Declarative Networking
in Declarative World

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Buzzwords

- Cloud
- Metal
- Network security
- Artificial intelligence

$whoami
Multi-networking

Why?

- Network equipment, routers, switches, ...
- Telco
- Separate storage networks
Network configuration

At installation-time

- NetworkManager uses static nmconnection files
- Changes not applied automatically
  - You may break your config...
  - ... and not notice for ages
Network configuration

At runtime

- Nmcli to modify the configuration
- Imperative way
- Basic protection against stupid things

```bash
[root@worker-6 system-connections]# cat default_connection.netconnection | grep address1
address1=192.99.99.123/24, 192.99.99.1
[root@worker-6 system-connections]# nmcli con mod 1969eb48-b733-40f9-9e29-a73b7d075737
    ipv4.addresses 10.10.99.99/24
    ipv4.gateway 192.168.111.111
ERROR: failed to modify ipv4.addresses: invalid IP address: Invalid IPv4 address '10.10.99.9924'.
[root@worker-6 system-connections]# nmcli con mod 1969eb48-b733-40f9-9e29-a73b7d075737
    ipv4.addresses 10.10.99.99/24
    ipv4.gateway 192.168.111.111
Warning: there is another connection with the name 'Wired Connection'. Reference the connection by its uuid '1969eb48-b733-40f9-9e29-a73b7d075737'.
[root@worker-6 system-connections]# cat default_connection.netconnection | grep address1
address1=10.10.99.99/24, 192.168.111.111
[root@worker-6 system-connections]#
```
Network configuration

At runtime, declarative

- Nmstatectl to apply the configuration
- Based on yaml
- Declarative

```
$ sudo nmstatectl show
...

dns:
  config:
    server:
      - 192.0.2.1
    search:
      - example.org

routes:
  config:
    - destination: 0.0.0.0/0
      next-hop-interface: eth1
      next-hop-address: 192.0.2.1

interfaces:
  - name: eth1
    type: ethernet
    description: Main-NIC
    state: up
    ipv4:
      enabled: true
      dhcp: false
      address:
        - ip: 192.0.2.9
        prefix-length: 24
    ipv6:
      enabled: false
```
Network configuration

Declarative, k8s-managed

- Kubernetes to apply the configuration
- Based on CRD
- Declarative
Demo

...
NMstate

Today

- Written in Rust
- NetworkManager as a backend
- Kubernetes Operator live and proven in action
- Usable from Rust, Golang, Python
The End

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