Configuring an Ethernet connection with a static IP address by using nmstatectl with an interface name

You can use the declarative Nmstate API to configure an Ethernet connection with static IP addresses, gateways, and DNS settings, and assign them to a specified interface name. Nmstate ensures that the result matches the configuration file or rolls back the changes.

Prerequisites

- A physical or virtual Ethernet Network Interface Controller (NIC) exists in the server's configuration.
- The `nmstate` package is installed.

Procedure

1. Create a YAML file, for example `~/create-ethernet-profile.yml`, with the following content:

```
---
interfaces:
- name: enp1s0
  type: ethernet
  state: up
  ipv4:
    enabled: true
    address:
    - ip: 192.0.2.1
      prefix-length: 24
    dhcp: false
  ipv6:
    enabled: true
    address:
```

```
    - ip: 2001:db8:1::1
      prefix-length: 64
    autoconf: false
    dhcp: false
routes:
  config:
  - destination: 0.0.0.0/0
    next-hop-address: 192.0.2.254
    next-hop-interface: enp1s0
  - destination: ::/0
    next-hop-address: 2001:db8:1::fffe
    next-hop-interface: enp1s0
dns-resolver:
  config:
    search:
    - example.com
    server:
    - 192.0.2.200
    - 2001:db8:1::ffbb
```

These settings define an Ethernet connection profile for the `enp1s0` device with the following settings:

- A static IPv4 address - `192.0.2.1` with the `/24` subnet mask
- A static IPv6 address - `2001:db8:1::1` with the `/64` subnet mask
- An IPv4 default gateway - `192.0.2.254`
- An IPv6 default gateway - `2001:db8:1::fffe`
- An IPv4 DNS server - `192.0.2.200`
- An IPv6 DNS server - `2001:db8:1::ffbb`
- A DNS search domain - `example.com`

2. Optional: You can define the `identifier: mac-address` and `mac-address: <mac_address>` properties in the `interfaces` property to identify the network interface card by its MAC address instead of its name, for example:

```
---
interfaces:
- name: <profile_name>
  type: ethernet
  identifier: mac-address
  mac-address: <mac_address>
  ...
```

3. Apply the settings to the system:

```
# nmstatectl apply ~/create-ethernet-profile.yml
```

Verification

1. Display the current state in YAML format:

```
# nmstatectl show enp1s0
```

2. Display the IP settings of the NIC:

```
# ip address show enp1s0
2: enp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group
default qlen 1000
    link/ether 52:54:00:17:b8:b6 brd ff:ff:ff:ff:ff:ff
    inet 192.0.2.1/24 brd 192.0.2.255 scope global noprefixroute enp1s0
       valid_lft forever preferred_lft forever
    inet6 2001:db8:1::fffe/64 scope global noprefixroute
       valid_lft forever preferred_lft forever
```

3. Display the IPv4 default gateway:

```
# ip route show default
default via 192.0.2.254 dev enp1s0 proto static metric 102
```

4. Display the IPv6 default gateway:

```
# ip -6 route show default
default via 2001:db8:1::fffe dev enp1s0 proto static metric 102 pref medium
```

5. Display the DNS settings:

```
# cat /etc/resolv.conf
search example.com
nameserver 192.0.2.200
nameserver 2001:db8:1::ffbb
```

   If multiple connection profiles are active at the same time, the order of `nameserver` entries depend on the DNS priority values in these profiles and the connection types.

6. Use the `ping` utility to verify that this host can send packets to other hosts:

```
# ping <host-name-or-IP-address>
```

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