

EVPN (3-Tier Network) with EVPN to Access Layer

This will define a 3-Tier network (Core/Distribution/Access) with EVPN from Core to Access layer

Note: This is an early draft of the API for EVPN-VXLAN. Things could change prior to going GA.

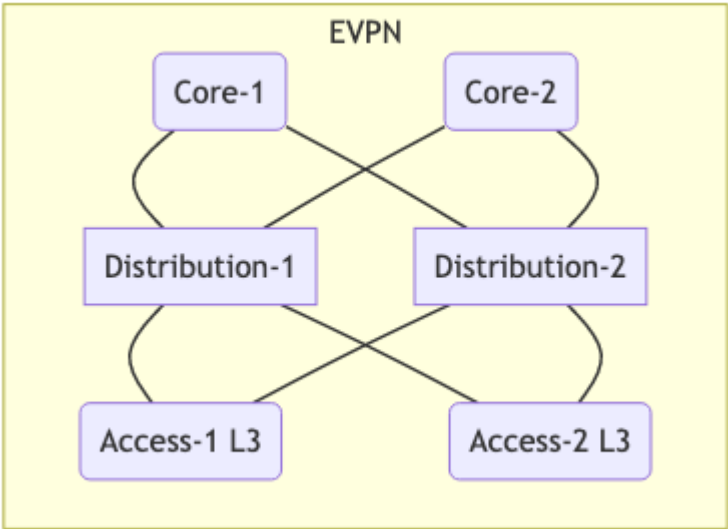
Required Variables:

- `site_id` xxxxxxxx-xxxx-xxxx-xxxx-00000000000b
- `device_id` (Core-1)
- `device_id` (Core-2)
- `device_id` (Distribution-1)
- `device_id` (Distribution-2)
- `device_id` (Access-1)
- `device_id` (Access-2)
- `mac_address` (Core-1)
- `mac_address` (Core-2)
- `mac_address` (Distribution-1)
- `mac_address` (Distribution-2)
- `mac_address` (Access-1)
- `mac_address` (Access-2)

EVPN Topology:

In this topology we are doing EVPN between the Core, Distribution and Access layer switches. Due to the IP-Clos nature of this fabric, L3 presence will happen at the access layer. This is the supported architecture from Juniper.

See this document for details: https://www.juniper.net/documentation/en_US/release-independent/nce/topics/concept/nce-evpn-vxlan-campus-arch.html



Step 1: (Define Networks/VRFs/PortUsage)

VRF

This payload configures 2 networks (`vlan101`, `vlan102`) that go into the `internal_vrf`. The internal VRF also include a static route.

EVPN Options

We also specify the EVPN option, but these are not required.

Port Usages

In this scenario, we will define a port usage that will be applied at the access layer so VLANs are plumbed appropriately.

Site Settings vs Network Template

This can also be applied to a network template and applied to the site, this example is using site settings only.

Site Settings

PUT:
/api/v1/sites/:site_id/setting

```
{
  "evpn_options": {
    "overlay": {
      "as": 65000
    },
    "underlay": {
      "as_base": 65001,
      "subnet": "10.255.240.0/20" } },
  "networks": {
    "vlan101": {
      "vlan_id": "101",
      "subnet": "192.168.101.0/24",
      "gateway": "192.168.101.1"},
    "vlan102": {
      "vlan_id": "102",
      "subnet": "192.168.102.0/24",
      "gateway": "192.168.102.1" } },
  "vrf_instances": {
    "internal_vrf": {
      "networks": ["vlan101", "vlan102"],
      "extra_routes": {"0.0.0.0/0": {"via": "192.168.192.1" } } },
  "port_usages": {
    "distribution-access": {
      "mode": "trunk",
      "disabled": false,
      "port_network": null,
      "voip_network": null,
      "stp_edge": false,
      "all_networks": false,
      "networks": ["vlan101", "vlan102"],
      "port_auth": null,
      "speed": "auto",
      "duplex": "auto",
      "mac_limit": 0,
      "poe_disabled": true,
      "enable_qos": false,
      "storm_control": {},
      "mtu": 9200
    } } }
```

Step 2: Apply Router ID/IRBs/VRF to Access switches

In this section, we are going to configure 3 things.

- Router ID
- IRB configurations for the L3 Gateways.
- Enable VRF for devices that need VRF

Access-1 Config

PUT:

```
/api/v1/sites/:site_id/devices/{{ Access-1_device_id }}
```

```
{
  "router_id": "192.168.255.11",
  "other_ip_configs": {
    "vlan101": {
      "type": "static",
      "ip": "192.168.101.2",
      "netmask": "255.255.255.0"
    },
    "vlan102": {
      "type": "static",
      "ip": "192.168.102.2",
      "netmask": "255.255.255.0"
    }
  },
  "vrf_config": {
    "enabled": true
  }
}
```

Access-2 Config

PUT:

/api/v1/sites/:site_id/devices/{{ Access-2_device_id }}

```
{
  "router_id": "192.168.255.12",
  "other_ip_configs": {
    "vlan101": {
      "type": "static",
      "ip": "192.168.101.3",
      "netmask": "255.255.255.0"
    },
    "vlan102": {
      "type": "static",
      "ip": "192.168.102.3",
      "netmask": "255.255.255.0"
    }
  },
  "vrf_config": {
    "enabled": true
  }
}
```

Step 3: Apply Router ID config to Distribution and Core switches.

In IP-Clos, you only apply the router_id to the Core/Distribution switches.

Scenario 1: Core-1 Config

```
PUT:
/api/v1/sites/:site_id/devices/{{ Core-1_device_id }}
```

```
{
  "router_id": "192.168.255.13"
}
```

Scenario 1: Core-2 Config

```
PUT:
/api/v1/sites/:site_id/devices/{{ Core-2_device_id }}
```

```
{
  "router_id": "192.168.255.14"
}
```

Scenario 1: Distribution-1 Config

```
PUT:
/api/v1/sites/:site_id/devices/{{ Distribution-1_device_id }}
```

```
{
  "router_id": "192.168.255.15"
}
```

Scenario 1: Distribution-2 Config

```
PUT:
/api/v1/sites/:site_id/devices/{{ Distribution-2_device_id }}
```

```
{  
  "router_id": "192.168.255.16"  
}
```


Step 4: Build EVPN Topology:

This step defines which switches will participate in the EVPN and what their role is.

```
POST
/api/v1/sites/:site_id/devices/evpn_topology
```

```
{
  "overwrite": true,
  "switches": [{
    "mac": "{{ Core-1_mac_address }}",
    "role": "core"
  },
  {
    "mac": "{{ Core-2_mac_address }}",
    "role": "core"
  },
  {
    "mac": "{{ Distribution-1_mac_address }}",
    "role": "distribution"
  },
  {
    "mac": "{{ Distribution-2_mac_address }}",
    "role": "distribution"
  },
  {
    "mac": "{{ Access-1_mac_address }}",
    "role": "access"
  },
  {
    "mac": "{{ Access-2_mac_address }}",
    "role": "access"
  }
  ]
}
```

Record Output from EVPN topology

Sample OUTPUT:

```

{
  "switches": [
    {
      "mac": "{{ Core-1_mac_address }}",
      "evpn_id": 1,
      "model": "xxxxxx-24P",
      "router_id": "192.168.255.11",
      "role": "core",
      "downlinks": [
        "{{ Distribution-1_mac_address }}",
        "{{ Distribution-2_mac_address }}"
      ],
      "downlink_ips": ["10.255.240.2", "10.255.240.4"]
    },
    {
      "mac": "{{ Core-2_mac_address }}",
      "evpn_id": 2,
      "model": "xxxxxxx-24P",
      "router_id": "192.168.255.12",
      "role": "access",
      "downlinks": [
        "{{ Distribution-1_mac_address }}",
        "{{ Distribution-2_mac_address }}"
      ],
      "downlink_ips": ["10.255.240.6", "10.255.240.8"]
    },
    {
      "mac": "{{ Distribution-1_mac_address }}",
      "evpn_id": 3,
      "model": "xxxxxx-48P",
      "router_id": "192.168.255.14",
      "role": "distribution",
      "uplinks": [
        "{{ Core-1_mac_address }}",
        "{{ Core-2_mac_address }}"
      ],
      "downlinks": [
        "{{ Access-1_mac_address }}",
        "{{ Access-2_mac_address }}"
      ],
      "downlink_ips": ["10.255.240.10", "10.255.240.12"]
    },
    {
      "mac": "{{ Distribution-2_mac_address }}",
      "evpn_id": 4,
      "model": "xxxxxx-48P",
      "router_id": "192.168.255.13",
      "role": "distribution",
      "uplinks": [
        "{{ Core-1_mac_address }}",
        "{{ Core-2_mac_address }}"
      ],
      "downlinks": [
        "{{ Access-1_mac_address }}",
        "{{ Access-2_mac_address }}"
      ],

```

```
        "downlink_ips": ["10.255.240.14", "10.255.240.16"]},
    },
    {
        "mac": "{{ Access-1_mac_address }}",
        "evpn_id": 5,
        "model": "xxxxxx-48P",
        "router_id": "192.168.255.14",
        "role": "access",
        "uplinks": [
            "{{ Distribution-1_mac_address }}",
            "{{ Distribution-2_mac_address }}"
        ],
    },
    {
        "mac": "{{ Access-2_mac_address }}",
        "evpn_id": 6,
        "model": "xxxxxx-48P",
        "router_id": "192.168.255.13",
        "role": "access",
        "uplinks": [
            "{{ Distribution-1_mac_address }}",
            "{{ Distribution-2_mac_address }}"
        ],
    }
]
}
```

Step 5: Match up the EVPN topology uplinks and downlinks.

In the EVPN topology output each switch will have uplinks,downlinks or both. Each Core switch will have evpn_downlinks Each Distribution switch will have both evpn_uplinks and evpn_downlinks. Access switches will have uplinks only.

The EVPN Topolgy will tell you which links go where.

In cases where there are multiple of the same type (uplinks/downlinks), the order is important. If the EVPN topology says that Core 1 has 2 downlinks (Distribution-1 and Distribution-2), it's important that you list those in the appropriate order and in a single entry.

Make sure you match up the port to the correct port type (ge vs mge vs xe vs et)

Core-1 Port Config

```
PUT:
/api/v1/sites/:site_id/devices/{{ Core-1_device_id }}
```

```
{
  "port_config": {
    "ge-0/0/22-23": {
      "usage": "evpn_downlink"
    }
  }
}
```

Based on the configuration and output from the EVPN_Topology, Core-1 will have:

- **ge-0/0/22** connected to **Distribution-1**
- **ge-0/0/23** connected to **Distribution-2**

Core-2 Port Config

```
PUT:
/api/v1/sites/:site_id/devices/{{ Core-2_device_id }}
```

```
{
  "port_config": {
    "ge-0/0/22-23": {
      "usage": "evpn_downlink"
    }
  }
}
```

Based on the configuration and output from the EVPN_Topology, Core-2 will have:

- `ge-0/0/22` connected to `Distribution-1`
- `ge-0/0/23` connected to `Distribution-2`

Distribution-1 Port Config

PUT:

```
/api/v1/sites/:site_id/devices/{{ Distribution-1_device_id }}
```

```
{
  "port_config": {
    "ge-0/0/22-23": {
      "usage": "evpn_uplink"
    },
    "ge-0/0/1-2": {
      "usage": "evpn_downlink"
    }
  }
}
```

Based on the configuration and output from the EVPN_Topology, Distribution-1 will have:

- **ge-0/0/22** connected to **Core-1**
- **ge-0/0/23** connected to **Core-2**
- **ge-0/0/1** to connect to **Access-1**
- **ge-0/0/2** to connect to **Access-2**

Distribution-2 Port Config

PUT:

```
/api/v1/sites/:site_id/devices/{{ Distribution-2_device_id }}
```

```
{
  "port_config": {
    "ge-0/0/22-23": {
      "usage": "evpn_uplink"
    },
    "ge-0/0/1-2": {
      "usage": "evpn_downlink"
    }
  }
}
```

Based on the configuration and output from the EVPN_Topology, Distribution-2 will have:

- **ge-0/0/22** connected to **Core-1**
- **ge-0/0/23** connected to **Core-2**
- **ge-0/0/1** to connect to **Access-1**
- **ge-0/0/2** to connect to **Access-2**

Access-1 Port Config

PUT:

```
/api/v1/sites/:site_id/devices/{{ Access-1_device_id }}
```

```
{
  "port_config": {
    "ge-0/0/22-23": {
      "usage": "evpn_uplink"
    },
    "ge-0/0/0": {
      "usage": "distribution-access"
    }
  }
}
```

Based on the configuration and output from the EVPN_Topology, Access-1 will have:

- `ge-0/0/22` connected to `Distribution-1`
- `ge-0/0/23` connected to `Distribution-2`

Access-2 Port Config

PUT:

```
/api/v1/sites/:site_id/devices/{{ Access-2_device_id }}
```

```
{
  "port_config": {
    "ge-0/0/22-23": {
      "usage": "evpn_uplink"
    },
    "ge-0/0/0": {
      "usage": "distribution-access"
    }
  }
}
```

Based on the configuration and output from the EVPN_Topology, Access-2 will have:

- `ge-0/0/22` connected to `Distribution-1`
- `ge-0/0/23` connected to `Distribution-2`