Efficiency Unlocked: Mastering Service Sync between Netbox and NSO

01/03/2025

Niclas Skøtt Petersen

Level(age): 27

Class(role): Network Specialist in Automation

Background:

6 years in Norlys in 4 different roles

Started my IT education in 2013.

Voluteer for many things

⚠ Warning:
Will continue to talk for hours about most fields in Tech if disturbed. No specific disturbance required.


BLOD-
DONORERNE
DANMARK

Who is Norlys Fibernet?

- Norlys Fibernet **owns, operates and maintains the largest fibre network in Denmark** measured by the number of households that have access to the network.

- The fibre network is available to more than **880,000 addresses**

- Norlys Fibernet also **operates several other fibre networks**, including SEF, RAH, ThyMors Energi, Nord Energi and MES

- Norlys Fibernet **owns 45% of RAH Fiber and 25% of SEF Fiber**
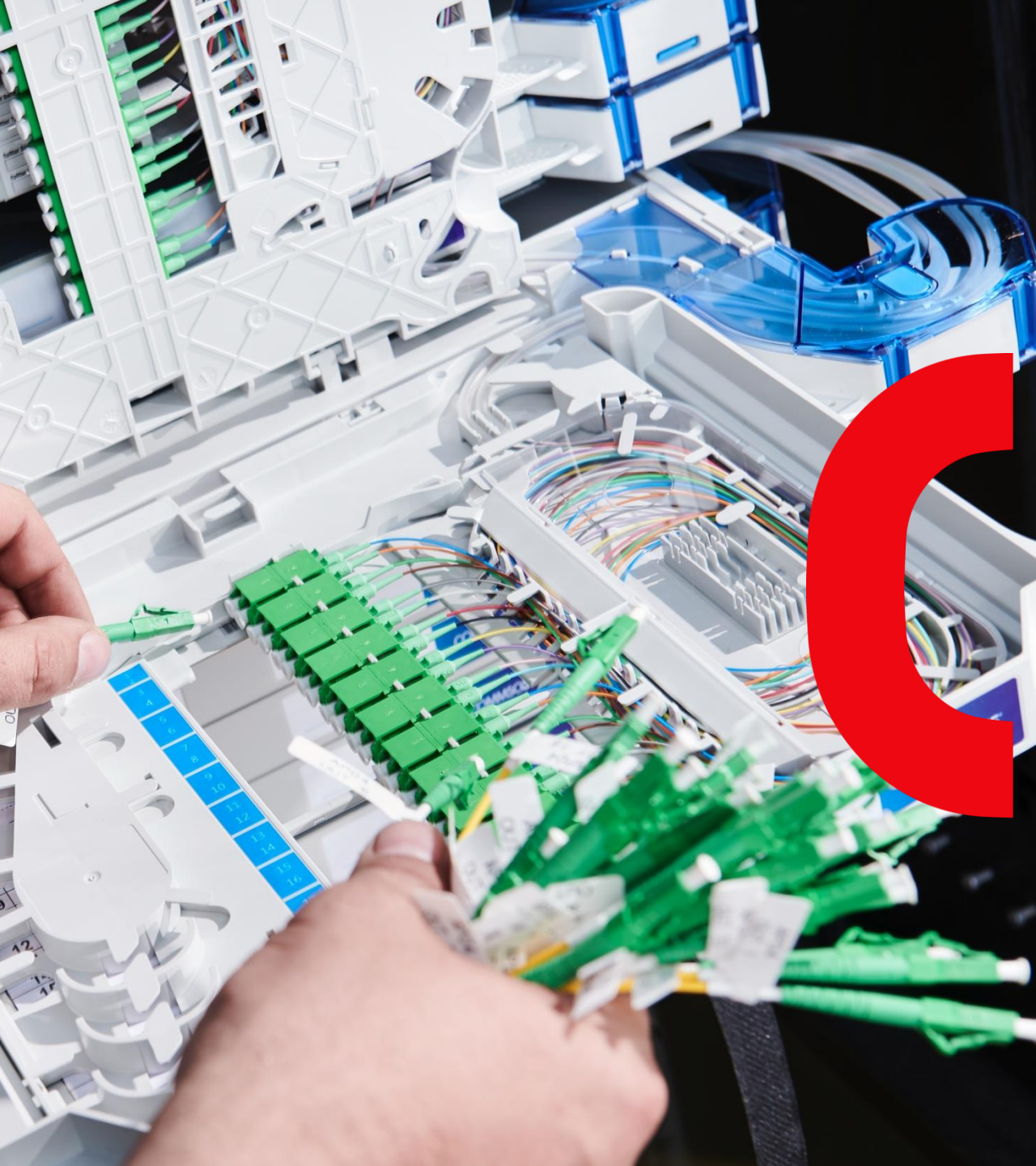
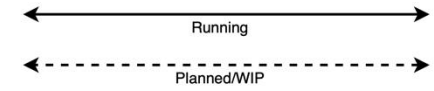→ The green area roughly corresponds to Norlys' electricity supply area
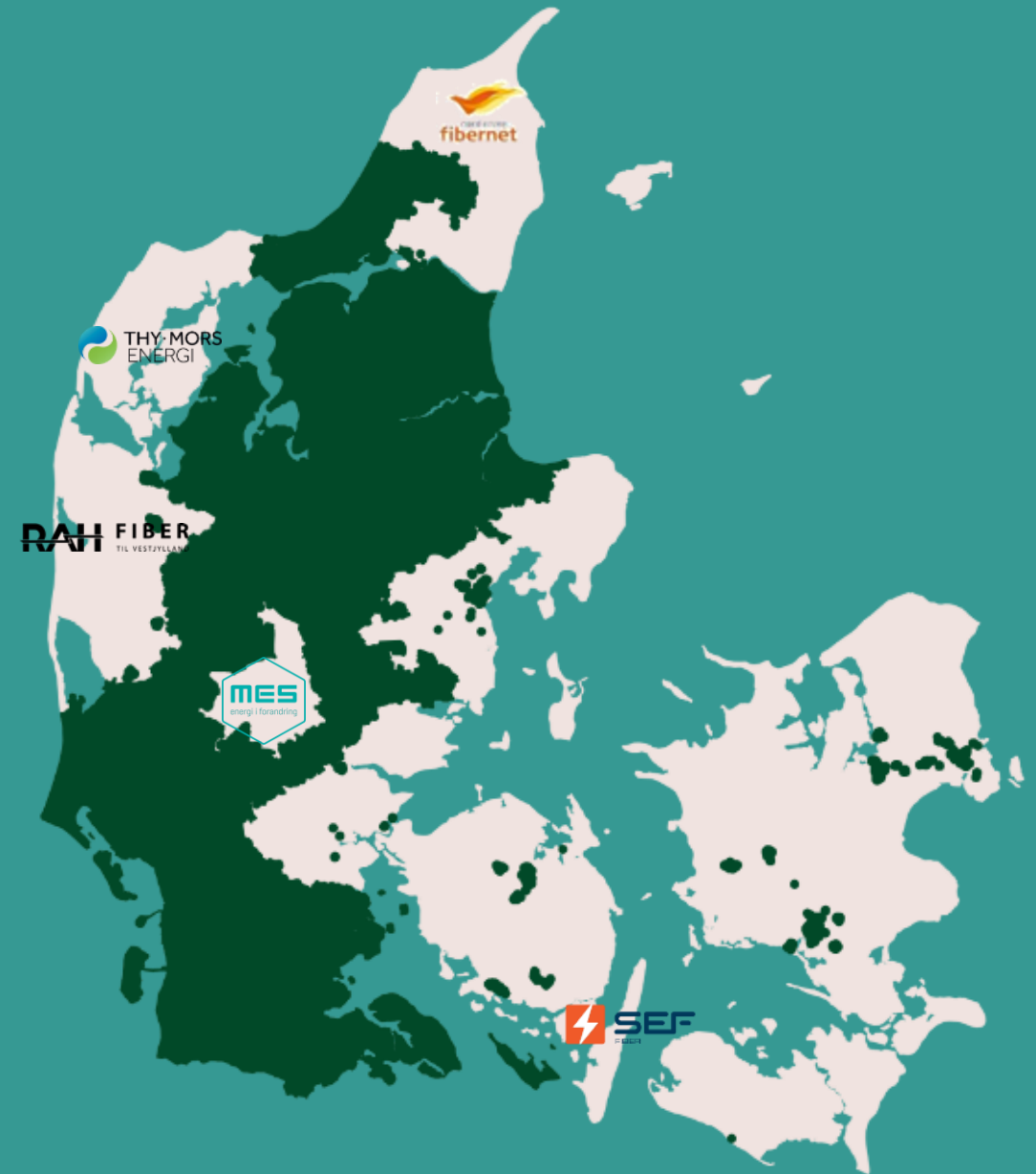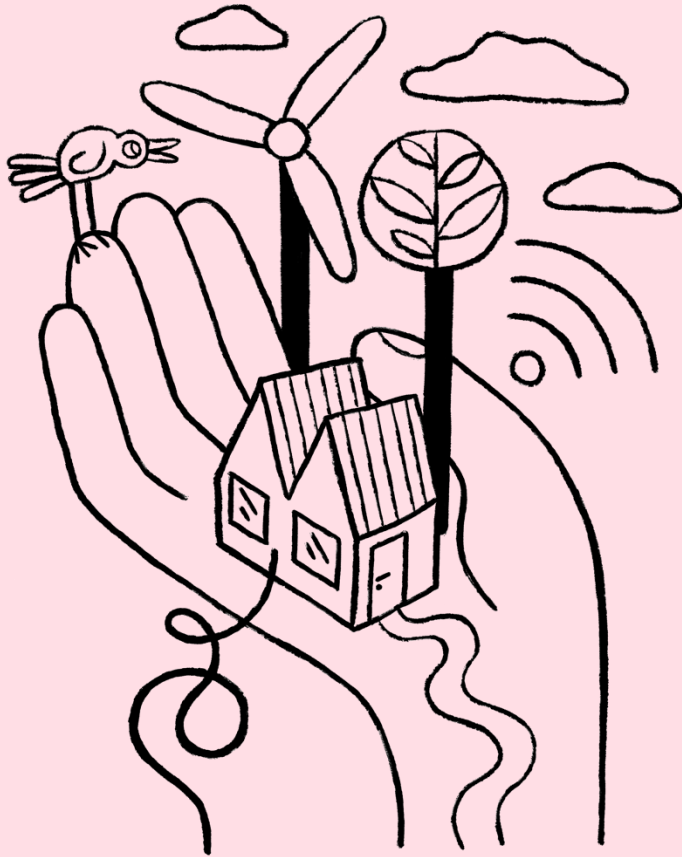
Agenda

- Short intro to Norlys Fibernet and me
- SSOT introduction – Netbox
- The Challenge
- Solution
- The "Demo"
- Next steps and Lessons learned
- Questions

SSoT introduction

SSoT - Netbox

Integrations Now

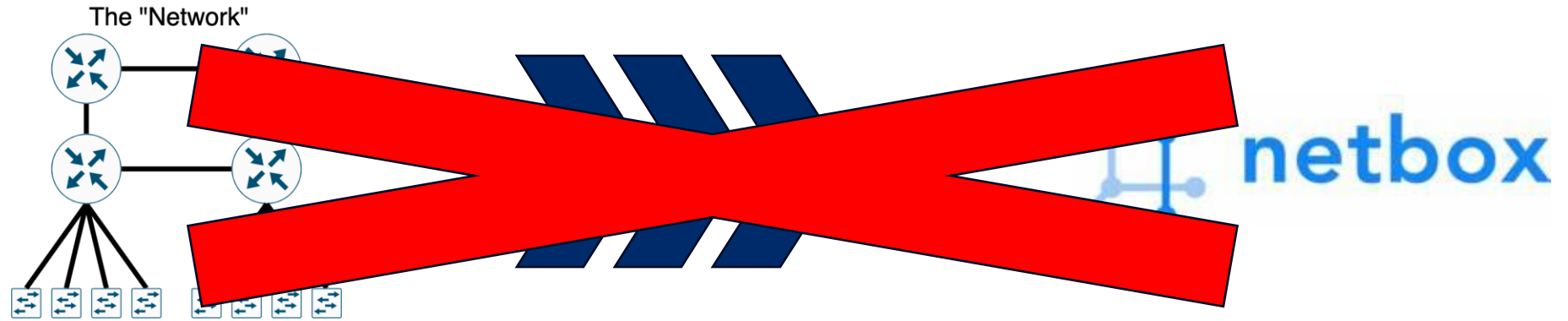# Flipping the script
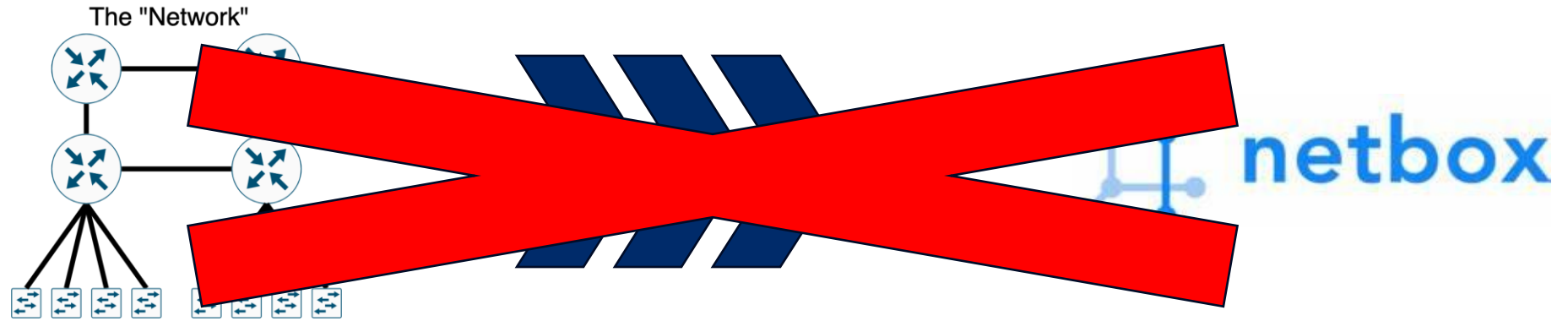
Flipping the script

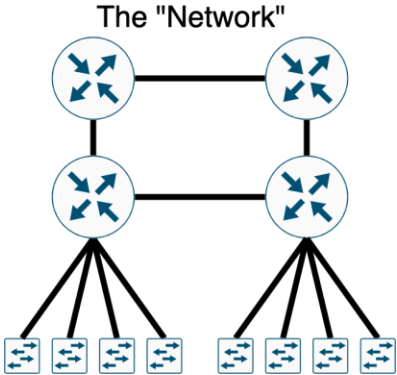
The "Network"
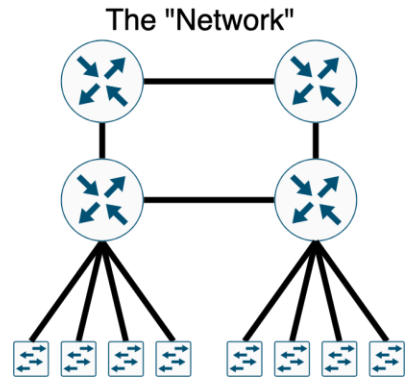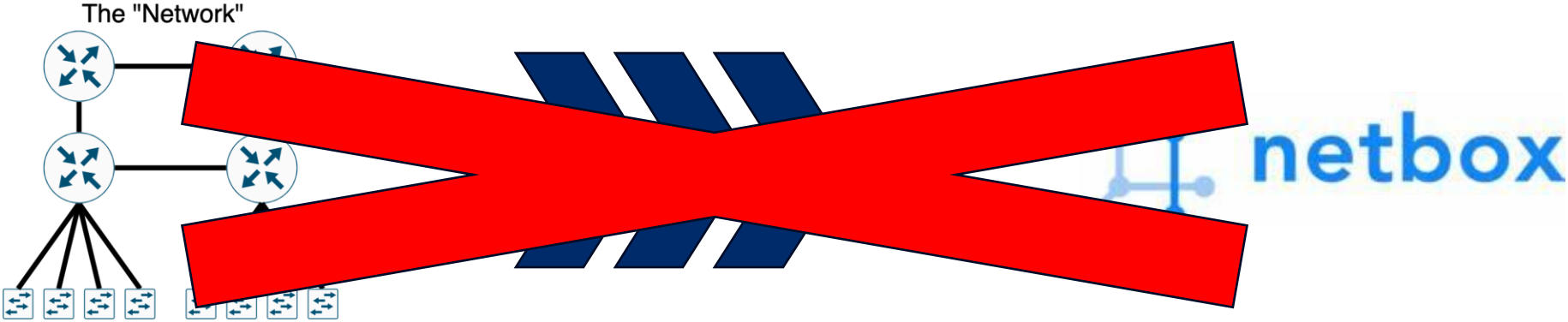
Flipping the script
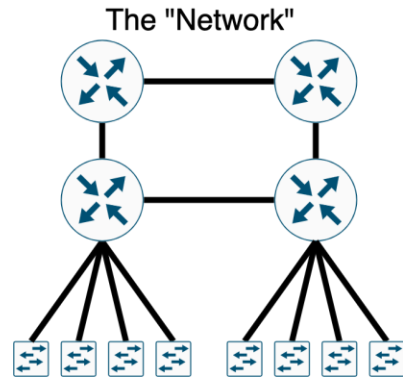
Flipping the script

Flipping the script

Flipping the script

Sync of Services

Goals and Solution

Goals for Service sync
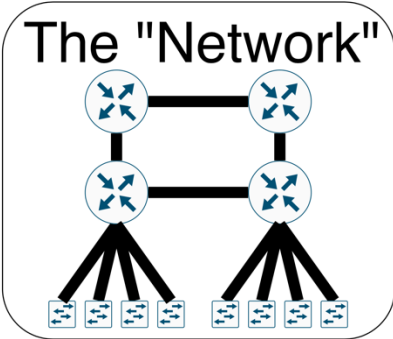
Dry-run verification of config as day 1

No values should be duplicated if possible.
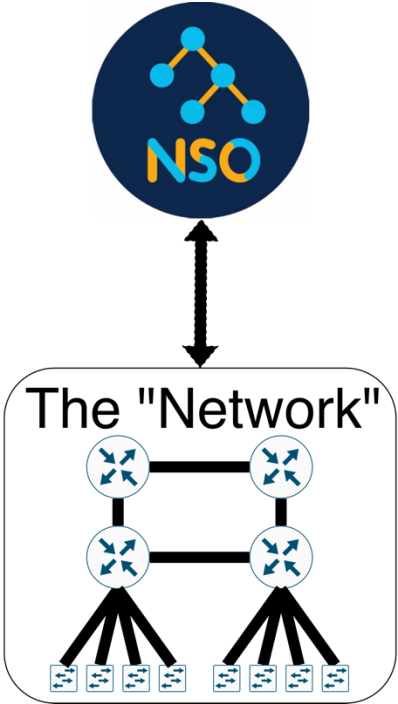
Ready for multiple Sources of Record

Services local for device
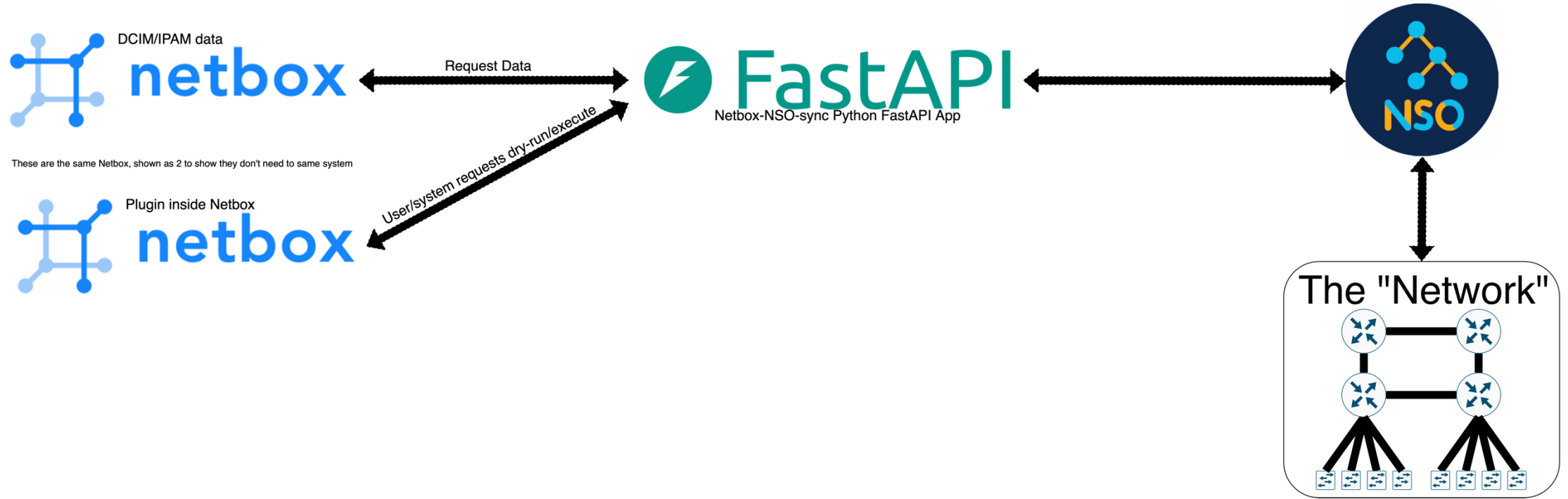
Services on global/group level

The Solution

DCIM/IPAM data

netbox

The "Network"

The Solution

DCIM/IPAM data
netbox

NSO

The "Network"

The Solution

DCIM/IPAM data

netbox

Netbox-NSO-sync Python FastAPI App

NSO

The "Network"

The Solution

DCIM/IPAM data
netbox

These are the same Netbox, shown as 2 to show they don't need to same system

Plugin inside Netbox
netbox

FastAPI
Netbox-NSO-sync Python FastAPI App

NSO

The "Network"

The Solution

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User/system requests dry-run/execute

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Request Data

User/system requests dry-run/execute

FastAPI

Netbox-NSO-sync Python FastAPI App

NSO

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Request Data

FastAPI
Netbox-NSO-sync Python FastAPI App

Request dry-run/execute

NSO

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User/system requests dry-run/execute

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Request Data

User/system requests dry-run/execute

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Netbox-NSO-sync Python FastAPI App

Request dry-run/execute

NSO

Send config to Network

The "Network"

The "Demo"

The Task

Hello Network Engineer.

We need you to add a link between test01ob01 and test01ob02.
Can you plan it and return documentation for the new link?
Then we will schedule technician to execute.

Speed should 2x10G.

test01ob01   test01ob02

Executing the task

Executing the task

Executing the task

Executing the task

Executing the task

1	2025-02-26T18:45:53.514833+00:00	Info	—	Device 1: 618353|618353
2	2025-02-26T18:45:53.514869+00:00	Info	—	Device 2: 748772|748773
3	2025-02-26T18:45:53.592000+00:00	Success	—	'object-case:5579079a-eb48-493a-a76e-f0d5b7845a2c' created
4	2025-02-26T18:45:53.633968+00:00	Info	—	Checking roles of devices
5	2025-02-26T18:45:53.651445+00:00	Info	—	Match found, MPLS like kind is mfa-oob-core
6	2025-02-26T18:45:54.581477+00:00	Info	—	Connected SMF cable between 'test01ob01/TenGigE0/0/0/14' and 'test01ob02/TenGigE0/0/0/14. Cable id = 97769'
7	2025-02-26T18:45:55.107512+00:00	Info	—	Connected SMF cable between 'test01ob01/TenGigE0/0/0/15' and 'test01ob02/TenGigE0/0/0/15. Cable id = 97770'
8	2025-02-26T18:45:55.123214+00:00	Info	—	Lag ID: 100
9	2025-02-26T18:45:55.308616+00:00	Info	—	Added Bundle-Ether100 to test01ob01
10	2025-02-26T18:45:55.325815+00:00	Info	—	Adding TenGigE0/0/0/14 to lag Bundle-Ether100 on test01ob01
11	2025-02-26T18:45:55.608756+00:00	Info	—	Setting test01ob01/TenGigE0/0/0/14 description to G: test01ob02 Te0/0/0/14 (BE100)
12	2025-02-26T18:45:55.704194+00:00	Info	—	Adding TenGigE0/0/0/15 to lag Bundle-Ether100 on test01ob01
13	2025-02-26T18:45:56.035477+00:00	Info	—	Setting test01ob01/TenGigE0/0/0/15 description to G: test01ob02 Te0/0/0/15 (BE100)
14	2025-02-26T18:45:56.136815+00:00	Warning	—	Updating service data for device test01ob01, please go sync config!
15	2025-02-26T18:45:56.485515+00:00	Info	—	test01ob01 Bundle-Ether100 got these interfaces added: TenGigE0/0/0/14, TenGigE0/0/0/15
16	2025-02-26T18:45:56.485544+00:00	Info	—	Added Bundle-Ether100 to test01ob02
17	2025-02-26T18:45:56.497384+00:00	Info	—	Adding TenGigE0/0/0/14 to lag Bundle-Ether100 on test01ob02
18	2025-02-26T18:45:56.779053+00:00	Info	—	Setting test01ob02/TenGigE0/0/0/14 description to G: test01ob01 Te0/0/0/14 (BE100)
19	2025-02-26T18:45:56.871529+00:00	Info	—	Adding TenGigE0/0/0/15 to lag Bundle-Ether100 on test01ob02
20	2025-02-26T18:45:57.112394+00:00	Info	—	Setting test01ob02/TenGigE0/0/0/15 description to G: test01ob01 Te0/0/0/15 (BE100)
21	2025-02-26T18:45:57.186474+00:00	Warning	—	Updating service data for device test01ob02, please go sync config!
22	2025-02-26T18:45:57.257765+00:00	Info	—	test01ob02 Bundle-Ether100 got these interfaces added: TenGigE0/0/0/14, TenGigE0/0/0/15
23	2025-02-26T18:45:57.572619+00:00	Info	—	Setting test01ob01/Bundle-Ether100 description to B: test01ob02 BE100
24	2025-02-26T18:45:57.654534+00:00	Info	—	Setting test01ob02/Bundle-Ether100 description to B: test01ob01 BE100
25	2025-02-26T18:45:57.716975+00:00	Info	—	Set description, MTU and enabled LAG.
26	2025-02-26T18:45:57.739615+00:00	Info	—	CIDR valid
27	2025-02-26T18:45:57.739646+00:00	Info	—	Getting all prefixes in Role: OOB-NCS-linknet and Tenant Fibernet Test
28	2025-02-26T18:45:58.059754+00:00	Success	—	Created prefix: 10.145.249.0/31
29	2025-02-26T18:45:58.071429+00:00	Success	—	Prefix assigned
30	2025-02-26T18:45:58.244876+00:00	Info	—	Added 10.145.249.0/31 to test01ob01 Bundle-Ether100
31	2025-02-26T18:45:58.291444+00:00	Info	—	Added 10.145.249.1/31 to test01ob01 Bundle-Ether100
32	2025-02-26T18:45:58.291507+00:00	Warning	—	Updating service data for device test01ob01, please go sync config!
33	2025-02-26T18:45:58.396895+00:00	Warning	—	Updating service data for device test01ob02, please go sync config!
34	2025-02-26T18:45:58.477664+00:00	Success	—	MPLS succesfully created and connected
35	2025-02-26T18:45:58.477708+00:00	Success	—	Script completed succesfully

Sidebar navigation:
- netbox Community
- Organization
- Racks
- Devices
- Connections
- Wireless
- IPAM
- VPN
- Virtualization
- Circuits
- Power
- Provisioning
- Customization

CUSTOMIZATION
- Custom Fields
- Custom Field Choices
- Custom Links
- Export Templates
- Saved Filters
- Tags
- Image Attachments

SCRIPTS
- Scripts

- Operations
- DDNS
- Netbox NSO Sync
- Admin

admin
Admin

Executing the task

Executing the task

```json
{
    "nso": {
        "services": {
            "lag-interface:lag-interface": {
                "DevID38055-IntId1016013": {
                    "device": "{{ netbox.dcim.devices.id.38055.name.short_name }}",
                    "lag-description": "{{ netbox.dcim.interfaces.id.1016013.description }}",
                    "lag-members": [
                        {
                            "description": "{{ netbox.dcim.interfaces.id.748772.description }}",
                            "interface": "{{ netbox.dcim.interfaces.id.748772.name }}"
                        },
                        {
                            "description": "{{ netbox.dcim.interfaces.id.748773.description }}",
                            "interface": "{{ netbox.dcim.interfaces.id.748773.name }}"
                        }
                    ],
                    "lag-name": "{{ netbox.dcim.interfaces.id.1016013.name }}",
                    "lldp": true,
                    "mtu": "{{ netbox.dcim.interfaces.id.1016013.mtu }}",
                    "name": "DevID38055-IntId1016013",
                    "netbox-nso-sync": 38055
                }
            },
            "mpls-link-interface:mpls-link-interface": {
                "DevID38055-IntId1016013": {
                    "area": 0,
                    "device": "{{ netbox.dcim.devices.id.38055.name.short_name }}",
                    "ipv4-cidr": "{{ netbox.ipam.ip_addresses.interface_id.1016013.address }}",
                    "lag-name": "{{ netbox.dcim.interfaces.id.1016013.name }}",
                    "link-kind": "oob",
                    "name": "DevID38055-IntId1016013",
                    "netbox-nso-sync": 38055
                }
            }
        }
    }
}
```

Executing the task

Executing the task

Executing the task

Executing the task

```
RP/0/RP0/CPU0:test01ob02#sho int desc | utility egrep "(\/0\/14|\/0\/15)"
Wed Feb 26 18:56:15.553 UTC
Te0/0/0/14          admin-down  admin-down
Te0/0/0/15          admin-down  admin-down
```

```
RP/0/RP0/CPU0:test01ob02#sho int desc | utility egrep "(\/0\/14|\/0\/15|100)"
Wed Feb 26 19:08:37.000 UTC
BE100               up          up          B: test01ob01 BE100
Te0/0/0/14          up          up          G: test01ob01 Te0/0/0/14 (BE100)
Te0/0/0/15          up          up          G: test01ob01 Te0/0/0/15 (BE100)
```

```
RP/0/RP0/CPU0:test01ob02#sho ospf neighbor Bundle-ether 100
Wed Feb 26 19:08:46.958 UTC

* Indicates MADJ interface
# Indicates Neighbor awaiting BFD session up

Neighbors for OSPF 10

Neighbor ID     Pri   State          Dead Time   Address       Interface
10.145.248.1    1     FULL/  -       00:00:39    10.145.249.0  Bundle-Ether100
    Neighbor is up for 00:03:30

Total neighbor count: 1
RP/0/RP0/CPU0:test01ob02#
```
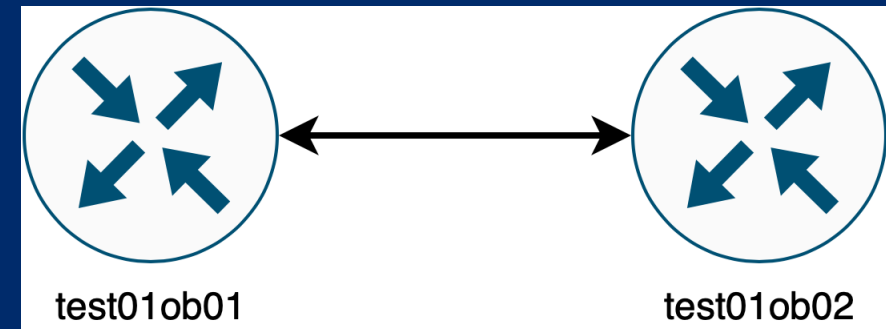
NORLYS

The Task

Hello Network Engineer.

We need you to add a link between test01ob01 and test01ob02.
Can you plan it and return documentation for the new link?
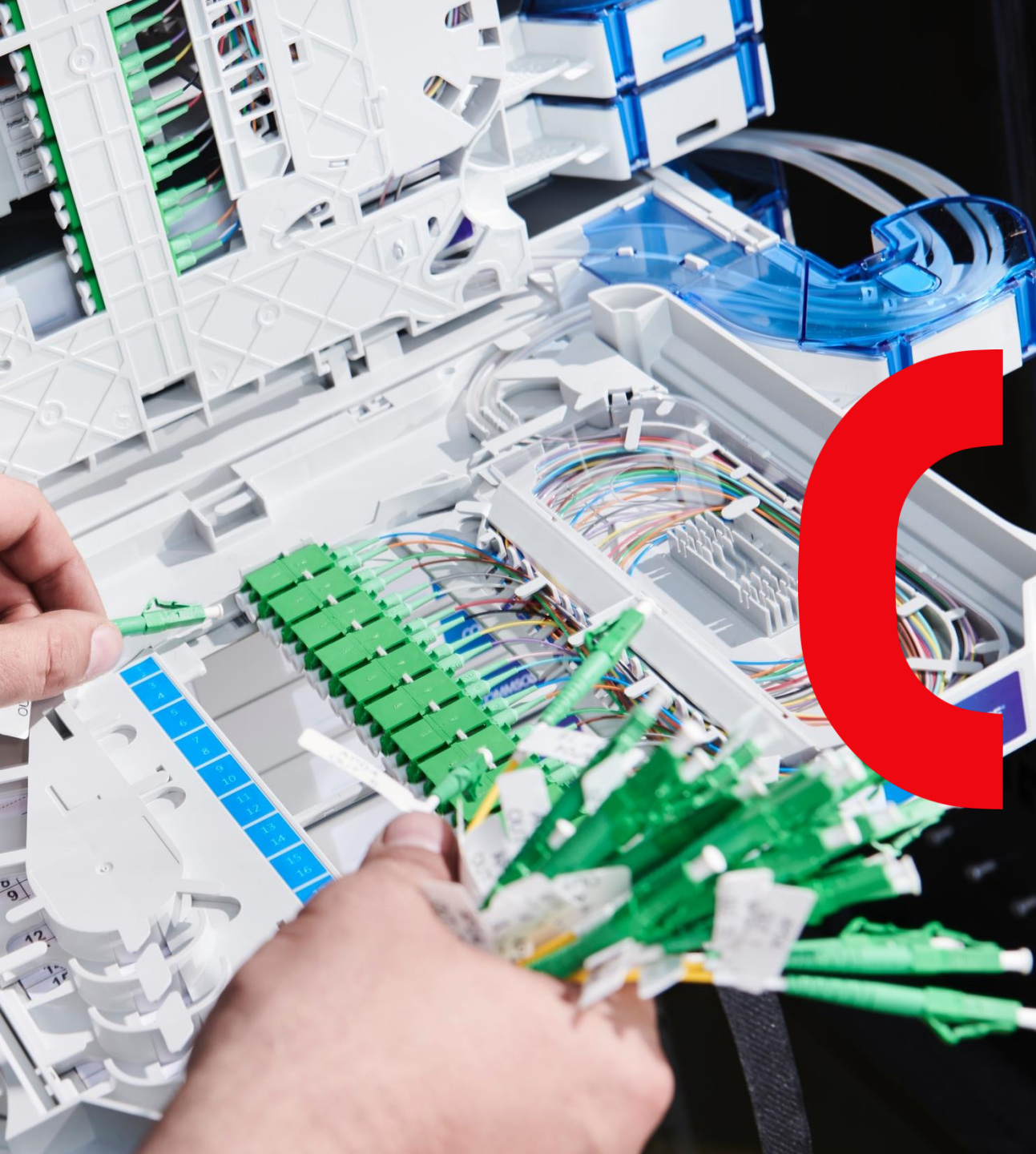*Then we will schedule technician to execute.*

Speed should 2x10G.

test01ob01   test01ob02

Executing the task

NORLYS

Next Steps

Next Steps

Brown field strategies	Reconciliation	Expanding Services
NSO and Device interaction	Extra Integrations	Compliance

New feature from the plugin

Questions?

Check out
norlys.dk/job