
EQUANIC
NONOG1
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Open Network Automation
Fredrik Holmberg, Equanic AS
fredrik@equanic.com

Introduction

Fredrik Holmberg

Networking + Open Source + Automation

@holmahenkel - Slack/LinkedIn/Twitter etc.

www.equanic.com

Agenda

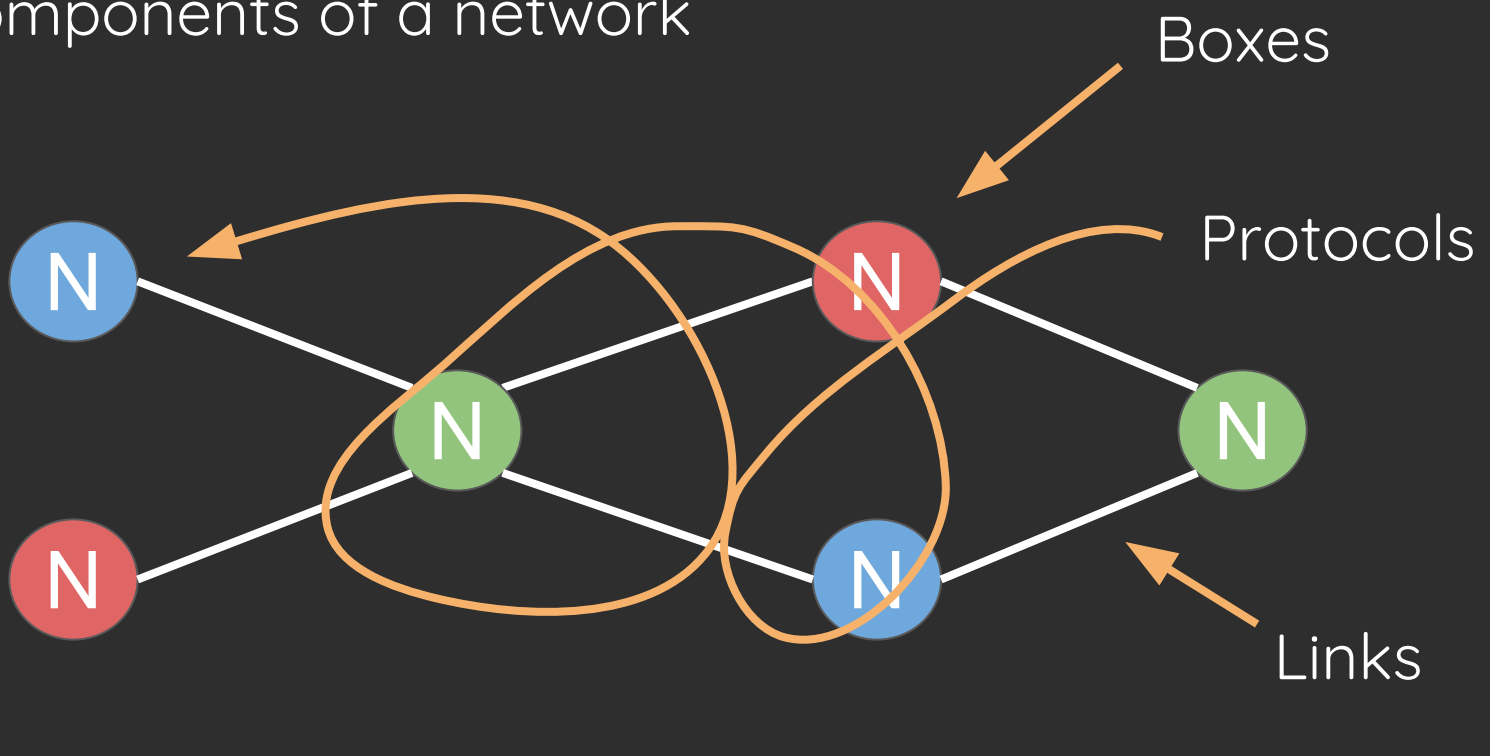
- Interactive Networks - your network as a data source
- Data Model Abstraction - from model to vendor yada
- Continuous Compliance - happy auditors and mgmt

Tools used today

- Vagrant - github.com/mitchellh/vagrant
- Ansible - github.com/ansible/ansible
- Napalm - github.com/napalm-automation/napalm

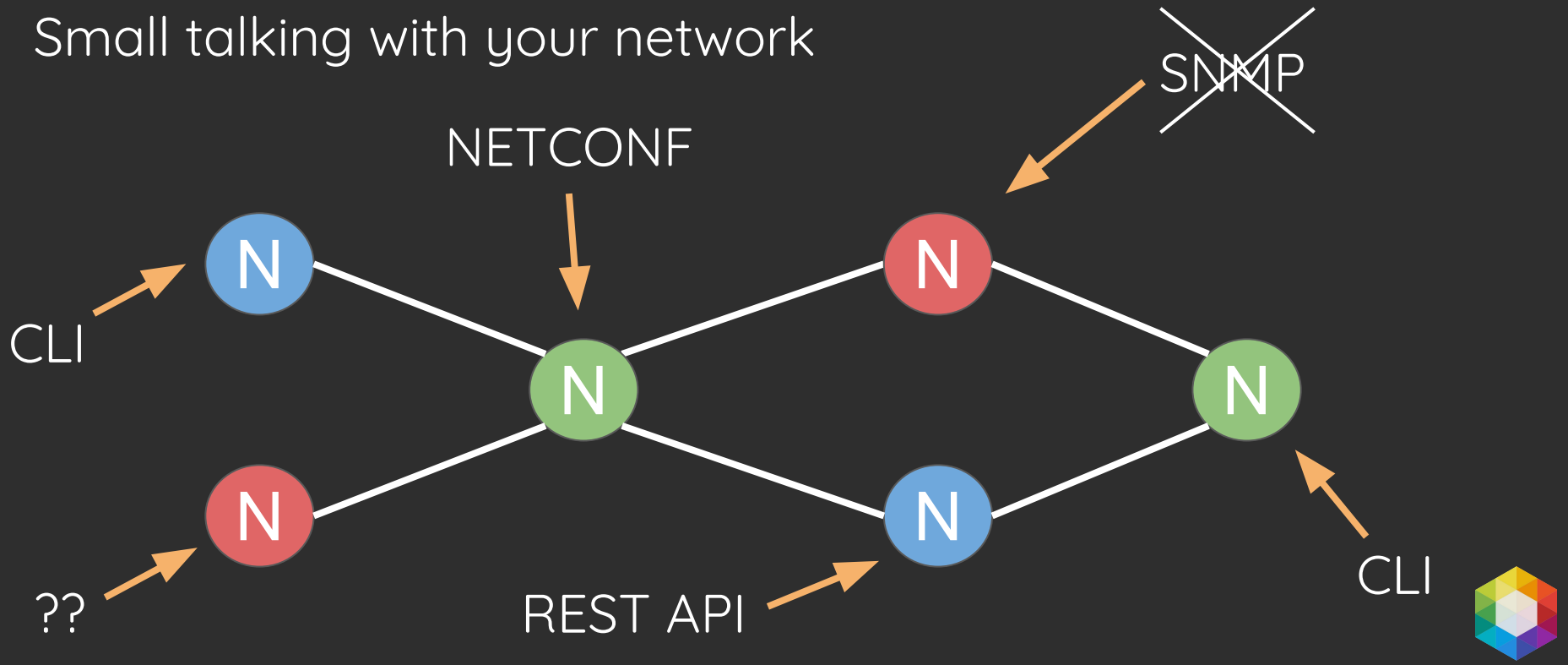
Interactive Networks

The components of a network



Interactive Networks

Small talking with your network



Interactive Networks

What does the returned data look like?

- STRUCTURED
  - XML
  - JSON
- UnStrUctURed
  - Raw CLI output

Interactive Networks

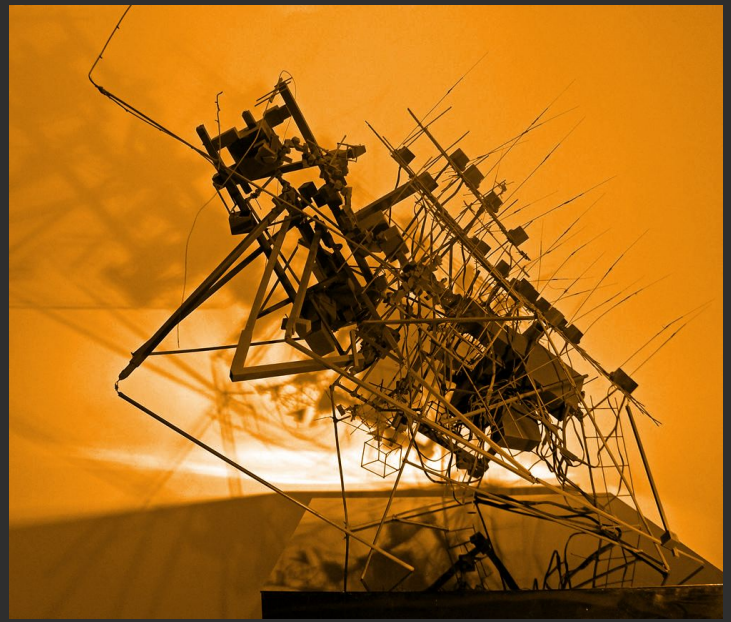
n ways of extracting the data

+

n ways of presenting the data

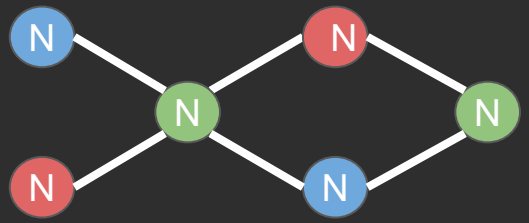
=

Complexity!



Interactive Networks

Unify the output by abstracting the vendor specifics




```
{
"bgp_neighbors": {
  "global": {
    "peers": {
      "10.99.13.1": {
          "description": "eBGP 13.1",
          "is_enabled": true,
          "is_up": true,
          "local_as": 65530,
          "remote_as": 65510,
          "remote_id": "10.0.0.1",
          "uptime": 419
        }
      }
    }
  }
}
```

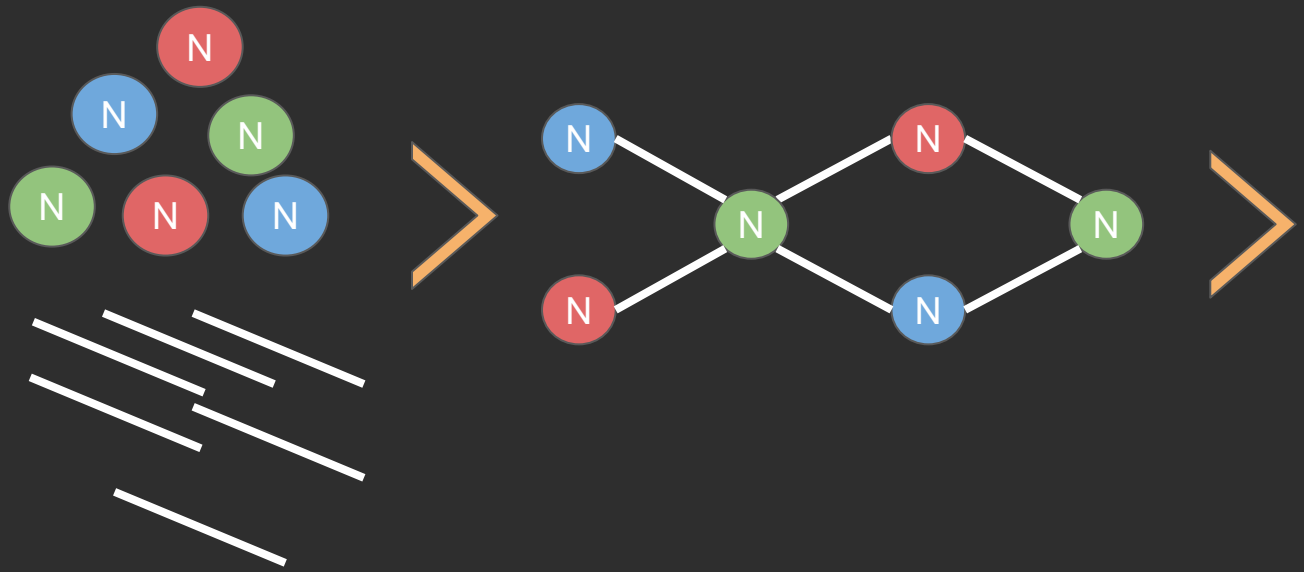

```
{
    "bgp_neighbors": {
        "global": {
            "peers": {
                "10.99.13.1": {
                    "address_family": {
                        "ipv4": {
                            "accepted_prefixes": 0,
                            "received_prefixes": 0,
                            "sent_prefixes": 0
                        }
                    },
                    "description": "",
                    "is_enabled": true,
                    "is_up": true,
                    "local_as": 65530,
                    "remote_as": 65510,
                    "remote_id": "10.0.0.1",
                    "uptime": 942
                },
                "10.99.23.2": {
                    "address_family": {
                        "ipv4": {
                            "accepted_prefixes": 0,
                            "received_prefixes": 0,
                            "sent_prefixes": 0
                        }
                    },
                    "description": "",
                    "is_enabled": true,
                    "is_up": true,
                    "local_as": 65530,
                    "remote_as": 65520,
                    "remote_id": "10.0.0.2",
                    "uptime": 938
                }
            },
            "router_id": "10.0.0.3"
        }
    }
}
```


DEMO

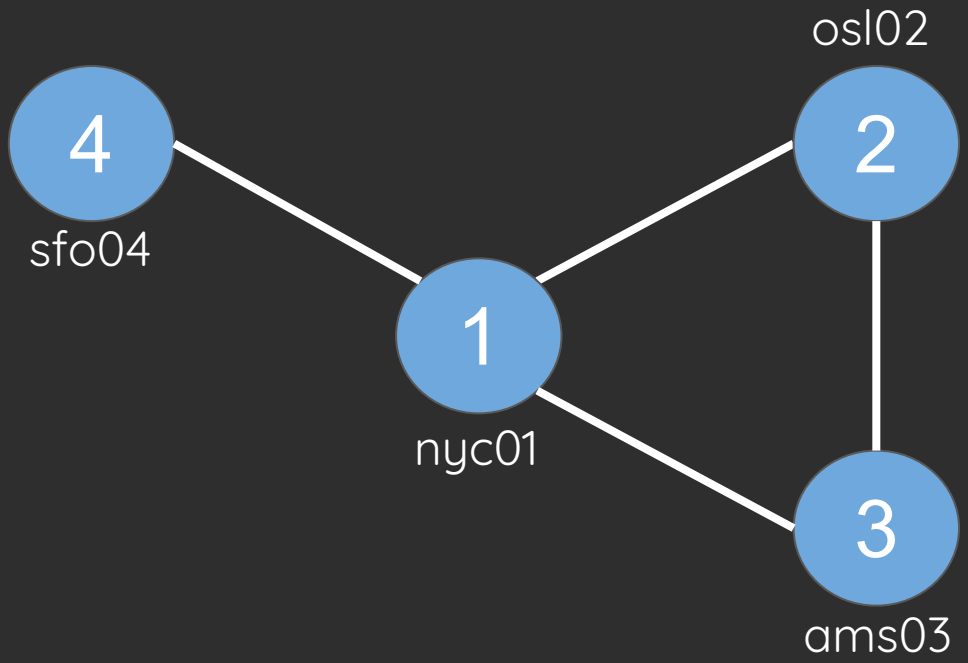

```
{
    "bgp_neighbors": {
        "global": {
            "peers": {
                "10.99.12.1": {
                    "address_family": {
                        "ipv4": {
                            "accepted_prefixes": 0,
                            "received_prefixes": 0,
                            "sent_prefixes": 0
                        }
                    },
                    "description": "",
                    "is_enabled": true,
                    "is_up": true,
                    "local_as": 65520,
                    "remote_as": 65510,
                    "remote_id": "10.0.0.1",
                    "uptime": 1352
                },
                "10.99.23.3": {
                    "address_family": {
                        "ipv4": {
                            "accepted_prefixes": 0,
                            "received_prefixes": 0,
                            "sent_prefixes": 0
                        }
                    },
                    "description": "",
                    "is_enabled": true,
                    "is_up": true,
                    "local_as": 65520,
                    "remote_as": 65530,
                    "remote_id": "10.0.0.3",
                    "uptime": 1214
                }
            },
            "router_id": "10.0.0.2"
        }
    }
}
```


Data Model Abstraction

From simple model to automation model to vendor yada



Data Model Abstraction



```
#
# Simple data model describing the
topology
#
---
nodes:
  - name: nyc01
    mgmt: 10.0.99.1
  - name: osl02
    mgmt: 10.0.0.2
  - name: ams03
    mgmt: 10.0.0.3
  - name: sfo04
    mgmt: 10.0.0.4

ptp:
  - from: nyc01
    from_if: GigabitEthernet0/1
    from_ip: 10.99.12.1
    to: osl02
    to_if: GigabitEthernet0/1
    to_ip: 10.99.12.2
    prefix: 31
  - from: osl02
    from_if: GigabitEthernet0/2
    from_ip: 10.99.23.2
    to: ams03
    to_if: GigabitEthernet0/1
    to_ip: 10.99.23.3
    prefix: 31
```

```
#
# Automation data model based on the simple
model
#
---
nodes:
  - name: nyc01
    mgmt: 10.0.99.1
    interfaces:
      - name: "GigabitEthernet0/1"
        ip: "10.99.12.1/31"
        meta: "osl02"
      - name: "GigabitEthernet0/2"
        ip: "10.99.13.1/24"
        meta: "ams03"
      - name: "GigabitEthernet0/3"
        ip: "10.99.14.1/25"
        meta: "sfo04"
  - name: osl02
    mgmt: 10.0.0.2
    interfaces:
      - name: "GigabitEthernet0/1"
        ip: "10.99.12.2/31"
        meta: "nyc01"
      - name: "GigabitEthernet0/2"
        ip: "10.99.23.2/31"
        meta: "ams03"
  - name: ams03
    mgmt: 10.0.0.3
    interfaces:
```

DEMO

```
#
# Vendor config generated from the
automation model
#

!------------ nyc01 ---------------
!
hostname nyc01
!
interface loopback0
 ip address 10.0.99.1 255.255.255.255
!
interface GigabitEthernet0/1
 ip address 10.99.12.1 255.255.255.254
 description link to osl02
!
interface GigabitEthernet0/2
 ip address 10.99.13.1 255.255.255.0
 description link to ams03
!
interface GigabitEthernet0/3
 ip address 10.99.14.1 255.255.255.128
 description link to sfo04
!
!
!
!
!
!------------ osl02 ---------------
!
```

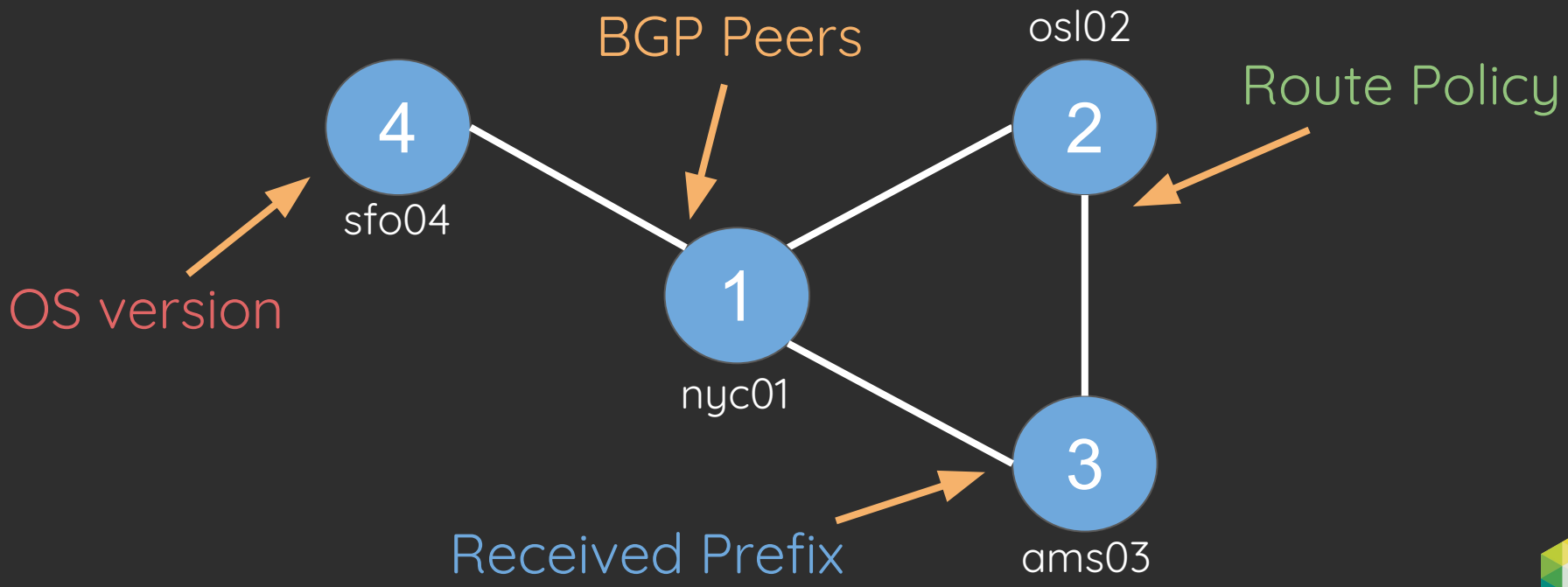
Continuous Compliance

Is your network in the correct state?

Fully automated compliance testing and reporting.

Incorporate into Audit, Security, Ops and Change processes.

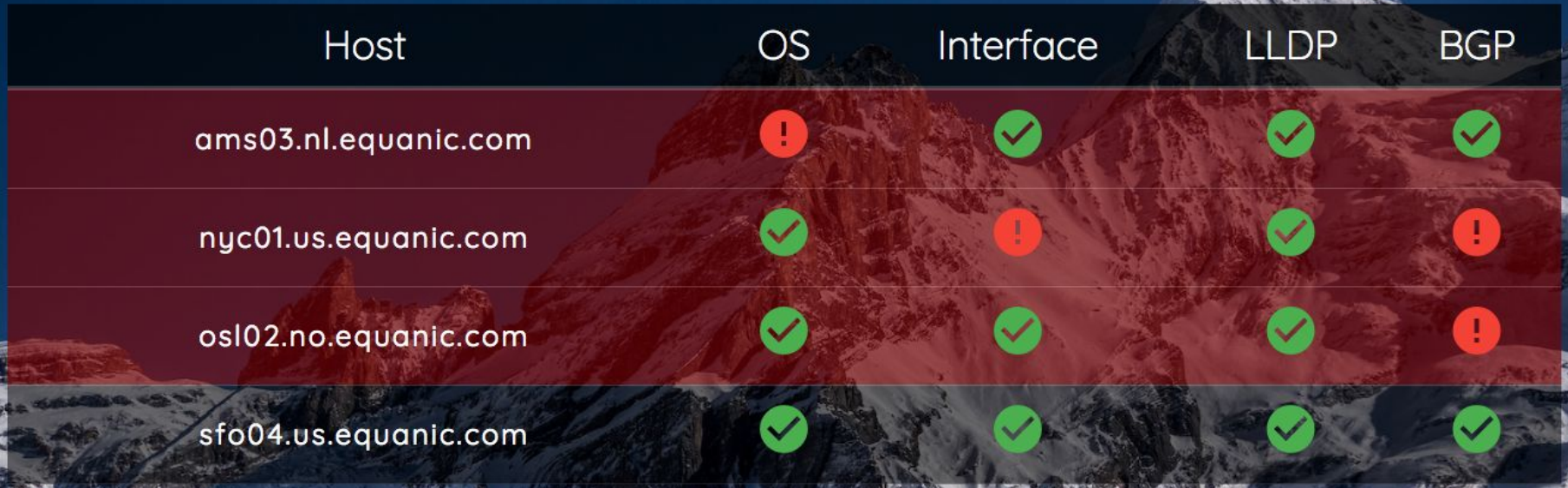
Continuous Compliance



DEMO

Network Compliance Report

2017-05-21 20:13:58



Host	OS	Interface	LLDP	BGP
ams03.nl.equanic.com	!	✓	✓	✓
nyc01.us.equanic.com	✓	!	✓	!
osl02.no.equanic.com	✓	✓	✓	!
sfo04.us.equanic.com	✓	✓	✓	✓

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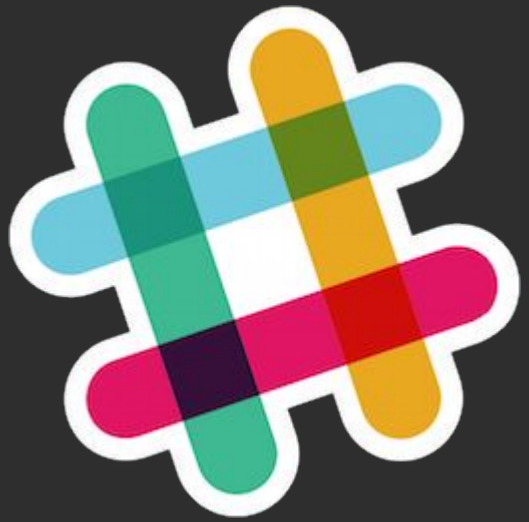
Let’s continue our talk



.. in the NONOG Slack channels!

nonog.net/slack/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Thank you!