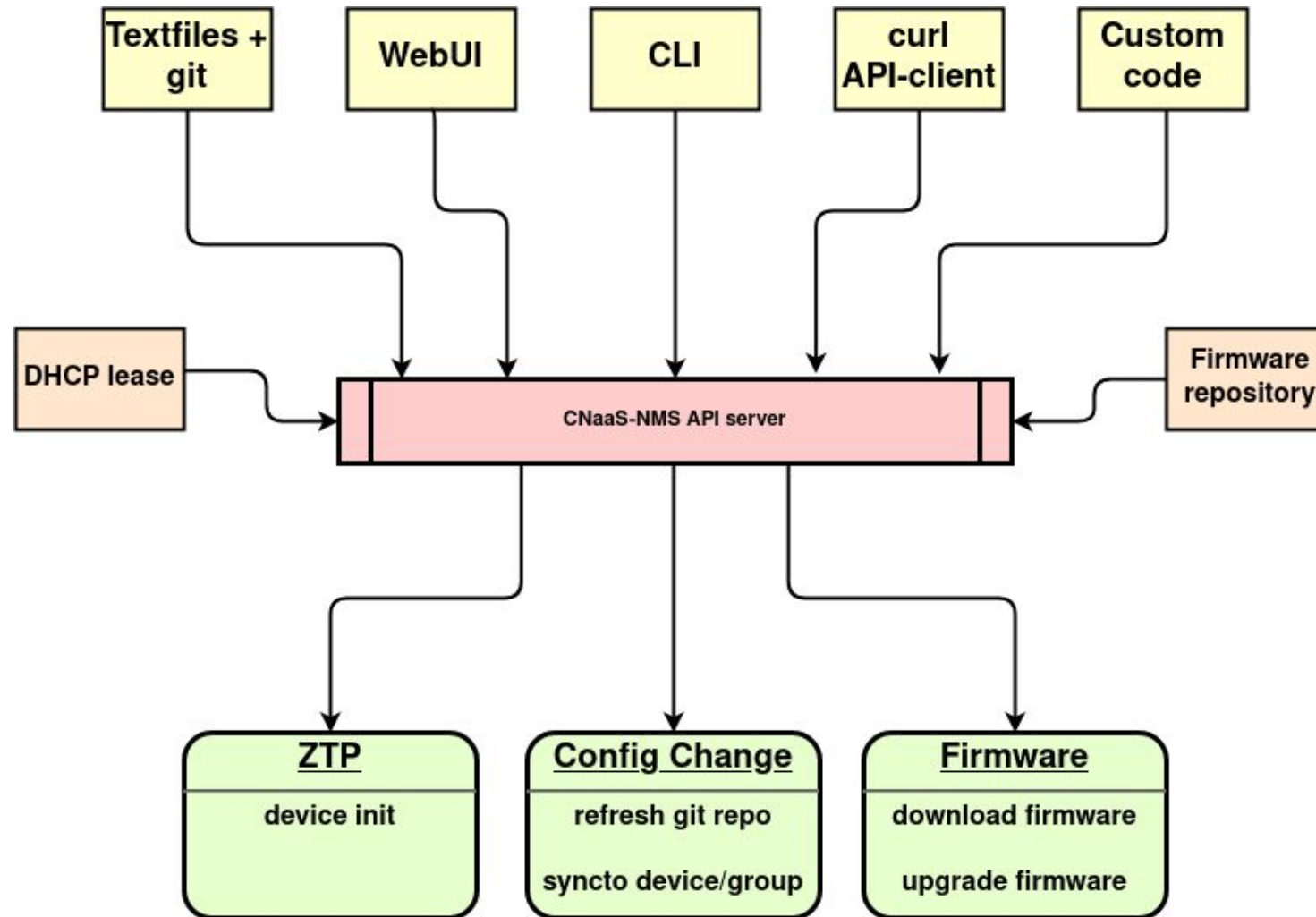


CNaaS-NMS

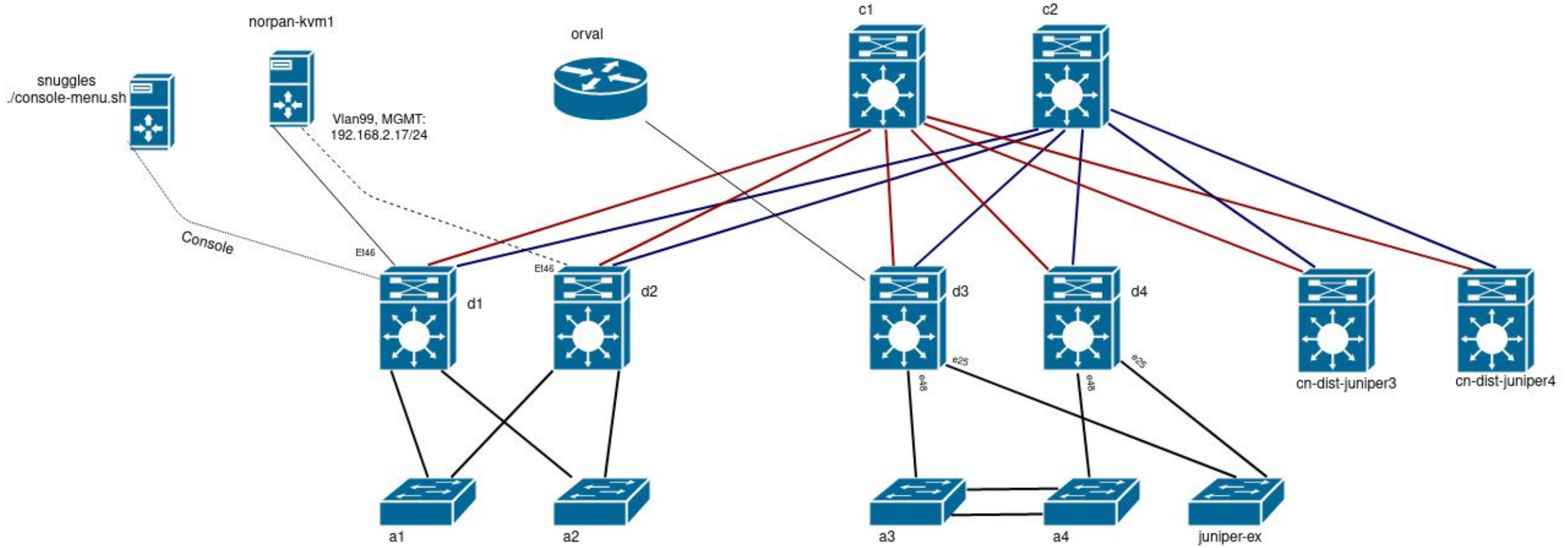
Technical Demo: Workflows

Johan Marcusson
Developer

Interaction with NMS



SUNET lab



How to use CNaaS-NMS

- Source code available on <https://github.com/SUNET/cnaas-nms>
- Pre-built docker containers available on docker.sunet.se/cnaas/api/latest
- Some experience with git and docker helps
- Virtual test env using vEOS in VirtualBox

Thanks for listening! Questions?

SUNET wiki documentation:

<https://wiki.sunet.se/display/CNaaS>

Source code available at GitHub:

<https://github.com/SUNET/cnaas-nms>

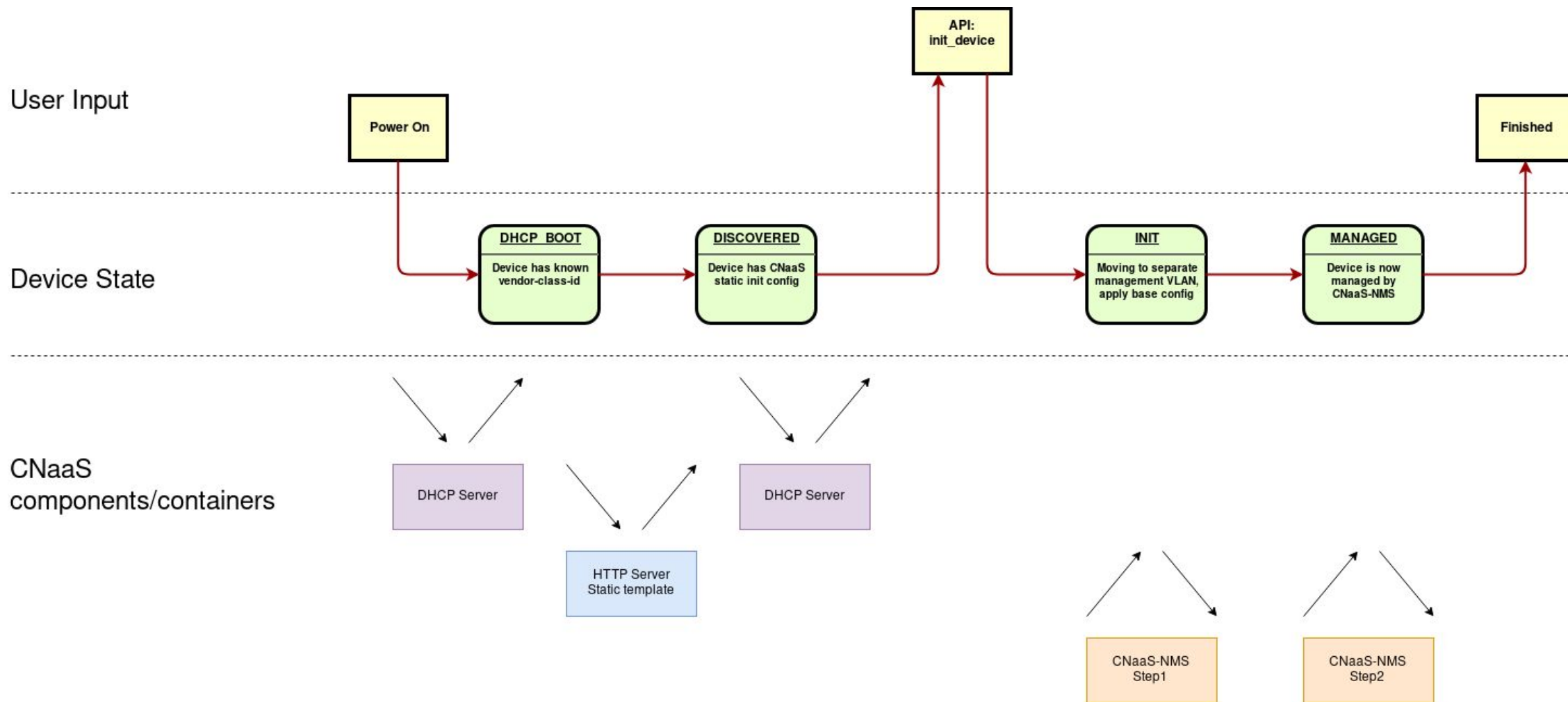
mail: johan.marcusson@sunet.se

#automation @ NREN slack



Reference slides

ZTP workflow



Demo: Zero-touch deployment (MLAG pair)

mac-FCBD67E94A21	UNKNOWN	DISCOVERED	119
mac-FCBD6783A593	UNKNOWN	DISCOVERED	120

Actions ▾

Description

Management IP (DHCP IP)

(192.168.0.194)

Infra IP

MAC

FCBD6783A593

Vendor

Arista

Model

CCS-720XP-24ZY4-F

OS Version

4.24.2.2F-18873105.42422F

Serial

JPE19313445

State

DISCOVERED

a3

Access MLAG pair ▾

ID 119 / MAC FCBD67E94A21 / SN JPE19431739 ▾

a4

Initialize...



ID 55 / MAC B8C253EA6871 / SN JW0218490776

ID 119 / MAC FCBD67E94A21 / SN JPE19431739

«

{

1

}

»

https://play.sunet.se/media/CNaaS+NMS+WebUI+ZTP+demo/0_ff0l8enk

Demo: Firmware upgrade

Step 2 of 3: Download firmware to device and activate it for next reboot

EOS-4.24.2.2F.swi

Start activate firmware Skip to step 3 Abort!

1/1 devices finished

status: FINISHED (job #184816)

start time: 2020-11-03T15:46:54.971941

finish time: 2020-11-03T15:46:55.707213

```
[2020-11-03 15:46:55,061] INFO in firmware job #184816: Device(s) selected for firmware upgrade (1): a3
[2020-11-03 15:46:55,066] INFO in firmware job #184816: Upgrade tasks selected: pre_flight = True, download = False, activate = False, reboot = False, post
[2020-11-03 15:46:55,075] INFO in firmware job #184816: Running pre-flight check on a3
[2020-11-03 15:46:55,682] INFO in firmware job #184816: Enough free space (3718348b), no cleanup
```

2-step process:

1. Download & activate firmware
2. Reboot devices (can be scheduled for a later time)

Reboot devices (3/3) Close

Step 3 of 3: Reboot devices and check that they start with new firmware

2020-01-30 03:00:00 UTC If left empty devices will reboot immediately

Start reboots Abort!

0/1 devices finished

status: ABORTED (job #184817)

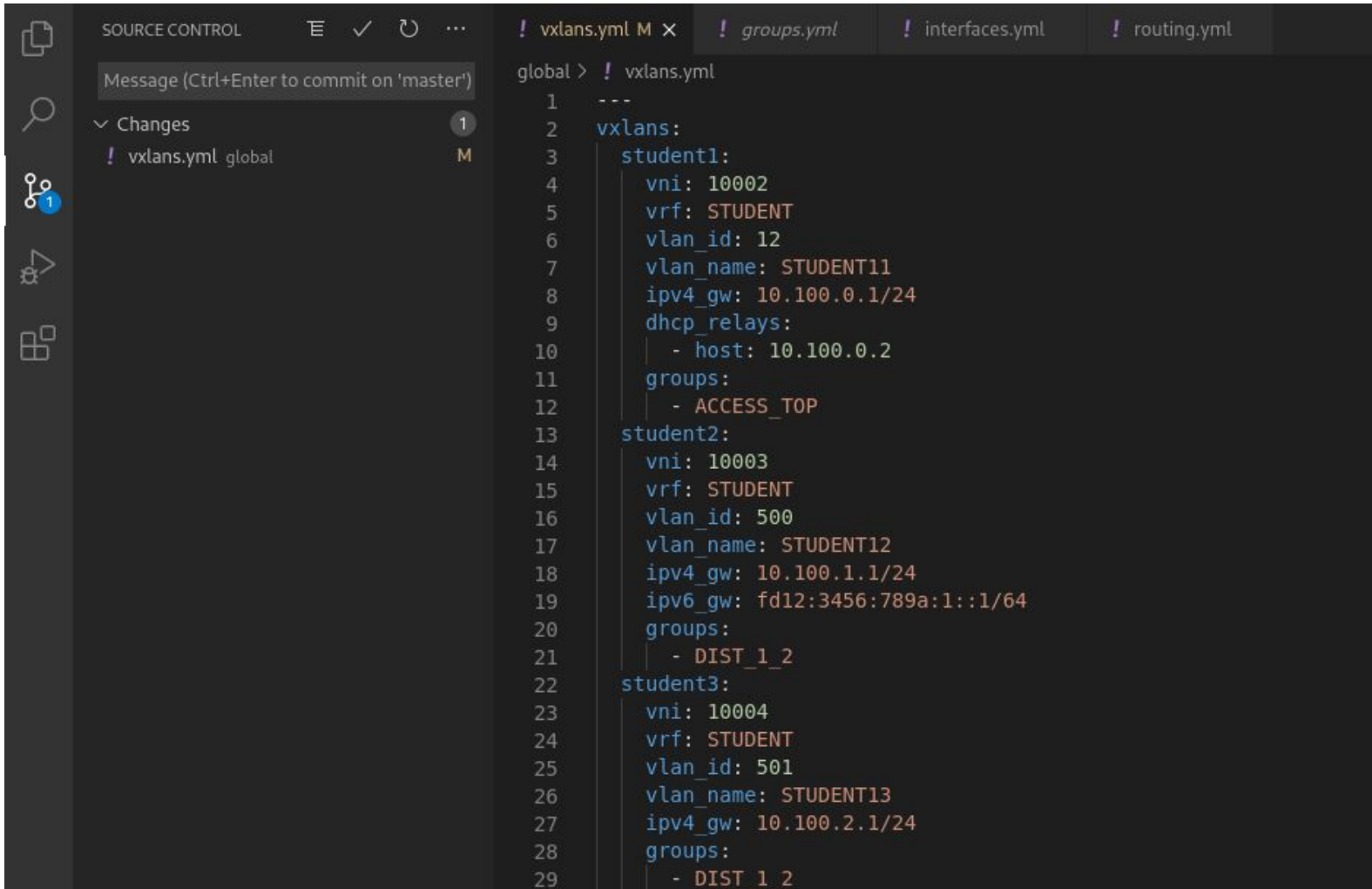
start time: 2020-11-03T15:47:05.250963

finish time: 2020-11-03T15:57:05.412213

```
[2020-11-03 15:47:05,275] INFO in firmware job #184817: Device(s) selected for firmware upgrade (1): a3
[2020-11-03 15:47:05,281] INFO in firmware job #184817: Upgrade tasks selected: pre_flight = False, download = False, activate = False, reboot = False, post
[2020-11-03 15:47:05,290] INFO in firmware job #184817: Running post-flight check on a3, delay start by 600s
WEBUI job #184817: Trying to abort job...
```

https://play.sunet.se/media/CNaaS-NMS+Firmware+Upgrade+via+WebUI/0_jf424rq1

Demo: Config change

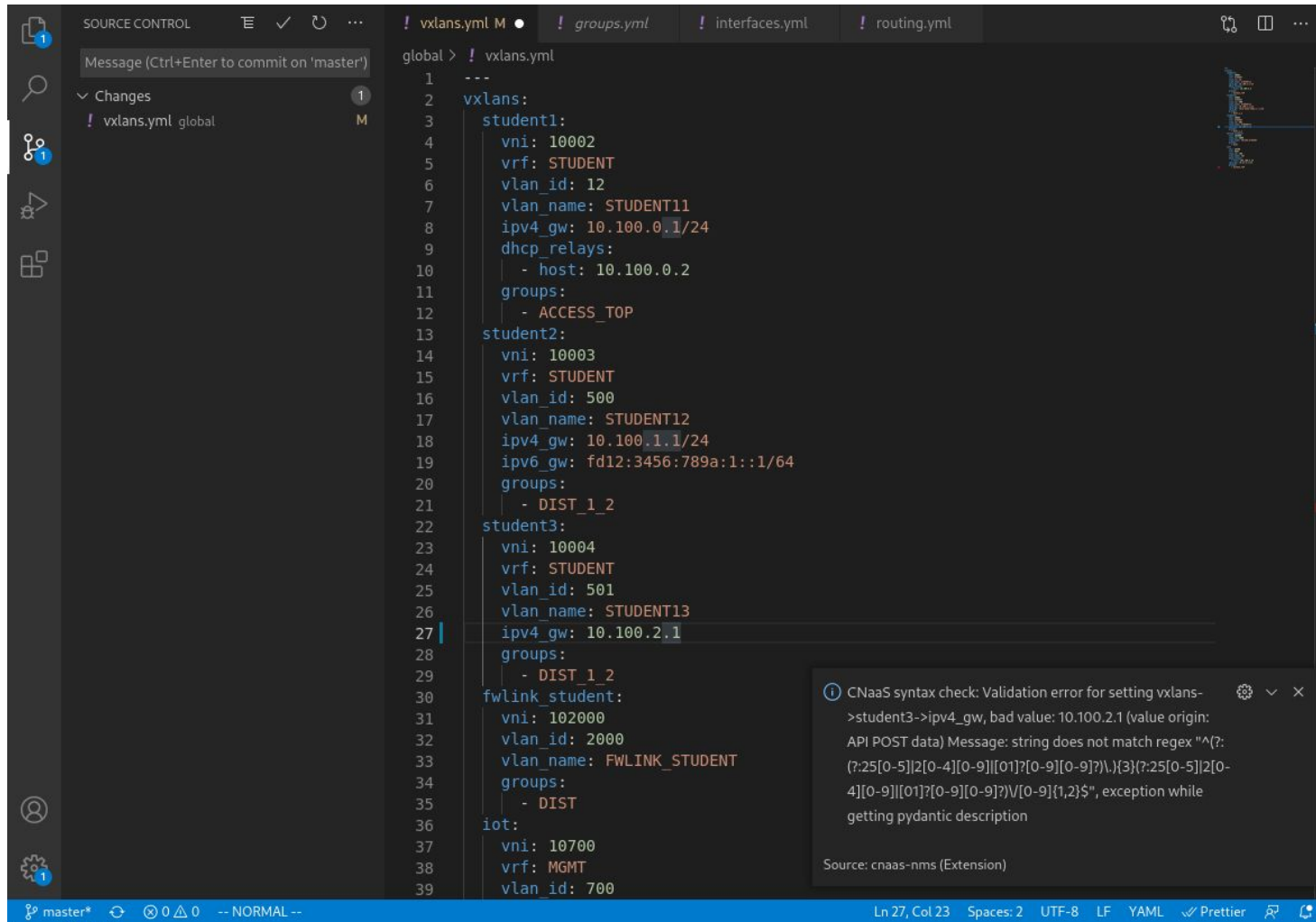


The screenshot shows a VS Code editor interface with a dark theme. On the left, the 'SOURCE CONTROL' sidebar is open, displaying a commit message input field with the text 'Message (Ctrl+Enter to commit on 'master')'. Below this, a 'Changes' section shows a file 'vxlangs.yml' with a 'global' change, marked with a green 'M' icon. The main editor area displays the 'vxlangs.yml' file, which is a YAML configuration. The file content is as follows:

```
global > ! vxlangs.yml
1 ---
2 vxlangs:
3   student1:
4     vni: 10002
5     vrf: STUDENT
6     vlan_id: 12
7     vlan_name: STUDENT11
8     ipv4_gw: 10.100.0.1/24
9     dhcp_relays:
10      - host: 10.100.0.2
11     groups:
12      - ACCESS_TOP
13   student2:
14     vni: 10003
15     vrf: STUDENT
16     vlan_id: 500
17     vlan_name: STUDENT12
18     ipv4_gw: 10.100.1.1/24
19     ipv6_gw: fd12:3456:789a:1::1/64
20     groups:
21      - DIST_1_2
22   student3:
23     vni: 10004
24     vrf: STUDENT
25     vlan_id: 501
26     vlan_name: STUDENT13
27     ipv4_gw: 10.100.2.1/24
28     groups:
29      - DIST_1_2
```

https://play.sunet.se/media/CNaaS+NMS+change+workflow%2C+VScode+%2B+WebUI/0_4a34tciw

Demo: Config change



```
1 ---
2 vxlan1:
3   student1:
4     vni: 10002
5     vrf: STUDENT
6     vlan_id: 12
7     vlan_name: STUDENT11
8     ipv4_gw: 10.100.0.1/24
9     dhcp_relays:
10      - host: 10.100.0.2
11     groups:
12      - ACCESS_TOP
13   student2:
14     vni: 10003
15     vrf: STUDENT
16     vlan_id: 500
17     vlan_name: STUDENT12
18     ipv4_gw: 10.100.1.1/24
19     ipv6_gw: fd12:3456:789a:1::1/64
20     groups:
21      - DIST_1_2
22   student3:
23     vni: 10004
24     vrf: STUDENT
25     vlan_id: 501
26     vlan_name: STUDENT13
27     ipv4_gw: 10.100.2.1
28     groups:
29      - DIST_1_2
30   fwlink_student:
31     vni: 102000
32     vlan_id: 2000
33     vlan_name: FWLINK_STUDENT
34     groups:
35      - DIST
36   iot:
37     vni: 10700
38     vrf: MGMT
39     vlan_id: 700
```

Message (Ctrl+Enter to commit on 'master')

Changes

- ! vxlan1.yml global M

CNaas syntax check: Validation error for setting vxlan1->student3->ipv4_gw, bad value: 10.100.2.1 (value origin: API POST data) Message: string does not match regex "^(?:25[0-5]|2[0-4][0-9]|0?[0-9])[0-9]{3}(?:25[0-5]|2[0-4][0-9]|0?[0-9])[0-9]{3}|V[0-9]{1,2}\$", exception while getting pydantic description

Source: cnaas-nms (Extension)

master* 0 0 -- NORMAL -- Ln 27, Col 23 Spaces: 2 UTF-8 LF YAML Prettier

Demo: Config change

Refresh repositories (1/4)

Latest settings repo commit: Commit [cba58d77](#) master by Johan Marcusson at 2021-04-23 10:24:59

Latest templates repo commit: Commit [865ac578](#) master by Johan Marcusson at 2021-04-23 14:54:39

Refresh settings

Refresh templates

Dry run (2/4)

Step 2 of 4: Sending generated configuration to devices to calculate diff and check sanity

☒ Re-sync devices (check for local changes made outside of NMS)

Start config dry run

Start over

100%

11/11 devices finished

status: FINISHED (job #185497)

start time: 2021-04-26T13:51:24.149412

finish time: 2021-04-26T13:51:35.172400

```
[2021-04-26 13:51:31,714] DEBUG in sync_devices job #185497: Empty diff for host c1, 0 change score
[2021-04-26 13:51:31,719] DEBUG in sync_devices job #185497: Empty diff for host c2, 0 change score
[2021-04-26 13:51:31,725] DEBUG in sync_devices job #185497: Empty diff for host d1, 0 change score
[2021-04-26 13:51:31,729] DEBUG in sync_devices job #185497: Empty diff for host d4, 0 change score
[2021-04-26 13:51:31,734] DEBUG in sync_devices job #185497: Empty diff for host a2, 0 change score
[2021-04-26 13:51:31,740] DEBUG in sync_devices job #185497: Empty diff for host d2, 0 change score
[2021-04-26 13:51:31,745] DEBUG in sync_devices job #185497: Empty diff for host d5, 0 change score
[2021-04-26 13:51:35,161] INFO in sync_devices job #185497: Change impact score: 27.0 (dry_run: True, selected devices: 11, changed devices: 1)
```

Demo: Config change

Verify difference (3/4)

Step 3 of 4: Look through and verify diff

Total devices affected: 11

Total change score: 27

a1 diffs

```
@@ -352,7 +352,7 @@
!
ip access-list standard snmp-clients
!
- ip routing
+ no ip routing
!
ip route 0.0.0.0/0 10.101.3.1
!
```

Commit configuration (4/4)

Step 4 of 4: Final step

Confirm commit



0%

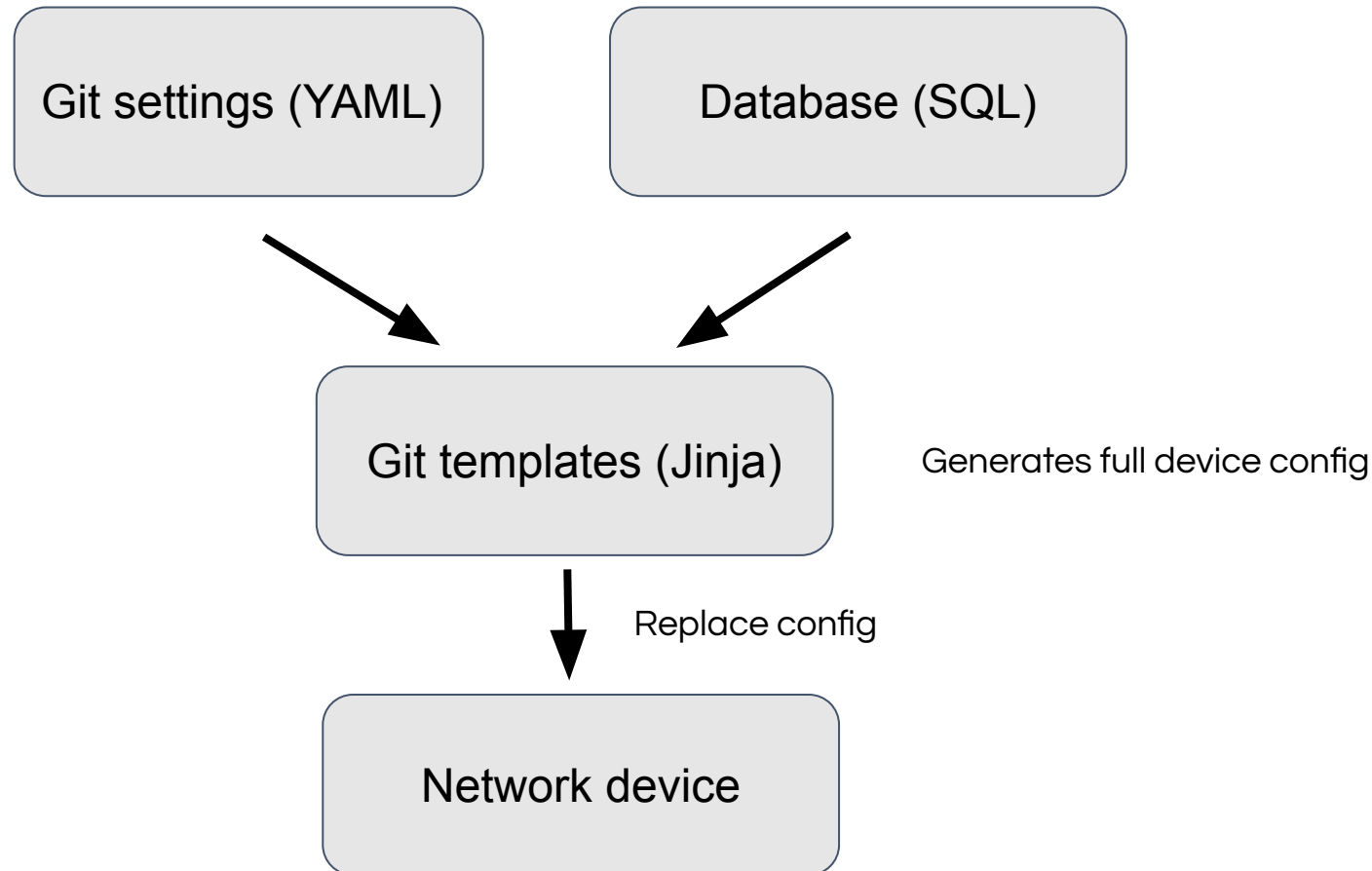
0/0 devices finished

status: (job #NA)

start time:

finish time:

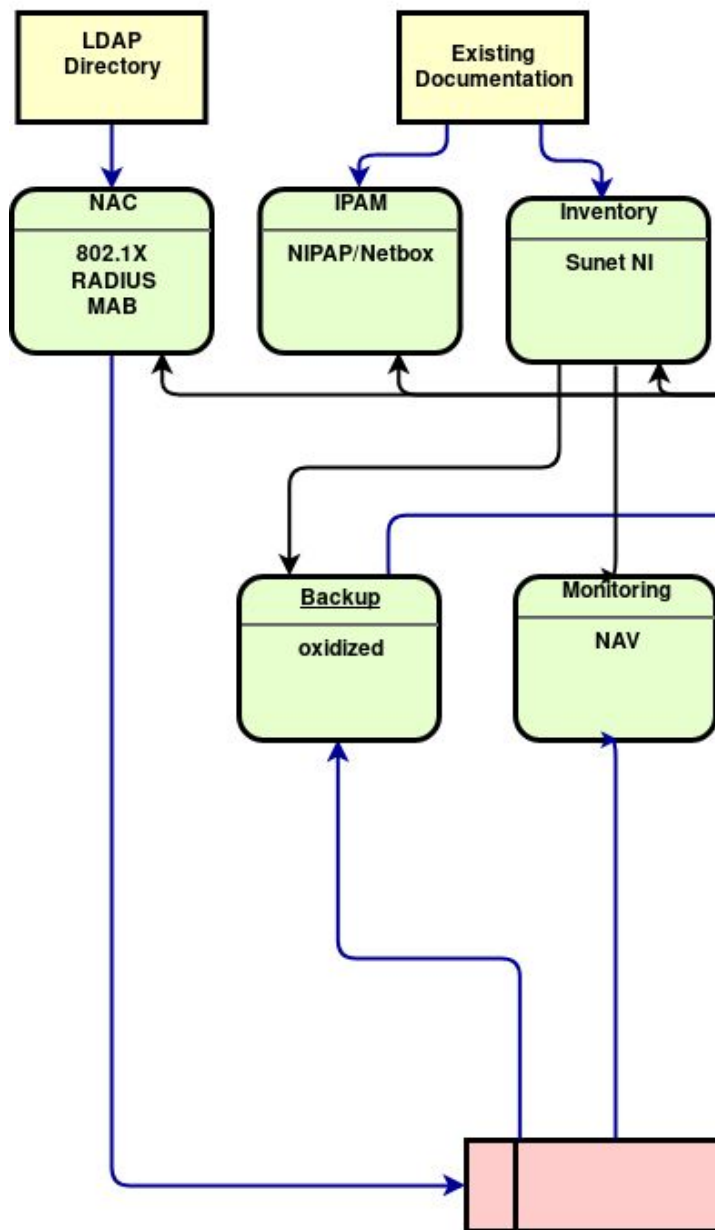
Config generation



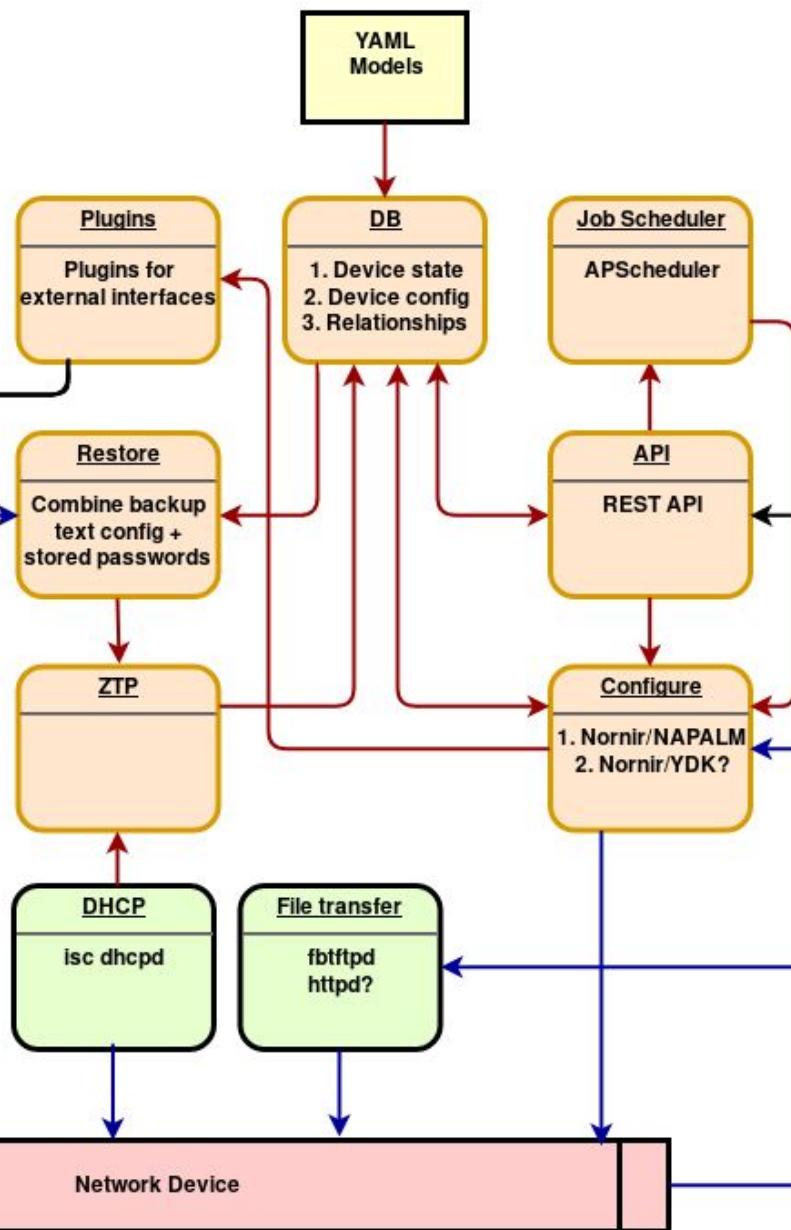
Change workflow

1. Update settings or templates
2. Commit and push to git
3. Ask API to pull changes from git (API-call)
4. Dry run on devices (API-call)
5. Verify diff
6. Live run (API-call)

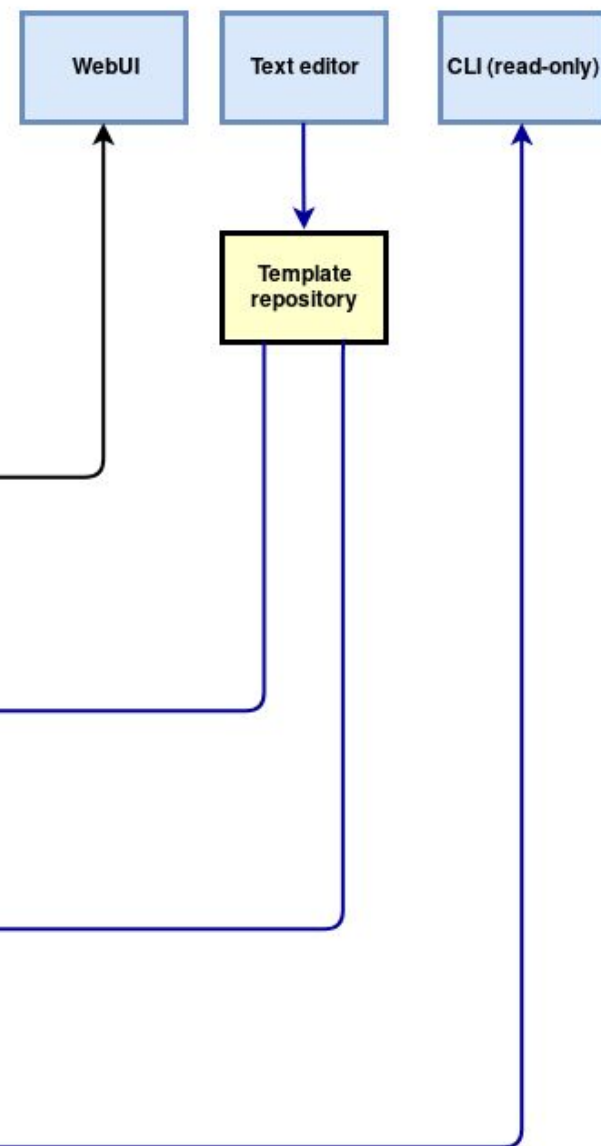
Support Systems



NMS/Automation Engine



User Interfaces



NAV portadmin for helpdesk

10.101.3.7 (HybridProxyHandler)

Port	Enabled	Linked	Port description	Vlan	
Ethernet1	☒		DOT1X TESTING TESTING 123	13 (ACCESS_AUTO)	
Ethernet2	☒		DOT1X TESTING TESTING 123	13 (ACCESS_AUTO)	
Ethernet3	☒		DOT1X	13 (ACCESS_AUTO)	
Ethernet4	☒		rainbow1	700	Save
Ethernet5	☒		DOT1X	13 (ACCESS_AUTO)	
Ethernet6	☒		rainbow2	700	Save
Ethernet7	☒		DOT1X	13 (ACCESS_AUTO)	
Ethernet8	☒		rainbow3	700	Save
Ethernet9	☒		DOT1X	13 (ACCESS_AUTO)	
Ethernet10	☒		rainbow4	700	Save
Ethernet11	☒		DOT1X	13 (ACCESS_AUTO)	
Ethernet12	☒		DOT1X	13 (ACCESS_AUTO)	
Ethernet13	☒		DOT1X	13 (ACCESS_AUTO)	