What's New in NSX-T 3.1.1

Nicolas MICHEL
NSBU PM/TPM Team

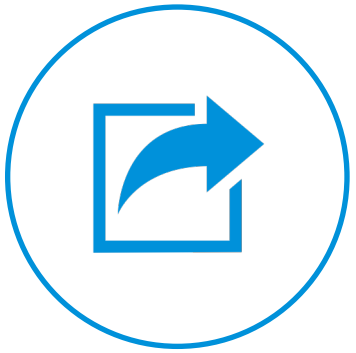
February 2021

Introducing NSX-T 3.1.1

Maintenance Release with OSPF support

Cloud Scale Networking

- OSPFv2 Support
- Federation Scale enhancements
- DHCP4 relay support on Service Interface



V2T Migration

- Lift and Shift in UI
- Two options for in-place
- Support VCF
- Support vRA enhancements(*8.3)
- Support Universal Objects in one site

Platform Enhancements

- N-vDS to VDS migration
- NSX-T Local Users (RBAC)
- NSX-T ALB Policy API Support
- NSX-T Identity Firewall Configuration Policy API
- VDS Licensing for NSX users

NSX Cloud

- NSX Manager in Azure Marketplace
- **Horizon Cloud integration**
- **AWS TGW support for Security use-case**

What's New in NSX-T 3.1.1

Federation

PM: Jerome Catrouillet
TPM: Dimitri Desmidt

February 2021

NSX-T 3.1.1 Enhancements

NSX-T 3.1.1

Scale

- Increase of # of Hypervisors from 256 to 650.

Orchestration

- Orchestration using PowerCLI

  Examples of Terraform and PowerCLI on:

  https://github.com/vmware-samples/nsx-t/tree/master/helper-scripts/Multi-Location/Federation/End2End

What's New in NSX-T 3.1.1

NSX Cloud

PM: Shiva Somasundaram
TPM: Geoff Wilmington

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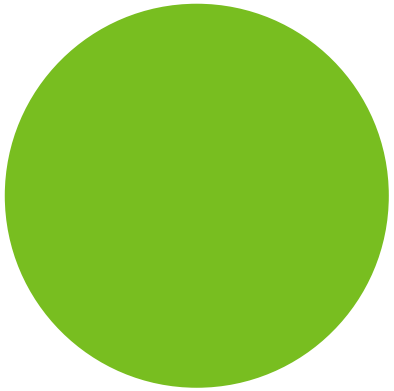
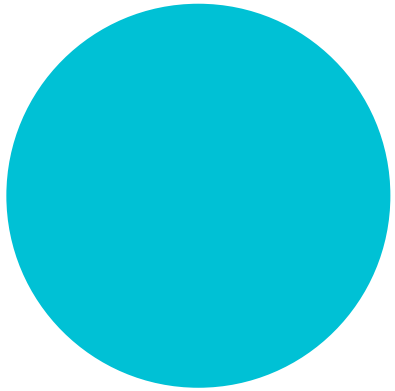
NSX Cloud

Updates and Improvements

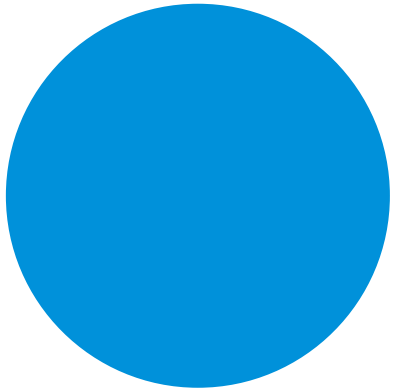
NSX-T 3.1.1



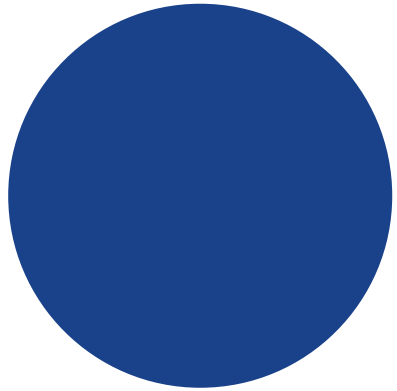
NSX Manager and Control Plane in Azure via Azure Marketplace



Horizon Cloud Day-0 Installation and Coordination



Support for PCG & AWS TGW

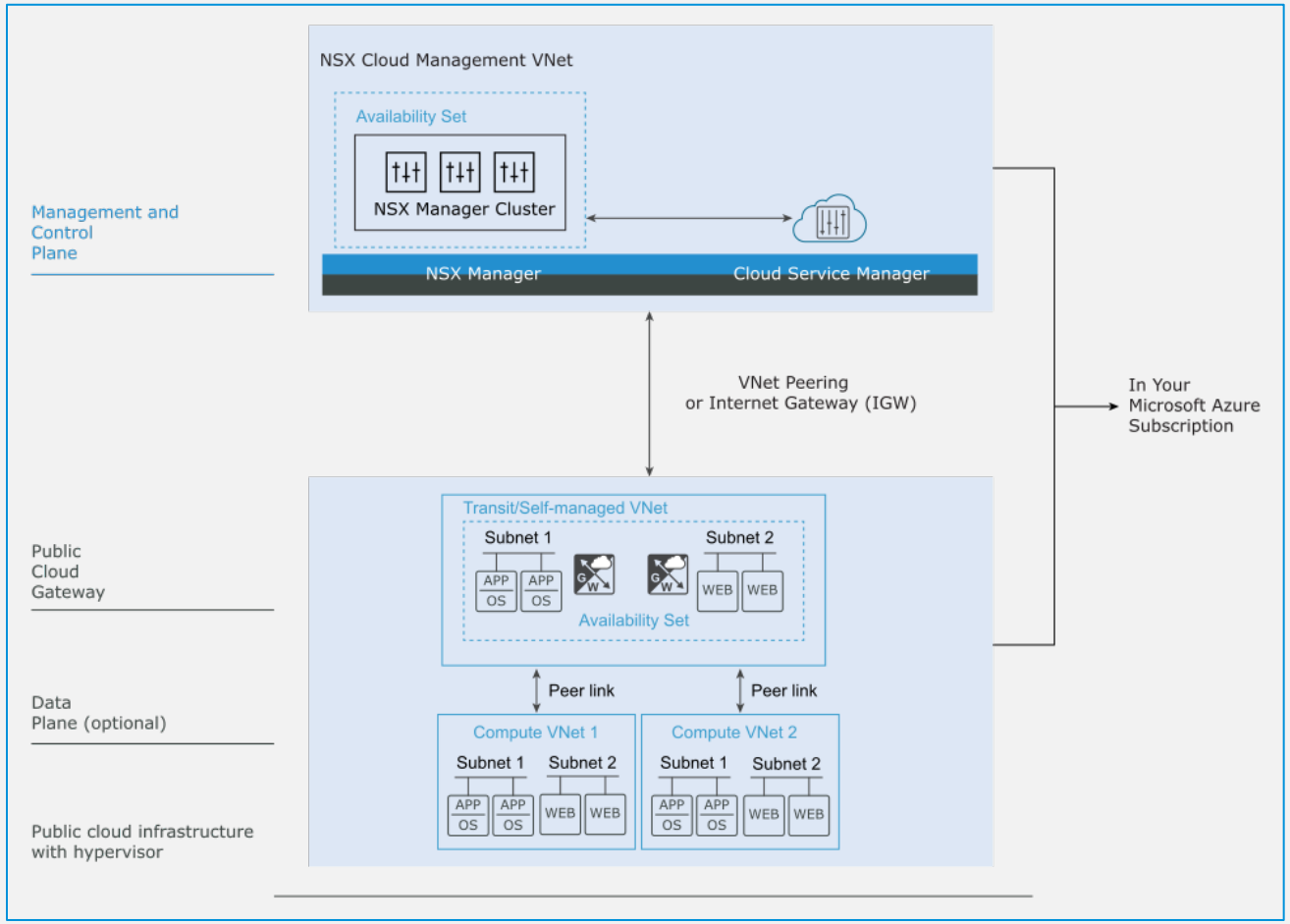


CSM Resiliency and UI Improvements

NSX Cloud

NSX Manager and Control Plane in Azure via Azure Marketplace and Terraform

NSX-T 3.1.1



Deployment of NSX Manager and CSM directly into an Azure VNet using Terraform Provider

- Azure Marketplace and Terraform provider will be available after Azure VHD submission approvals

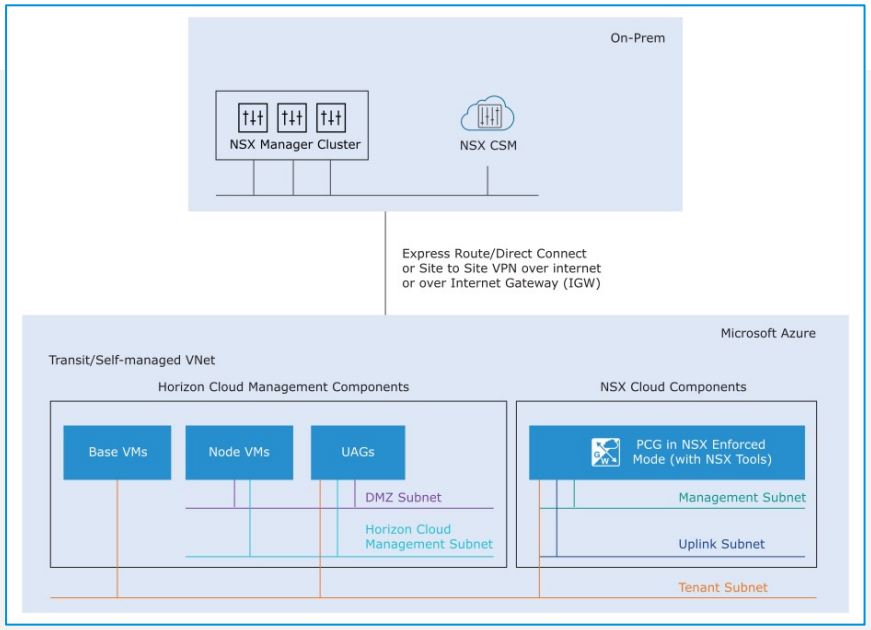
No on-premises NSX-T presence required

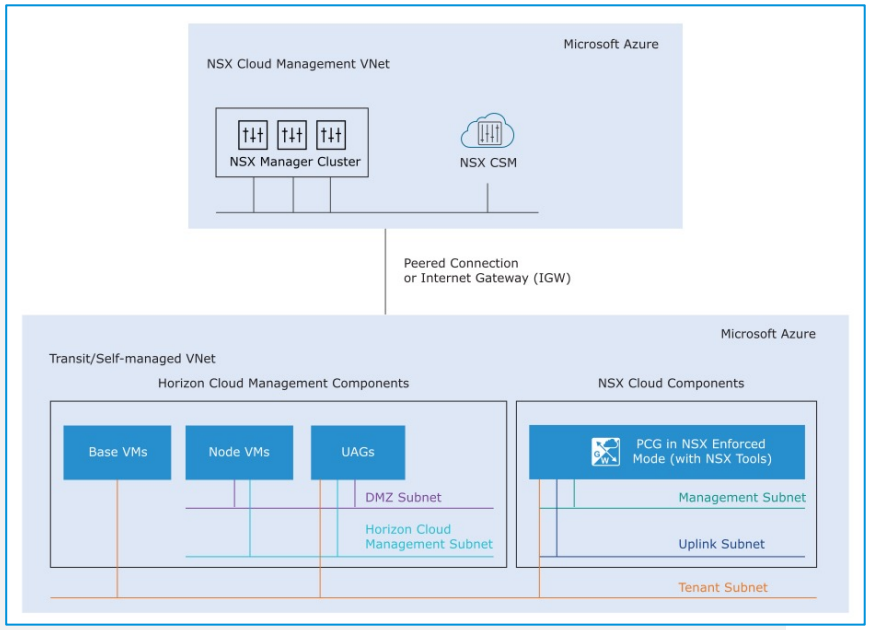
- *Federation not supported

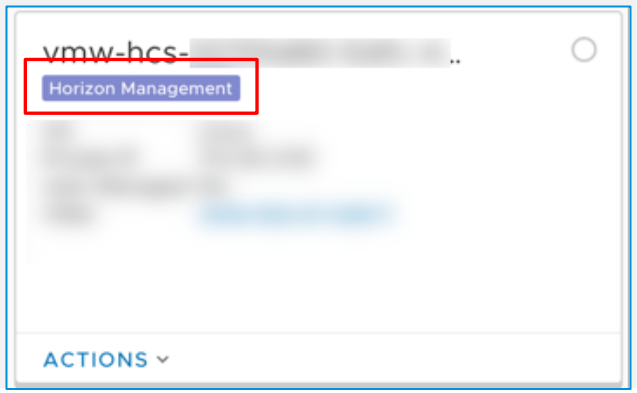
NSX Cloud

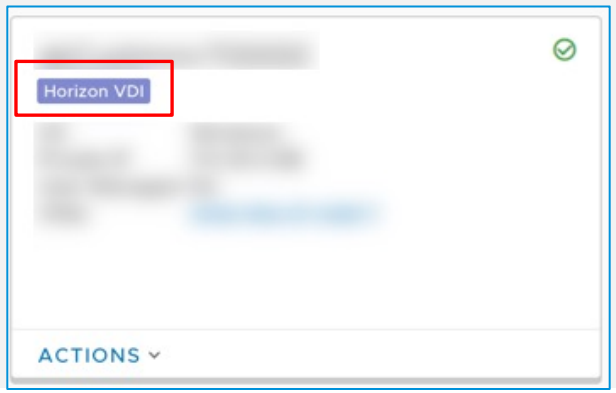
Horizon Cloud Day-0 Installation and Coordination

NSX-T 3.1.1









Supported for NSX Manager deployed in Azure or on-premises

- Native Azure NSX deployment

NSX Tools can be automatically installed into the base image

NSX Cloud differentiates HCS on Azure Components

Auto-created security policies for Horizon Cloud components and VDI machines

What's New in NSX-T 3.1.1

Platform Security

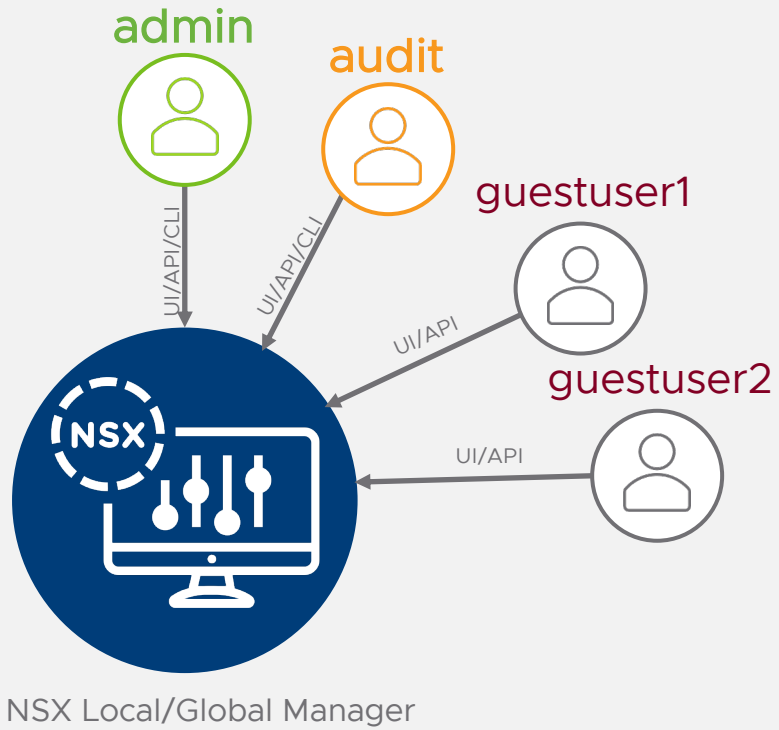
PM: Rajiv Prithvi
TPM: Ganapathi Bhat

February 2021

Platform - Security

NSX-T ”Local” Users - Overview

NSX-T 3.1.1



Overview

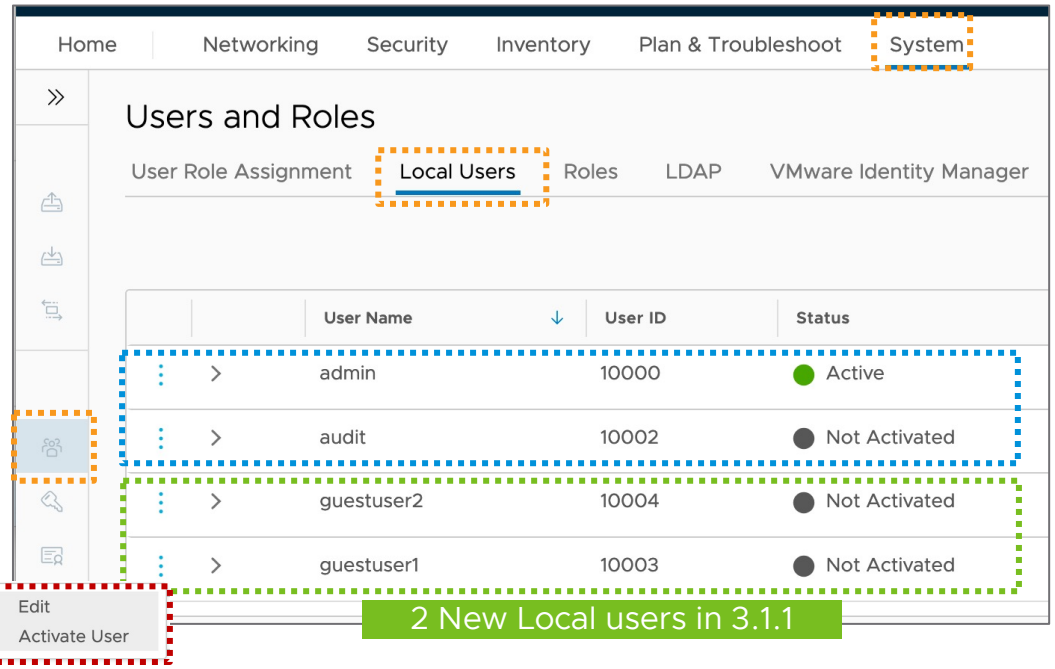
- NSX has following system created Local users on both Local Manager and Global Manager:
  - admin -> UI/API/CLI
  - audit-> UI/API/CLI
  - guestuser1-> UI/API (New in 3.1.1)
  - guestuser2 -> UI/API (New in 3.1.1)
  - root* -> CLI`
- By default, local users audit, guestuser1 & guestuser2 are inactive
- Cannot add/delete local users, but can be renamed
- **RBAC role can be changed only to ”guestuser1 & guestuser2” , default “auditor” (network admin/security admin)**
- Option to add remote users using LDAP/VIDM** integration with different RBAC role
- With NSX Manager cluster, Resetting local user password on one automatically sync’s that to other nodes in the cluster

*-> Shell User-Mainly for advanced level of debugging with VMware support only.
**-> As of 3.1.X - NSX Global Manager supports only VIDM .

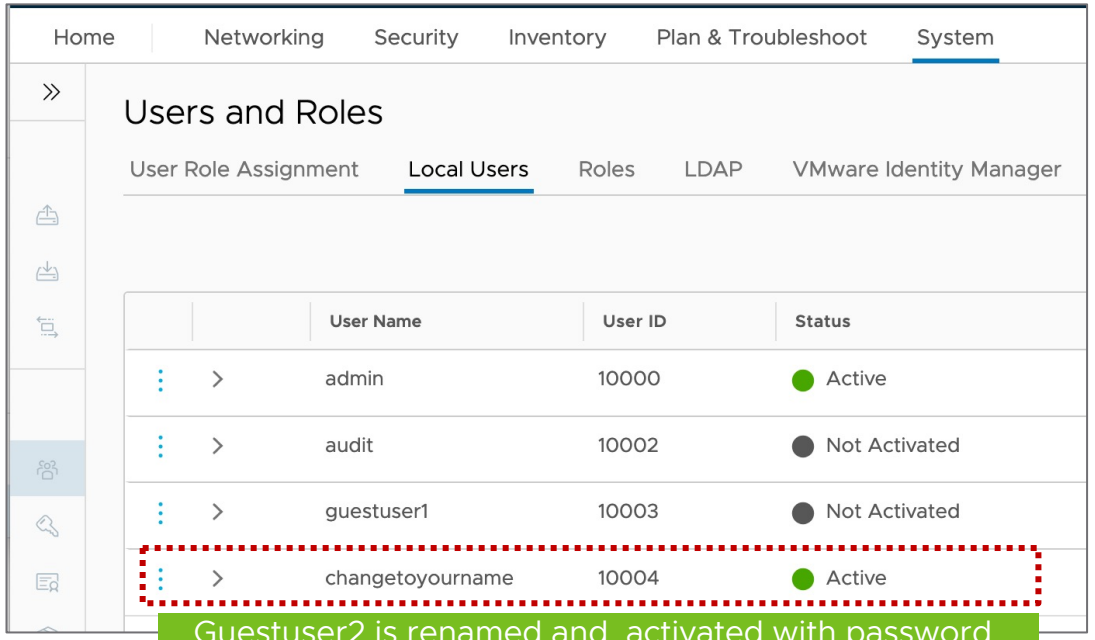
Platform - Security

UI Page for Users & RBAC Roles

NSX-T 3.1.1

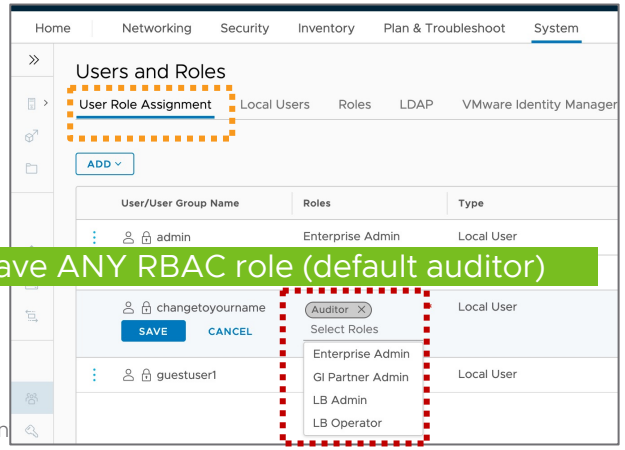


2 New Local users in 3.1.1

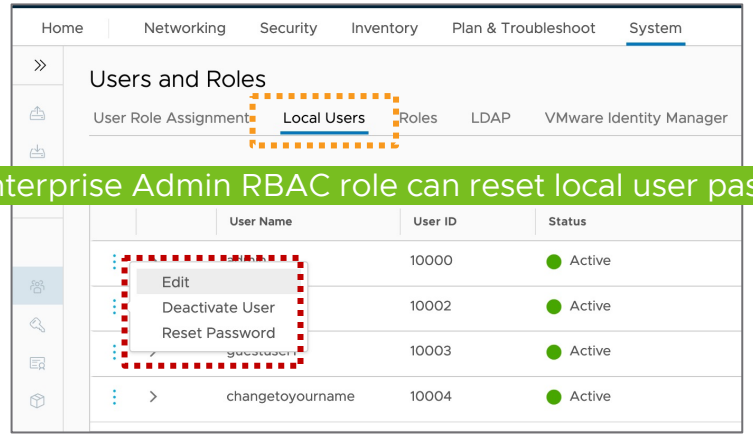


Guestuser2 is renamed and activated with password.

New Local Users can have ANY RBAC role (default auditor)



User with Enterprise Admin RBAC role can reset local user password



What's New in NSX-T 3.1.1

OSPF

PM: Jerome Catrouillet
TPM: Nicolas Michel

February 2021

OSPF

OSPF Generalities

NSX-T 3.1.1 supports OSPFv2 described in RFC2328.

Open Shortest Path First is a link state routing protocol and is considered as an IGP.

IGP (Interior Gateway Protocol): Advertise routes within an Autonomous System.(OSPF, RIP, IS-IS, EIGRP)

EGP (Exterior Gateway Protocol): Advertise routes between Autonomous Systems. eBGP is the only EGP nowadays.

OSPF is a link state routing protocol based on the Dijkstra Shortest Path First Algorithm to compute routes.

- Distance Vector routing protocol: Advertise the best path (metric or distance) to all neighbors.
- Link State routing protocol: Advertise links information (status) into a database (LSDB) and compute a map of the network. Support network hierarchies (areas). Converge faster than Distance Vector and scales better.

OSPF Resources: Vault (https://vault.vmware.com/group/nsx/l3-t)

OSPF

OSPF Generalities - Operations

1 - Build Adjacency:

- OSPF enabled routers try to establish an adjacency by sending ”Hello” packets. Adjacency is established if parameters match between the routers. (Timers/Subnet mask/MTU etc..)

2 - LSA flooding:

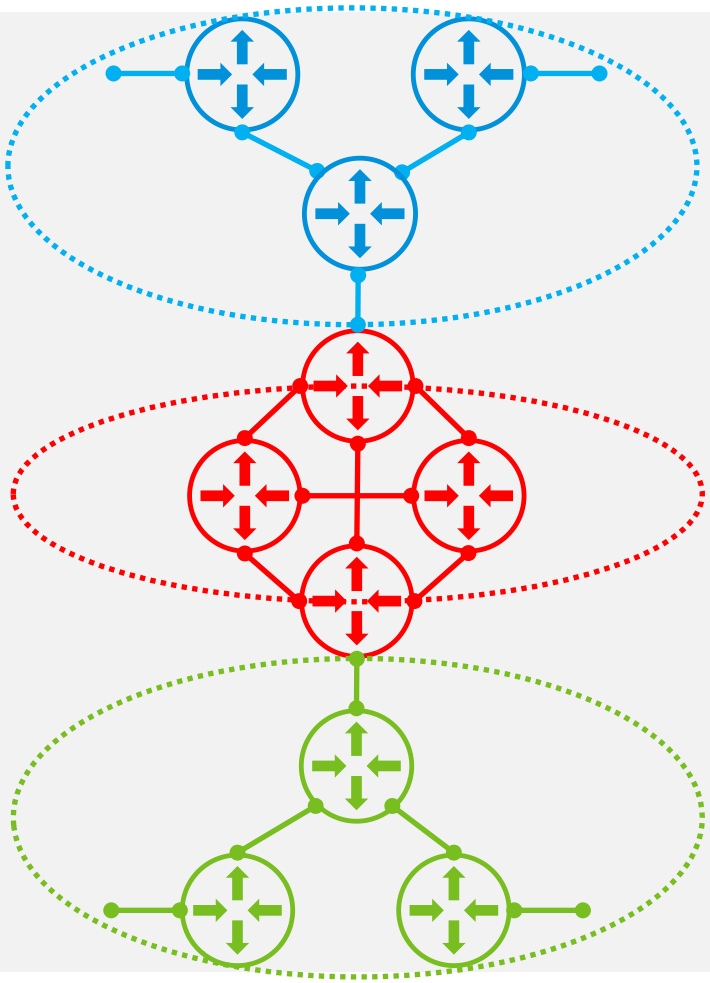
- Link state advertisement are information regarding links/interfaces and their status. These LSA are flooded router to router within an area. Multiple types of LSA: Router - Network – Summary – Summary ASBR – External – Multicast – NSSA etc …
- These LSAs are injected into a Link State Database.
- To optimize LSA flooding, OSPF elects a Designated Router (DR) and Backup Designated Router (BDR) using priority. A Tier-0 gateway will never be elected DR/BDR (priority 0)

3 – Dijkstra Computation and routing table processing:

- Each router will create a map of the networking topology based on the LSA flooded previously (Shortest Path to each destination).

OSPF

OSPF and Areas



OSPF Area 10

OSPF Area 0
”Backbone”

OSPF Area 20

OSPF Routers in an Area have the same detailed topology for their own area only. (no detailed knowledge of the topology of another area to reduce CPU burden).

An OSPF router can have links in different areas (ABR). NSX-T supports 1 Area per gateway (no ABR functionality).

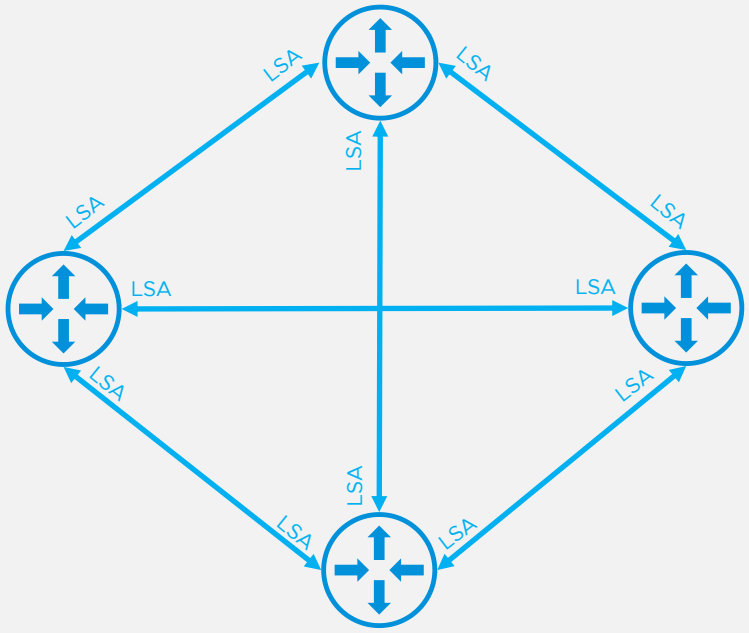
A link can be in only one area

OSPF routers in area 10 only needs to know how to exit their area.

Area 0 exchanges the routing information to other areas

OSPF

OSPF and Areas



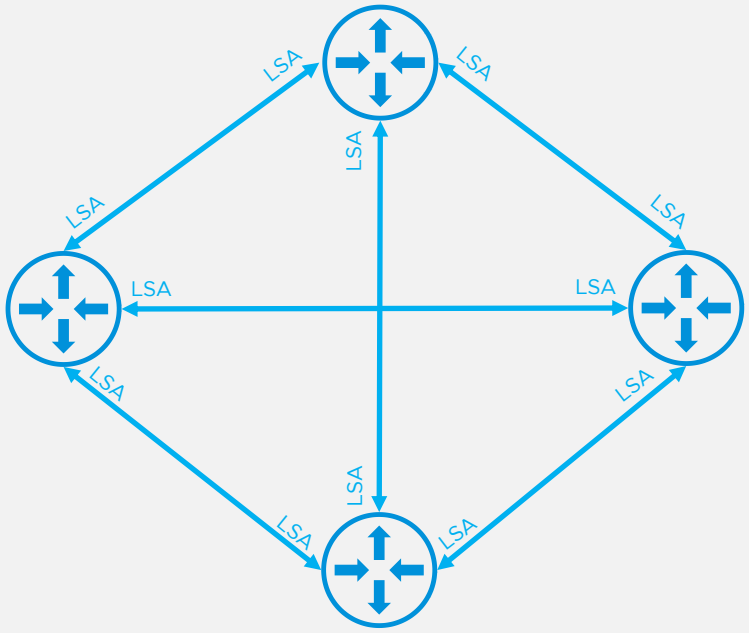
OSPF Area 10

After an Adjacency has been established, OSPF Routers will flood LSAs (Link State Advertisement) to all OSPF neighbors. There are multiple types of LSAs :

- Type 1: Router LSA (Interfaces - neighbors)
- Type 2: Transit subnets for Broadcast network (not used in P2P)
- Type 3: Summary LSA. LSA sent from an ABR inside an Area
- Type 4: ASBR LSA
- Type 5: External LSA
- Type 7: NSSA

OSPF

OSPF and Areas



OSPF Area 10

LSA Database must be identical for each node in the area.

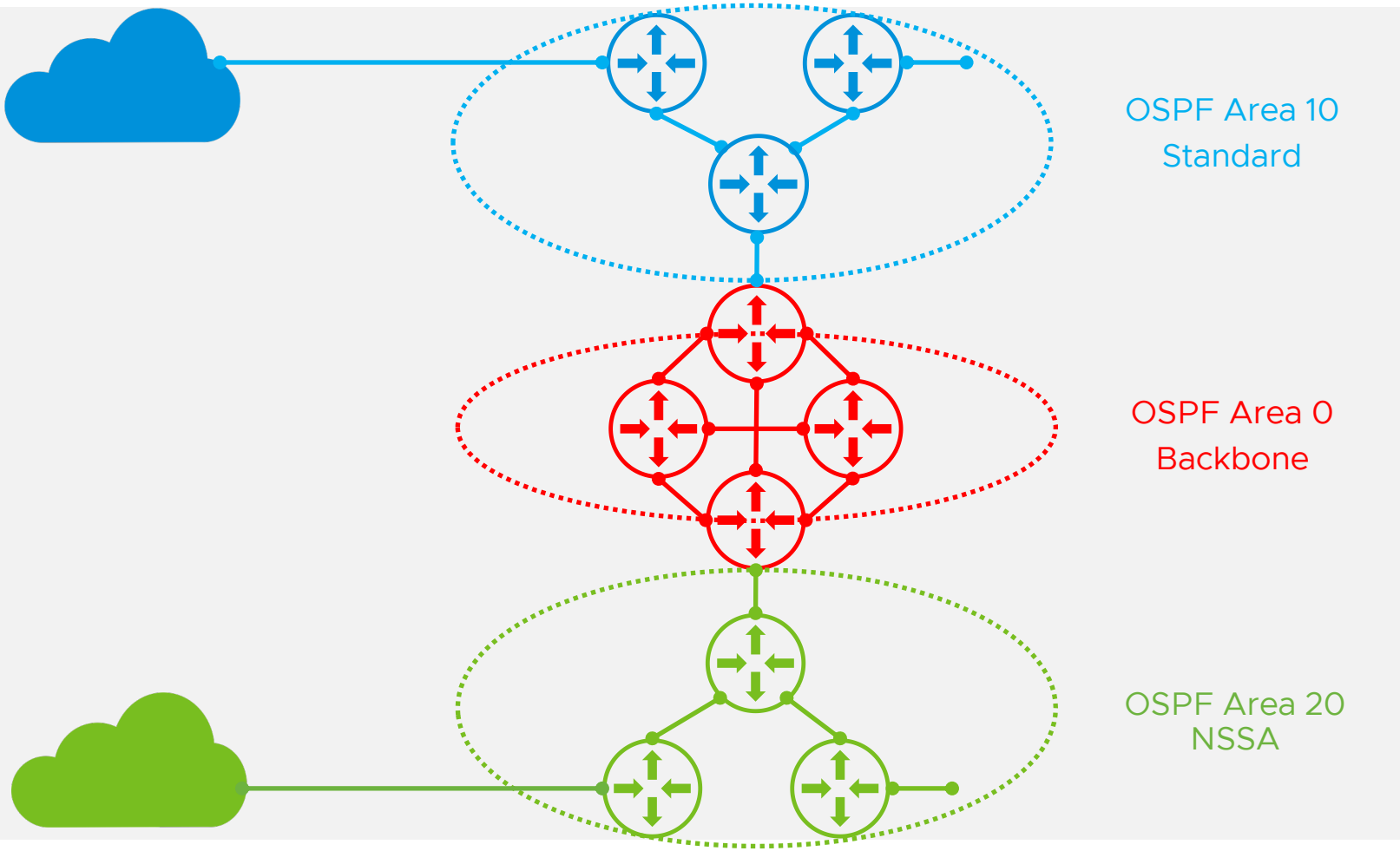
Each Router will compute a map of the topology in the area.

When a link fails, the router will flood its LSAs to all OSPF routers in the area which will trigger another Dijkstra computation

OSPF

NSX-T and Areas

NSX-T 3.1.1



Standard Area: Non backbone area that needs to be connected to a backbone area (OSPF area 10) using an ABR (Area Border Router). External LSA (type 5) can be injected in that kind of area.

Backbone Area: Must be design with redundancy in mind and cannot be partitioned. Has knowledge of the entire topology. Inter Area Traffic must flow through it.

Not so Stubby Area: Does not allow "External LSA" (Type 5) to be injected but will rather use "Not so Stubby" LSA (Type 7). Routes will be advertised into OSPF as "N2" instead of "E2". Lower the amount of LSAs (no Type 5 LSA. Instead, a Default is injected into the Area). Use for scale

Virtual links are not supported.

OSPF

OSPF Adjacencies

NSX-T 3.1.1

Before sending LSAs in an OSPF area, a router needs to establish an adjacency with another OSPF peer. Adjacencies are established using “hello” packets.

An OSPF router identifies itself within the area using a unique ID: “router-id”. In NSX-T 3.1.1, the OSPF router-id is inherited from BGP when an interface is configured on a Tier-0. (Behavior currently discussed between Engineering and PM/TPM).

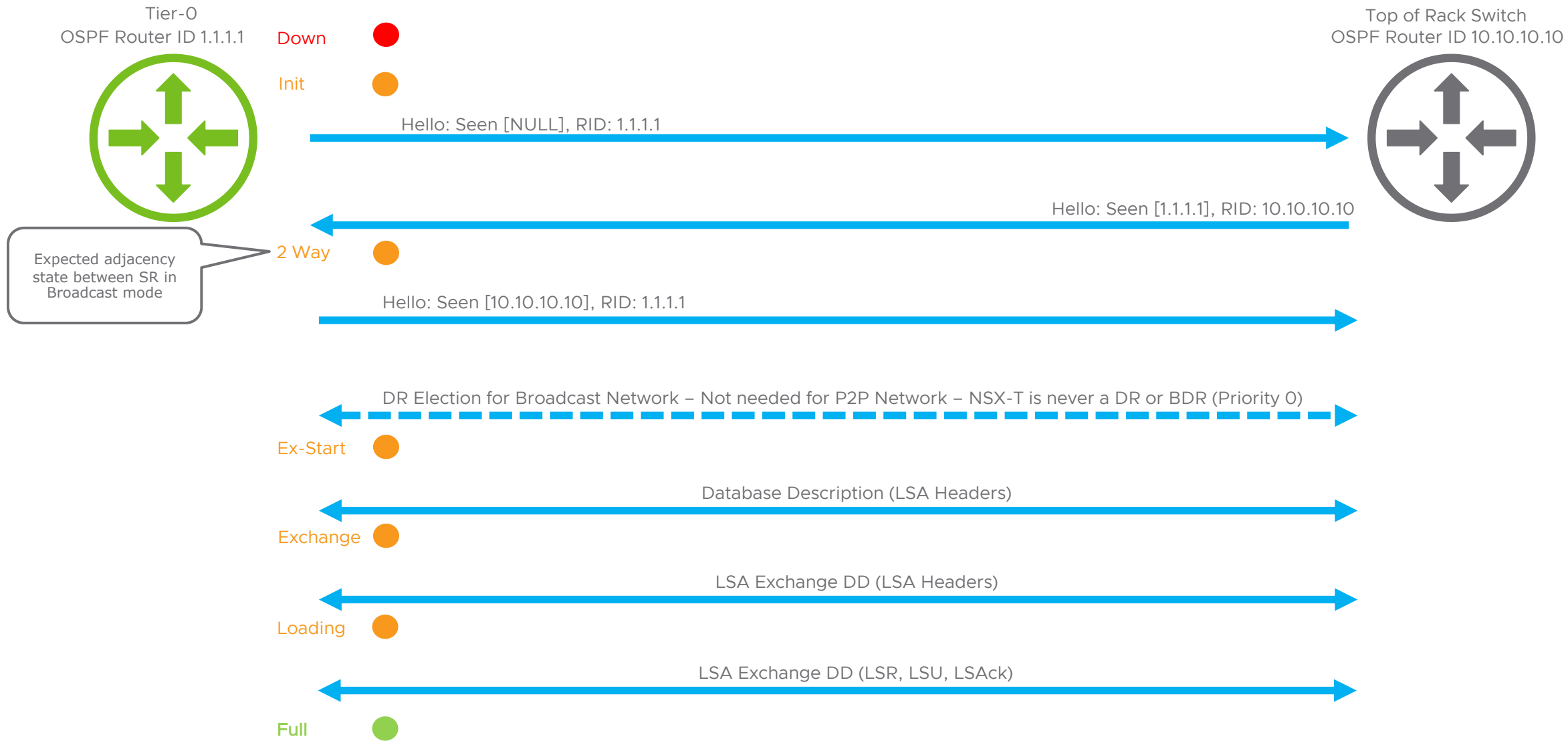
Some Parameters in the Hello packets (Dst IP: 224.0.0.5 – All SPF Routers) must match between OSPF peers to establish a proper and healthy adjacency:

- Area
- Subnet Mask configured on that interface
- MTU
- OSPF Timers (Hello / Dead)
- Interface Type (P2P / Broadcast …)
- Router Priority
- Unique Router-ID

OSPF

OSPF Adjacencies

NSX-T 3.1.1

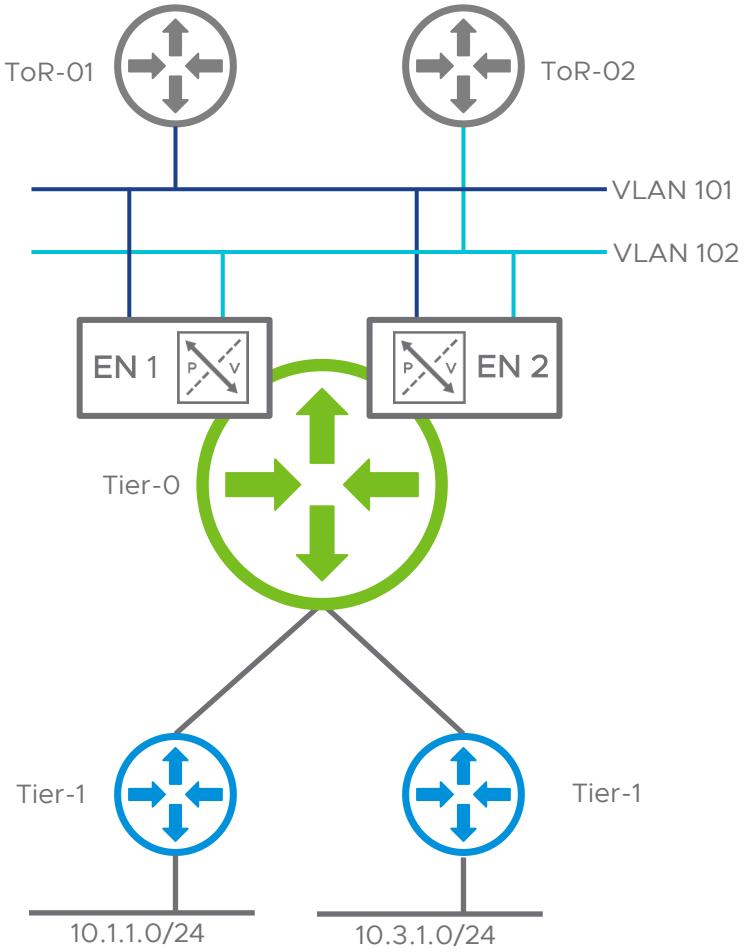


OSPF

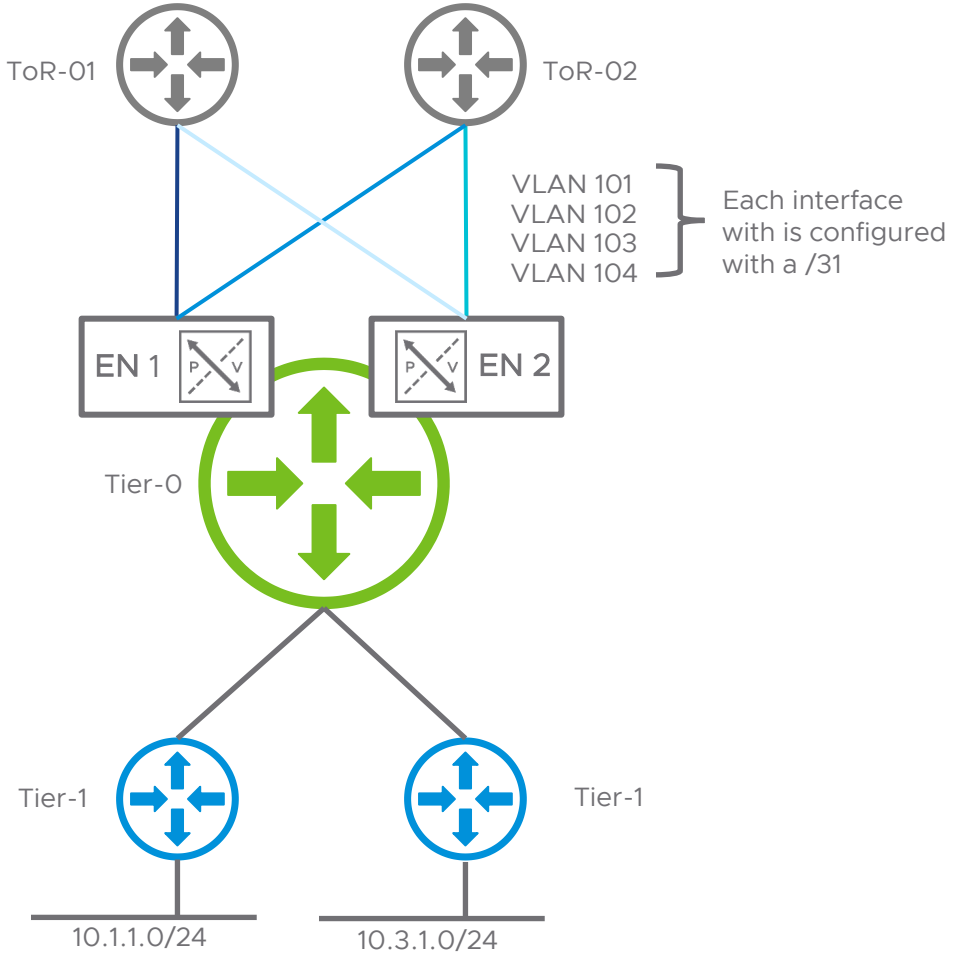
OSPF Adjacencies

NSX-T 3.1.1

NSX-T 3.1.1 support interfaces to be configured as Point to Point or Broadcast for OSPF



Broadcast



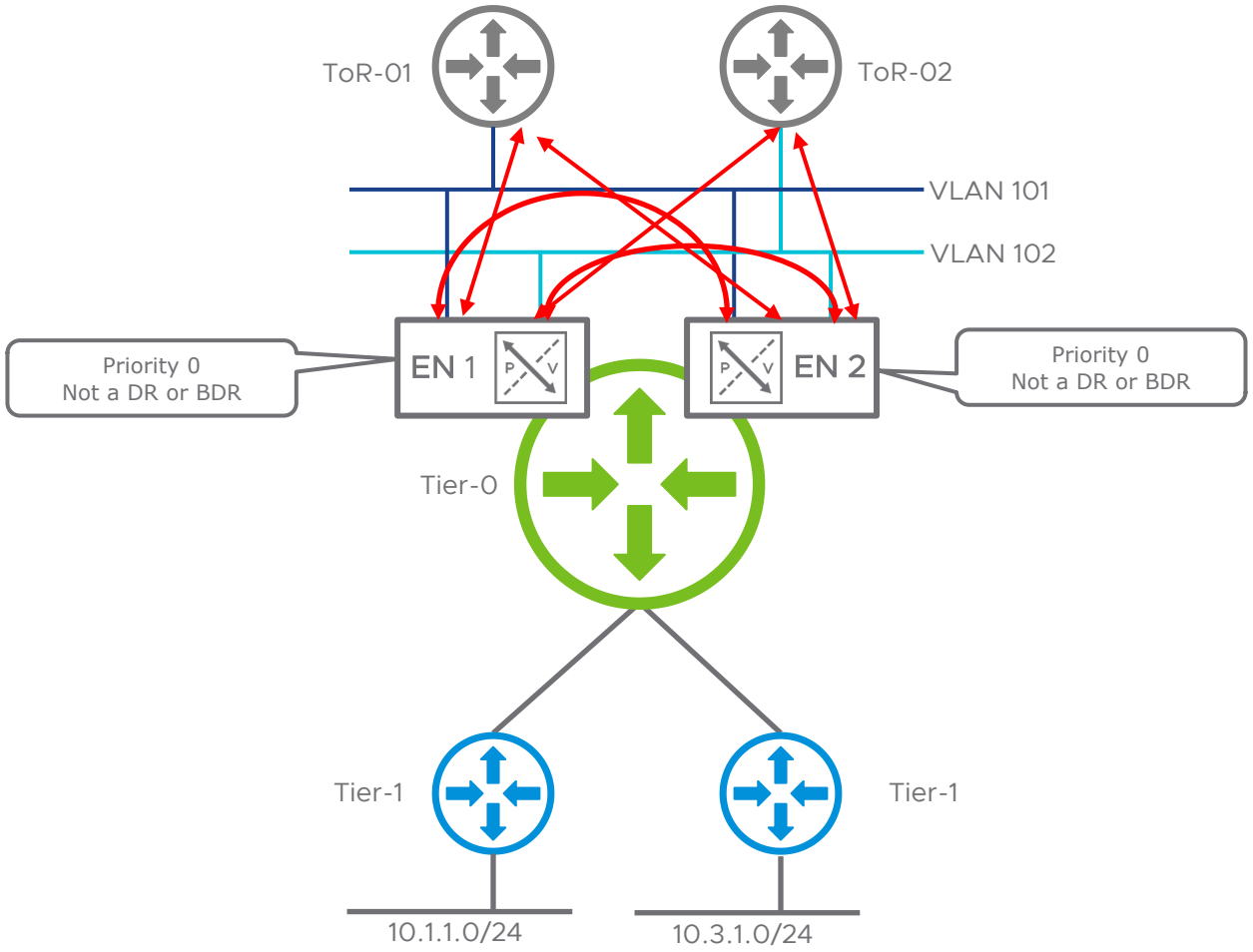
Point to Point

OSPF

OSPF Adjacencies – Broadcast

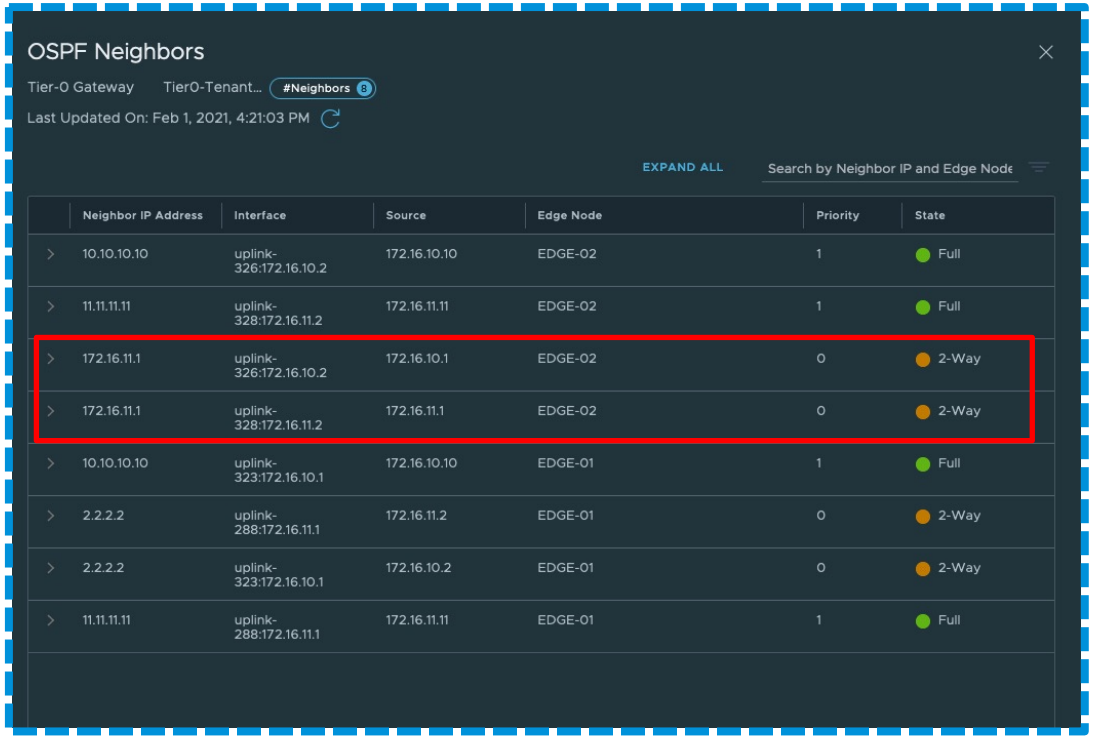
NSX-T 3.1.1

NSX-T 3.1.1 support interfaces to be configured as Broadcast.



Broadcast

DR/BDR election: NSX-T Priority=0

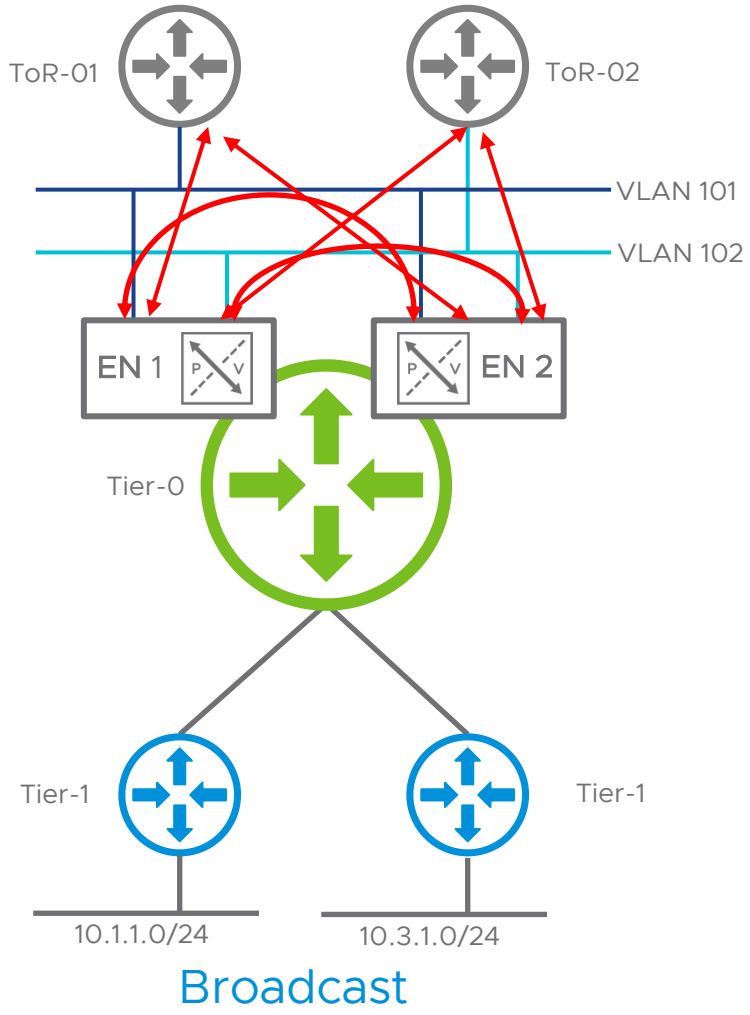


A router will only form an OSPF adjacency on a broadcast network with a DR/BDR

OSPF

OSPF Adjacencies – Broadcast

NSX-T 3.1.1

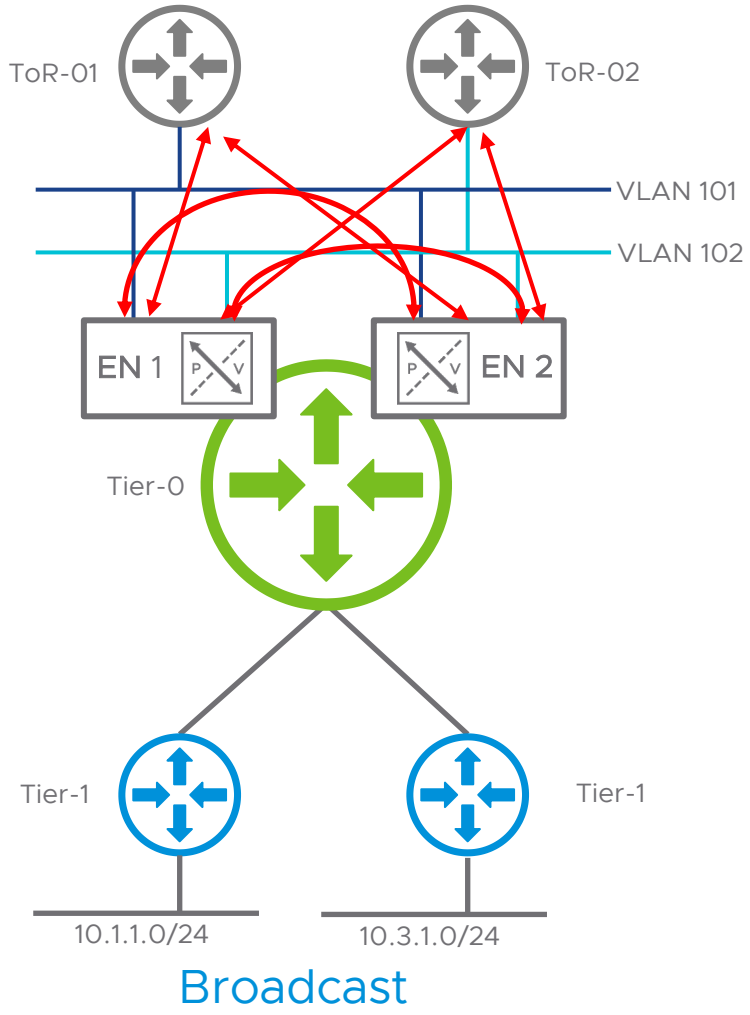



```
SRV-EDGE-01(tier0_sr)> get ospf interface
uplink-288 is up
  ifindex 24, MTU 9000 bytes, BW 0 Mbit <UP,BROADCAST,RUNNING,MULTICAST>
  Internet Address 172.16.11.1/24, Broadcast 172.16.11.255, Area 0.0.0.0
  MTU mismatch detection: enabled
  Router ID 172.16.11.1, Network Type BROADCAST, Cost: 10
  Transmit Delay is 1 sec, State DROther, Priority 0
  Designated Router (ID) 11.11.11.11, Interface Address 172.16.11.11
  No backup designated router on this network
  Multicast group memberships: OSPFAllRouters
  Timer intervals configured, Hello 10s, Dead 40s, Wait 40s, Retransmit 5
    Hello due in 1.007s
  Neighbor Count is 2, Adjacent neighbor count is 1
  Authentication NULL is enabled
uplink-323 is up
  ifindex 20, MTU 9000 bytes, BW 0 Mbit <UP,BROADCAST,RUNNING,MULTICAST>
  Internet Address 172.16.10.1/24, Broadcast 172.16.10.255, Area 0.0.0.0
  MTU mismatch detection: enabled
  Router ID 172.16.11.1, Network Type BROADCAST, Cost: 10
  Transmit Delay is 1 sec, State DROther, Priority 0
  Designated Router (ID) 10.10.10.10, Interface Address 172.16.10.10
  No backup designated router on this network
  Multicast group memberships: OSPFAllRouters
  Timer intervals configured, Hello 10s, Dead 40s, Wait 40s, Retransmit 5
    Hello due in 1.007s
  Neighbor Count is 2, Adjacent neighbor count is 1
  Authentication NULL is enabled
```

OSPF

OSPF Adjacencies – Broadcast

NSX-T 3.1.1



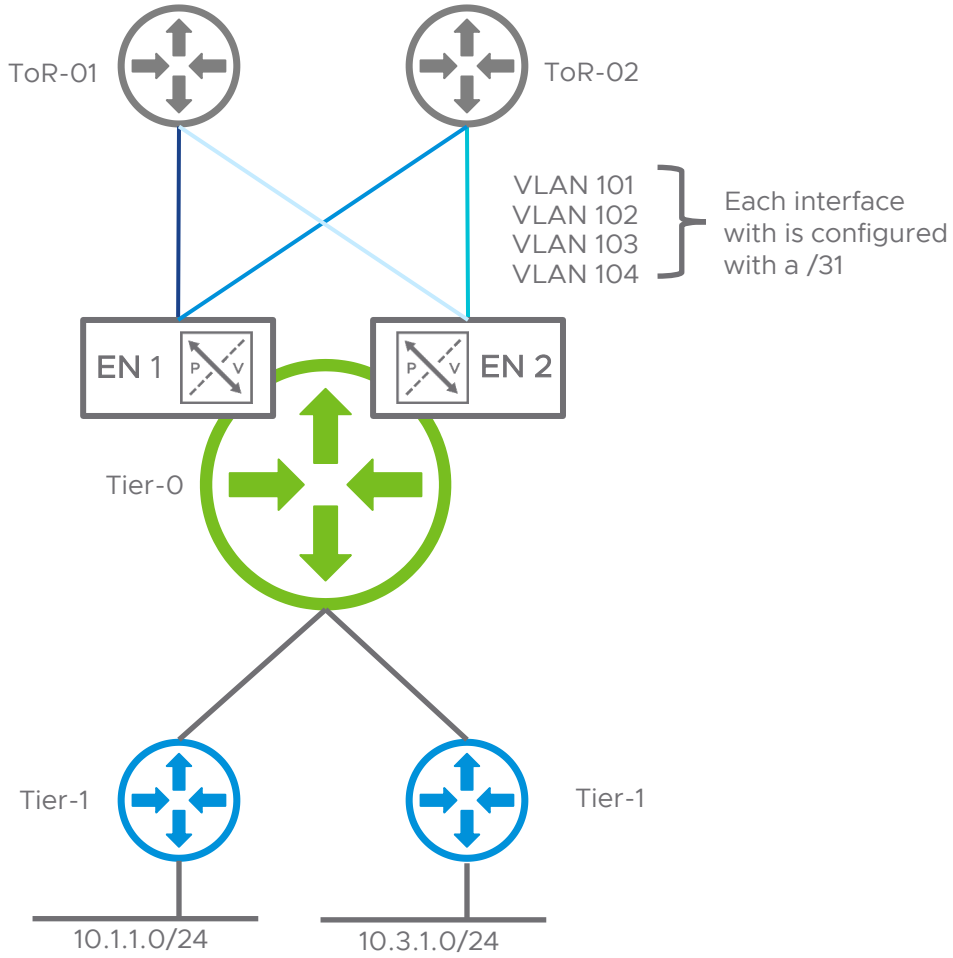

```
SRV-EDGE-01(tier0_sr)> get ospf neigh

Neighbor ID     Pri State           UpTime      Dead Time Address         Interface                RXmtL RqstL DBsmL
2.2.2.2           0 2-Way/DROther   4h03m26s    36.806s   172.16.11.2     uplink-288:172.16.11.1   0     0     0
11.11.11.11       1 Full/DR         4h04m07s    31.441s   172.16.11.11    uplink-288:172.16.11.1   0     0     0
2.2.2.2           0 2-Way/DROther   4h03m26s    36.808s   172.16.10.2     uplink-323:172.16.10.1   0     0     0
10.10.10.10       1 Full/DR         4h04m07s    37.409s   172.16.10.10    uplink-323:172.16.10.1   0     0     0
```

OSPF

OSPF Adjacencies – Point to Point

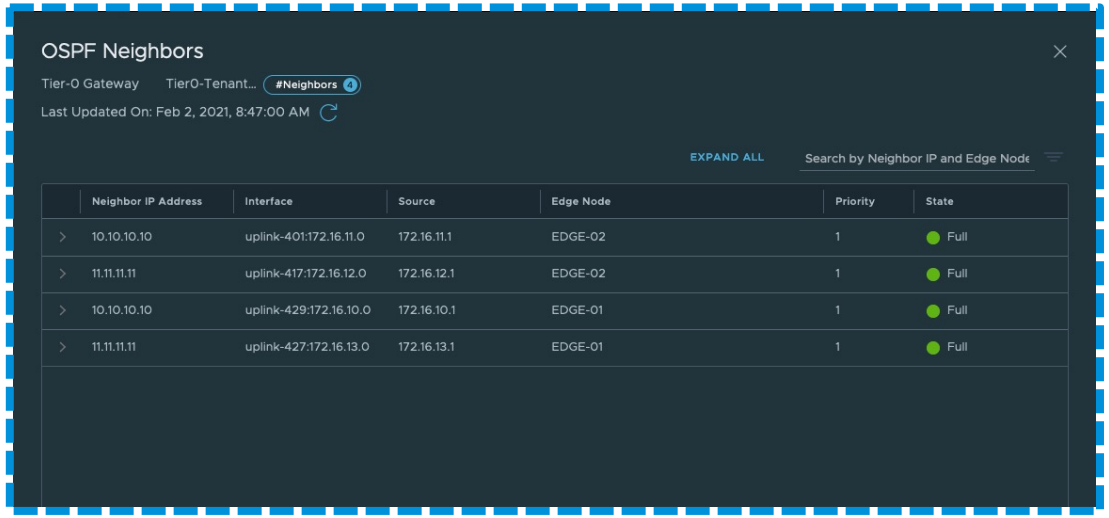
NSX-T 3.1.1

NSX-T 3.1.1 support interfaces to be configured as Point to Point. (strongly recommended)



Point to Point

No DR/BDR Election

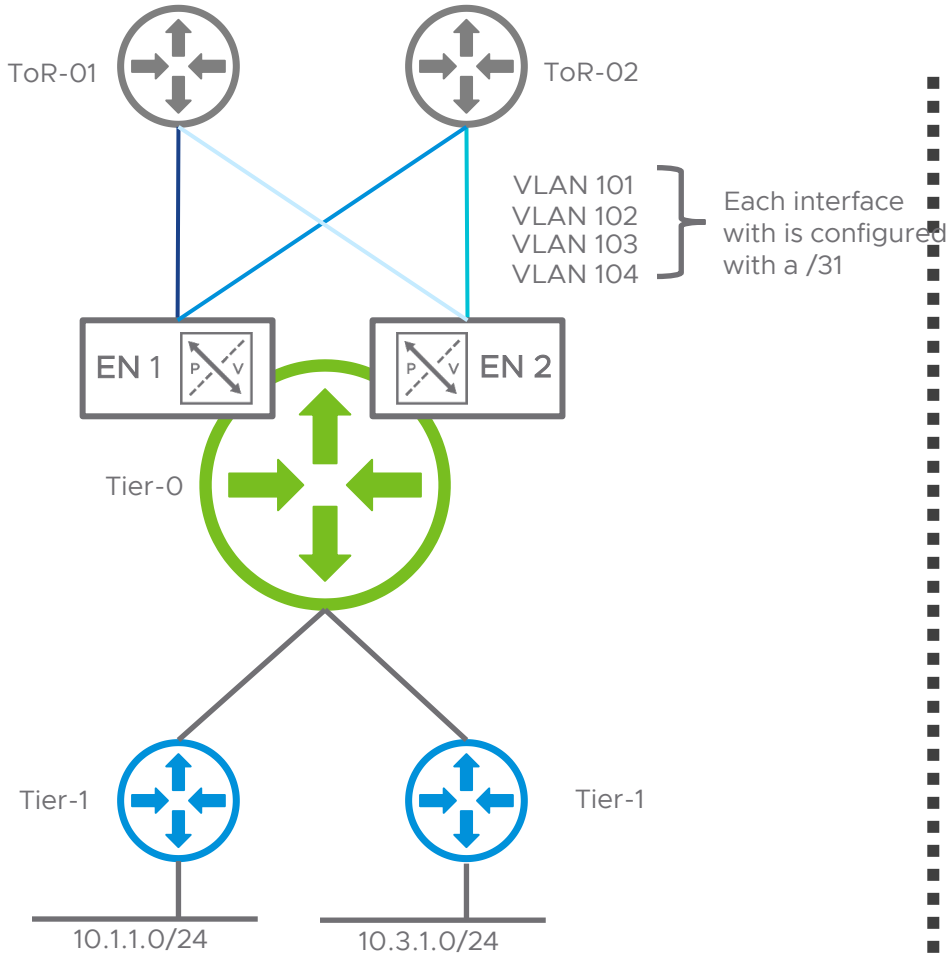


Simpler output and less adjacencies to track

OSPF

OSPF Adjacencies – Point to Point

NSX-T 3.1.1

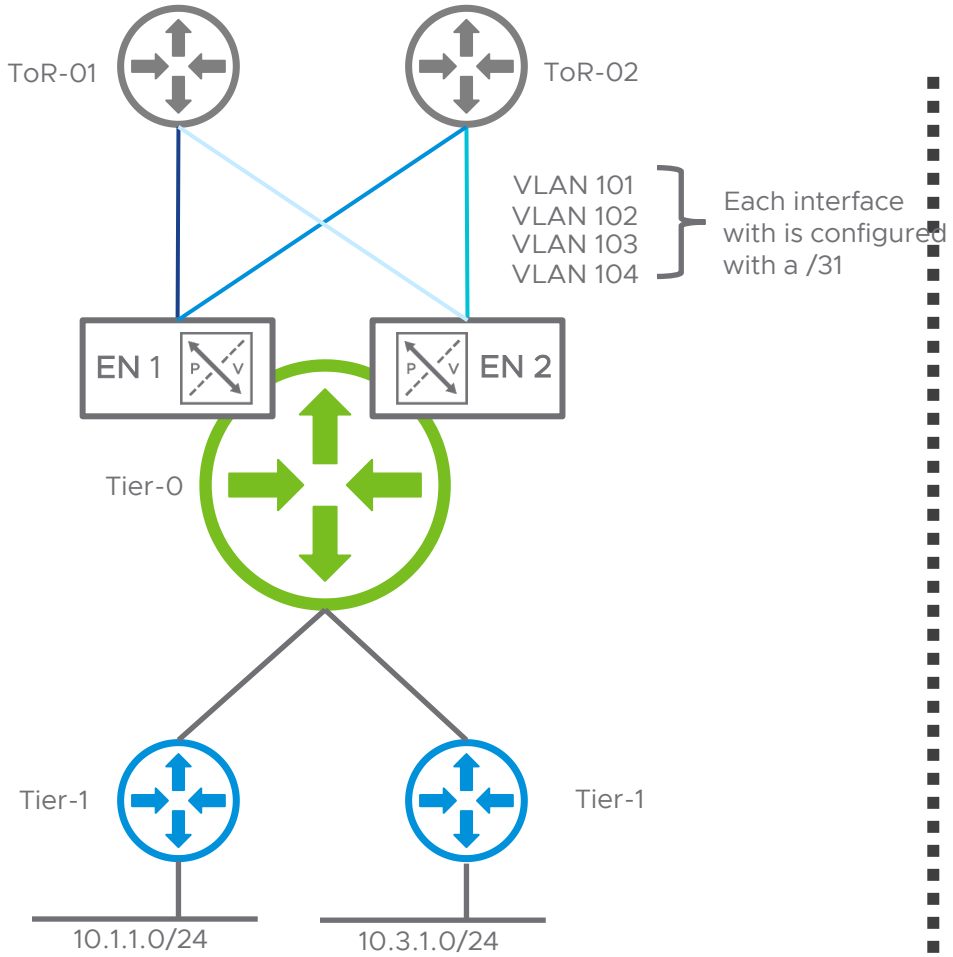



```
SRV-EDGE-01(tier0_sr)> get ospf interface
uplink-427 is up
  ifindex 37, MTU 9000 bytes, BW 0 Mbit <UP,BROADCAST,RUNNING,MULTICAST>
  Internet Address 172.16.13.0/31, Area 0.0.0.0
  MTU mismatch detection: enabled
  Router ID 1.1.1.1, Network Type POINTOPOINT, Cost: 65534
  Transmit Delay is 1 sec, State Point-To-Point, Priority 0
  No backup designated router on this network
  Multicast group memberships: OSPFAllRouters
  Timer intervals configured, Hello 10s, Dead 40s, Wait 40s, Retransmit 5
    Hello due in 8.667s
  Neighbor Count is 1, Adjacent neighbor count is 1
  Authentication NULL is enabled
uplink-429 is up
  ifindex 40, MTU 9000 bytes, BW 0 Mbit <UP,BROADCAST,RUNNING,MULTICAST>
  Internet Address 172.16.10.0/31, Area 0.0.0.0
  MTU mismatch detection: enabled
  Router ID 1.1.1.1, Network Type POINTOPOINT, Cost: 65534
  Transmit Delay is 1 sec, State Point-To-Point, Priority 0
  No backup designated router on this network
  Multicast group memberships: OSPFAllRouters
  Timer intervals configured, Hello 10s, Dead 40s, Wait 40s, Retransmit 5
    Hello due in 8.668s
  Neighbor Count is 1, Adjacent neighbor count is 1
  Authentication NULL is enabled
```

OSPF

OSPF Adjacencies – Point to Point

NSX-T 3.1.1



Point to Point

```
SRV-EDGE-01(tier0_sr)> get ospf neighbor

Neighbor ID     Pri State    UpTime  Dead Time Address         Interface
11.11.11.11       1 Full/-   9m22s   37.788s   172.16.13.1     uplink-427:172.16.13.0
10.10.10.10       1 Full/-   9m30s   39.795s   172.16.10.1     uplink-429:172.16.10.0
```

OSPF

OSPF Support in NSX-T 3.1.1

NSX-T 3.1.1

Active-Active and Active-Standby topologies are supported.

OSPF v2 only support. IPv6 workloads need BGP and IPv6 address family.

BFD Support with OSPFv2 (BM: 50ms – VM: 500ms – Multiplier: 3)

OSPF v2 support in the Parent Tier-0 Gateway only.

- Not currently supported on a Tier-0 VRF.
- Not currently supported for Federation.

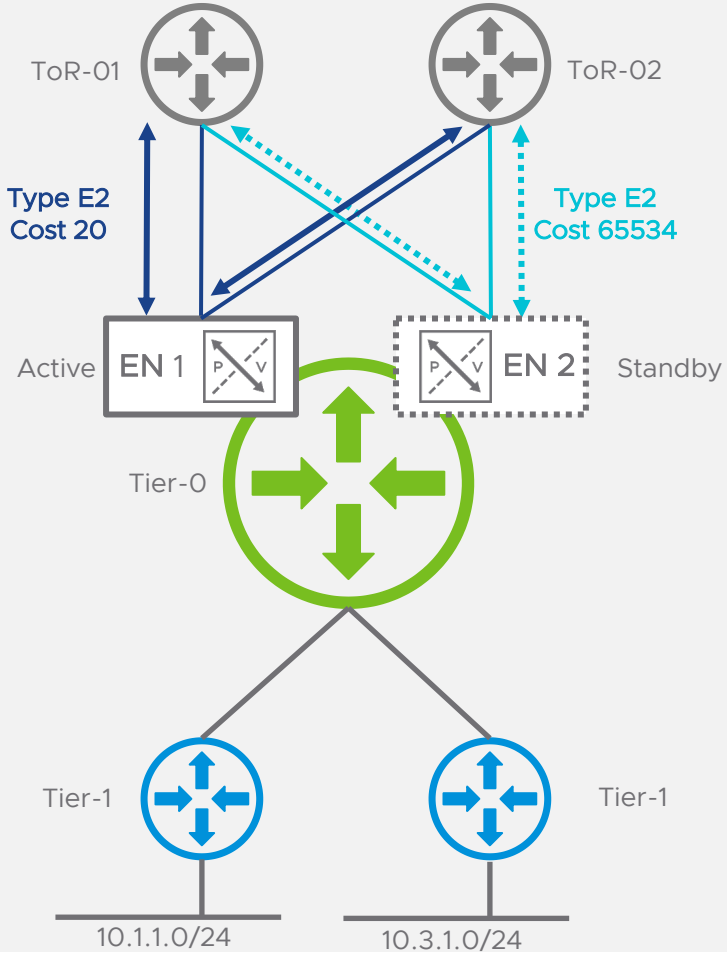
A Single Area per Tier-0 is supported (No ABR functionality). No Inter SR Routing needed (LSDB is identical within an area).

- Backbone (Area 0)
- Non-Backbone
- NSSA (Not so Stubby)

OSPF

Active/Standby Topology

NSX-T 3.1.1



Standby Tier-0 is still active from an OSPF standpoint.

Standby Tier-0 will use OSPF cost to influence routing decision on ToR-A and ToR-B.

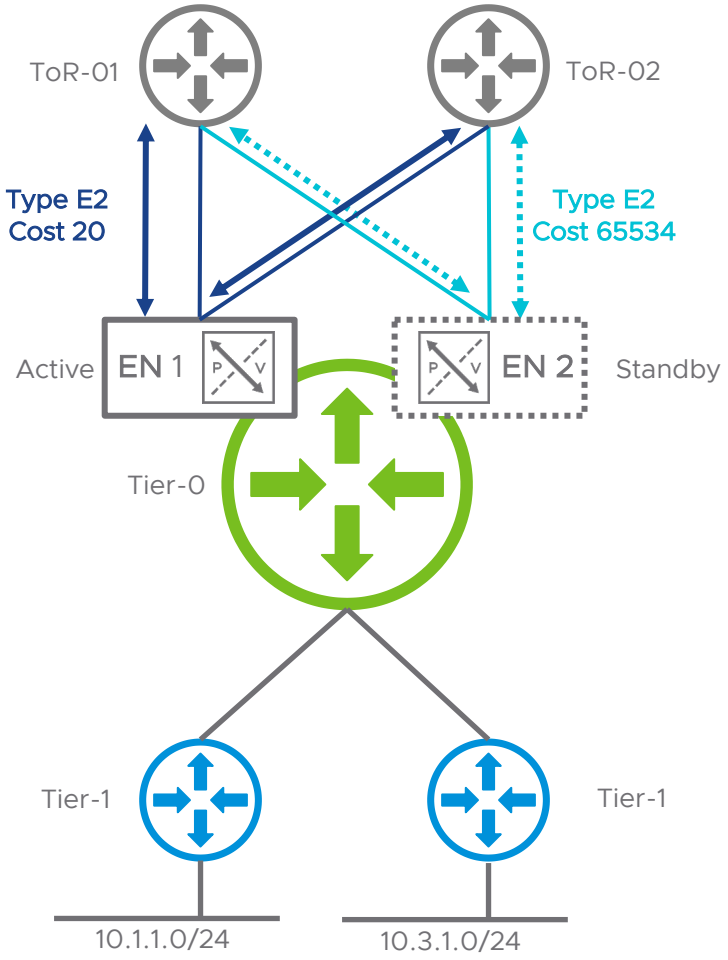
Metrics sent by standby Tier-0 is 65534

OSPF

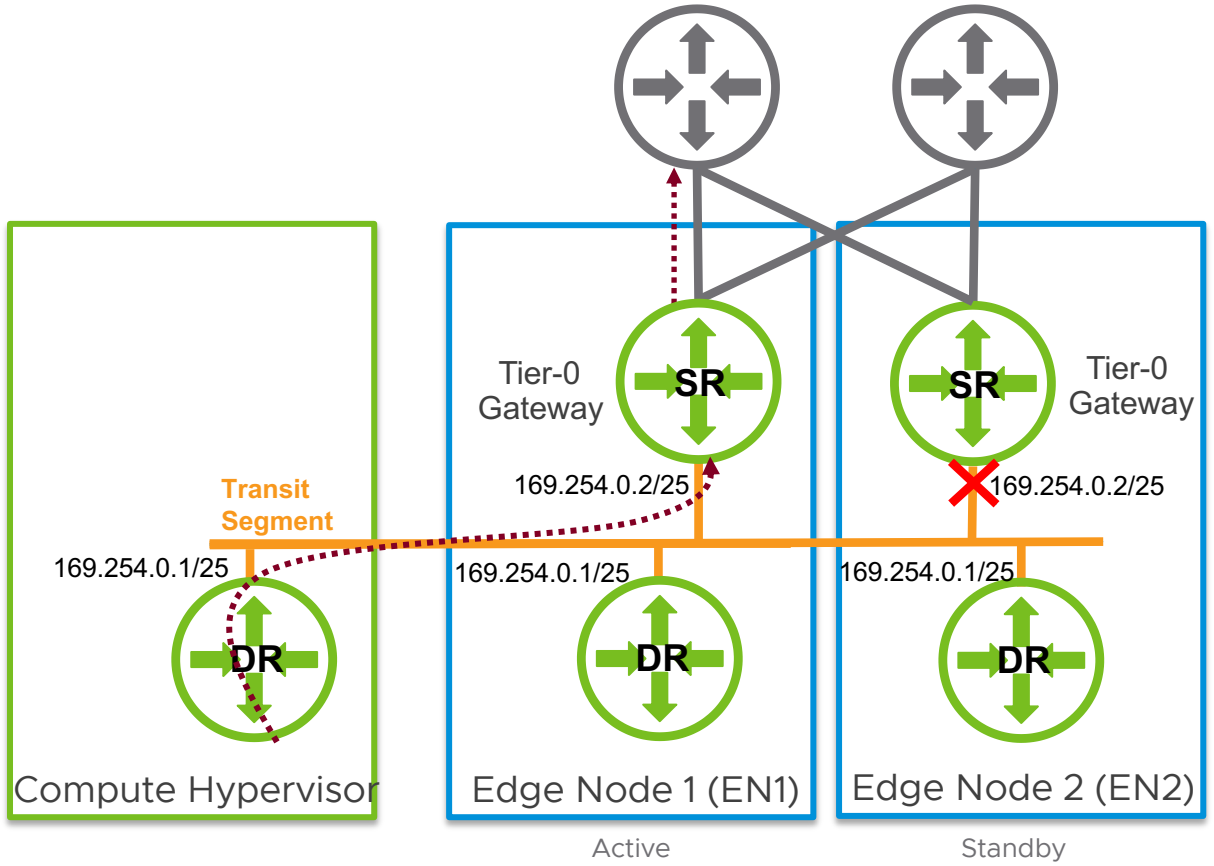
Active/Standby Topology

NSX-T 3.1.1

Logical Topology



Physical Topology

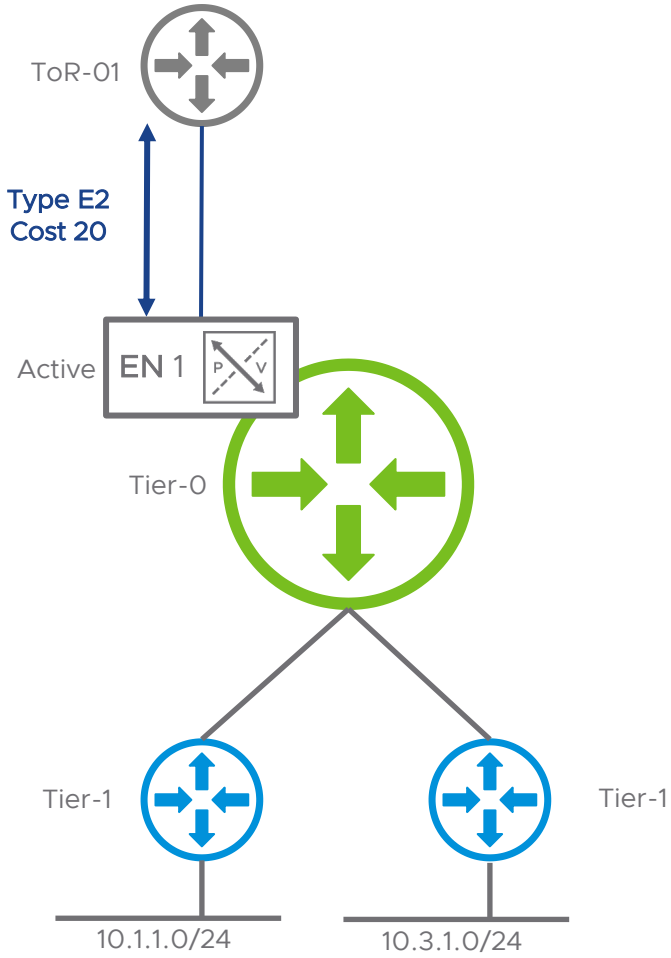


OSPF

Active/Standby Topology – ToR Verification

NSX-T 3.1.1

```
cumulus@TOR-01:mgmt:~$ net show ospf database external 10.1.1.0

               AS External Link States

  LS age: 164
  Options: 0x2  : *|-|-|-|-|-|E|-
  LS Flags: 0x6
  LS Type: AS-external-LSA
  Link State ID: 10.1.1.0 (External Network Number)
  Advertising Router: 172.16.11.1
  LS Seq Number: 80000005
  Checksum: 0x9095
  Length: 36

  Network Mask: /24
        Metric Type: 2 (Larger than any link state path)
        TOS: 0
        Metric: 20
        Forward Address: 0.0.0.0
        External Route Tag: 4016
```

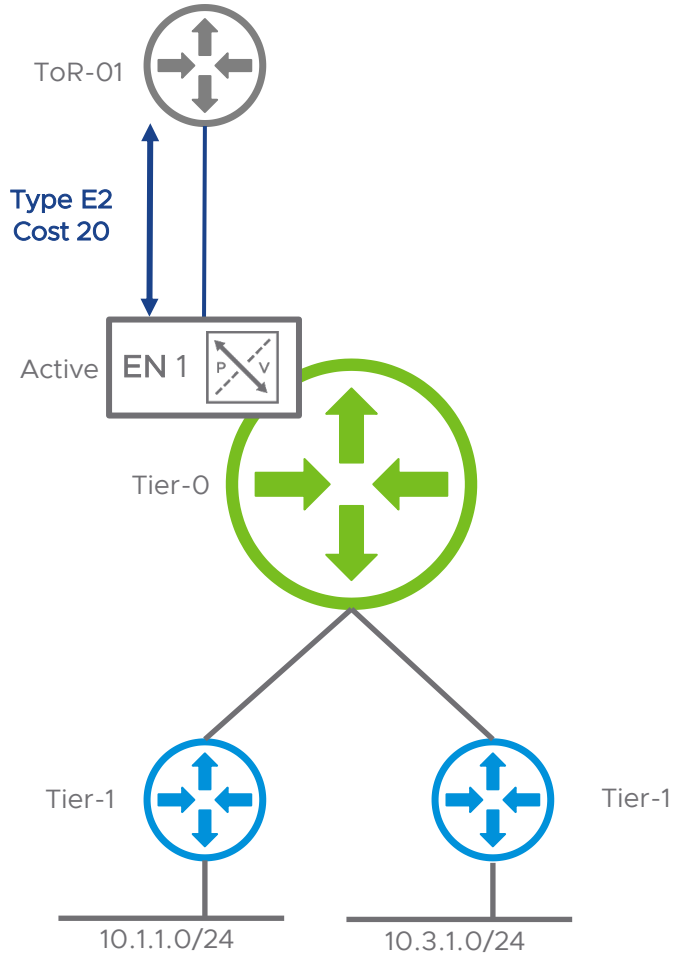


OSPF

Active/Standby Topology – Edge Verification CLI

NSX-T 3.1.1

```
SRV-EDGE-01(tier0_sr)> get ospf database external 10.1.1.0

      OSPF Router with ID (172.16.11.1)

               AS External Link States

  LS age: 296
  Options: 0x2  : *|-|-|-|-|-|E|-
  LS Flags: 0xb
  LS Type: AS-external-LSA
  Link State ID: 10.1.1.0 (External Network Number)
  Advertising Router: 172.16.11.1
  LS Seq Number: 80000013
  Checksum: 0x74a3
  Length: 36

  Network Mask: /24
        Metric Type: 2 (Larger than any link state path)
        TOS: 0
        Metric: 20
        Forward Address: 0.0.0.0
        External Route Tag: 4016
```

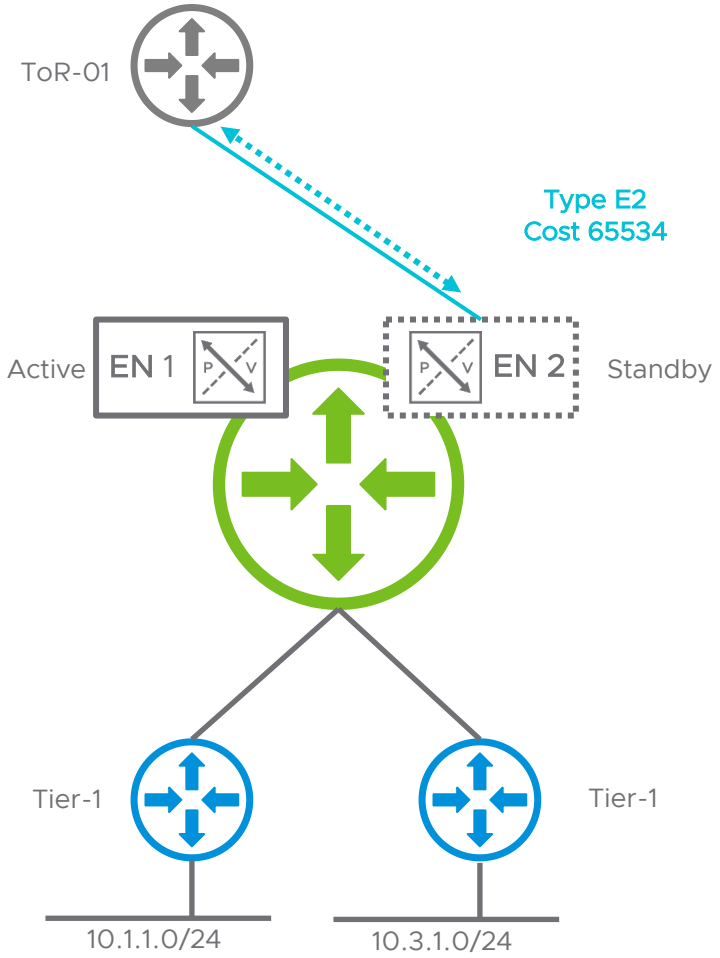


OSPF

Active/Standby Topology – ToR Verification

NSX-T 3.1.1

```
cumulus@TOR-01:mgmt:~$ net show ospf database external 10.1.1.0

               AS External Link States

  LS age: 129
  Options: 0x2  : *|-|-|-|-|-|E|-
  LS Flags: 0x6
  LS Type: AS-external-LSA
  Link State ID: 10.1.1.0 (External Network Number)
  Advertising Router: 2.2.2.2
  LS Seq Number: 80000007
  Checksum: 0x6396
  Length: 36

  Network Mask: /24
        Metric Type: 2 (Larger than any link state path)
        TOS: 0
        Metric: 65534
        Forward Address: 0.0.0.0
        External Route Tag: 4016
```

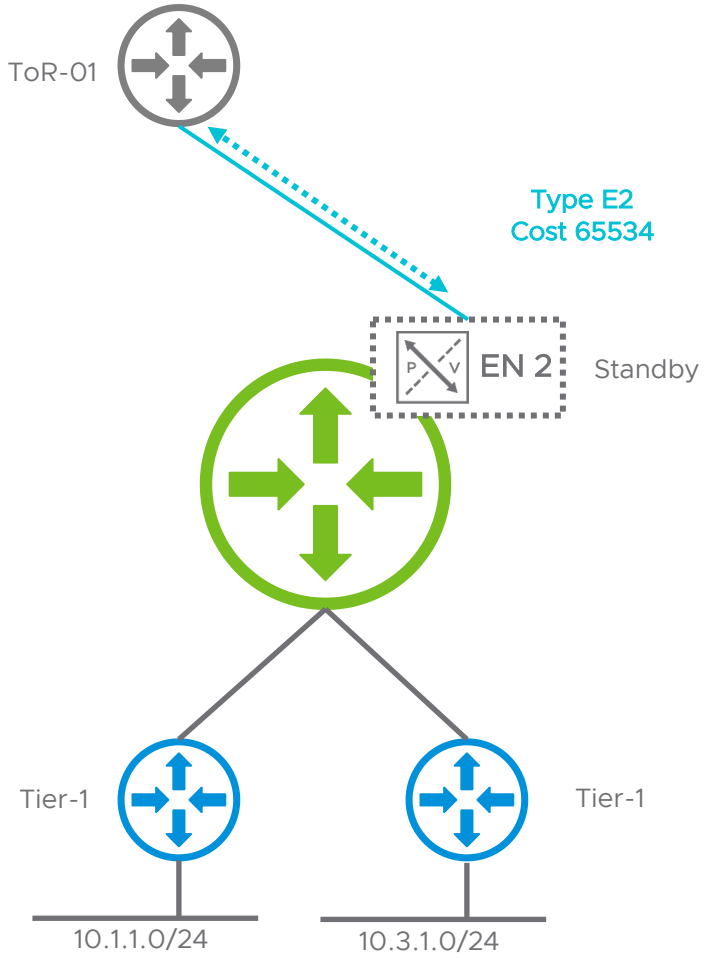


OSPF

Active/Standby Topology – ToR Verification

NSX-T 3.1.1

```
SRV-EDGE-02(tier0_sr)> get ospf database external 10.1.1.0

       OSPF Router with ID (2.2.2.2)

                AS External Link States

  LS age: 992
  Options: 0x2  : *|-|-|-|-|-|E|-
  LS Flags: 0xb
  LS Type: AS-external-LSA
  Link State ID: 10.1.1.0 (External Network Number)
  Advertising Router: 2.2.2.2
  LS Seq Number: 80000018
  Checksum: 0x41a7
  Length: 36

  Network Mask: /24
        Metric Type: 2 (Larger than any link state path)
        TOS: 0
        Metric: 65534
        Forward Address: 0.0.0.0
        External Route Tag: 4016
```

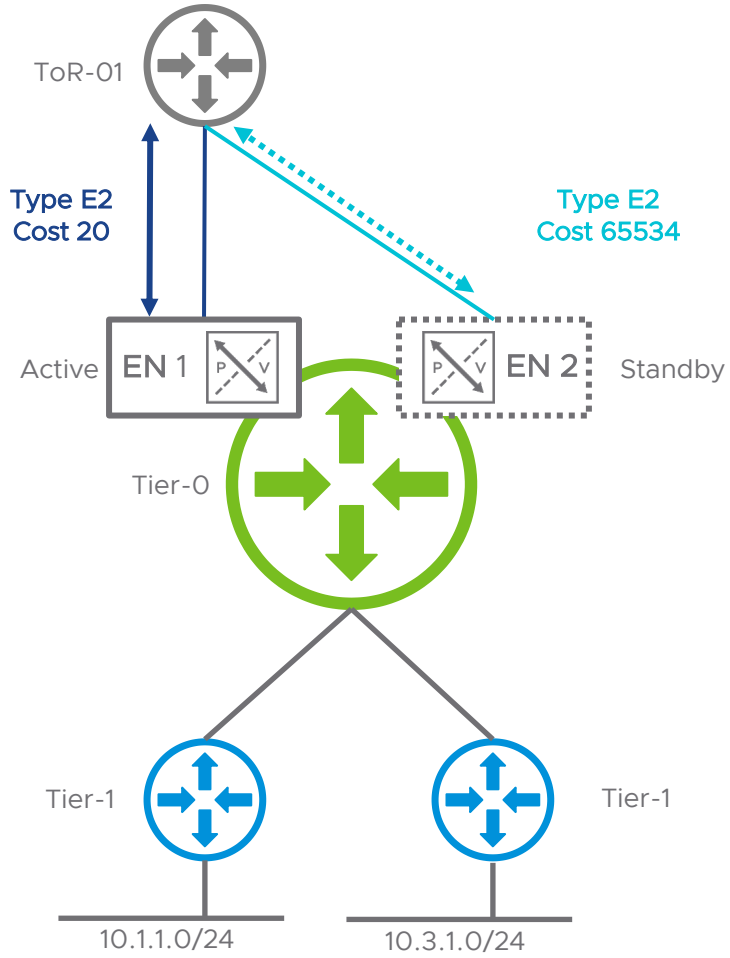


OSPF

Active/Standby Topology – ToR Verification

NSX-T 3.1.1

```
cumulus@TOR-01:mgmt:~$ net show route 10.1.1.0
RIB entry for 10.1.1.0
======================
Routing entry for 10.1.1.0/24
  Known via "ospf", distance 110, metric 20, tag 4016, best
  Last update 00:46:12 ago
  * 172.16.10.1, via swp1.10, weight 1


FIB entry for 10.1.1.0
======================
10.1.1.0/24 via 172.16.10.1 dev swp1.10 proto ospf metric 20
```

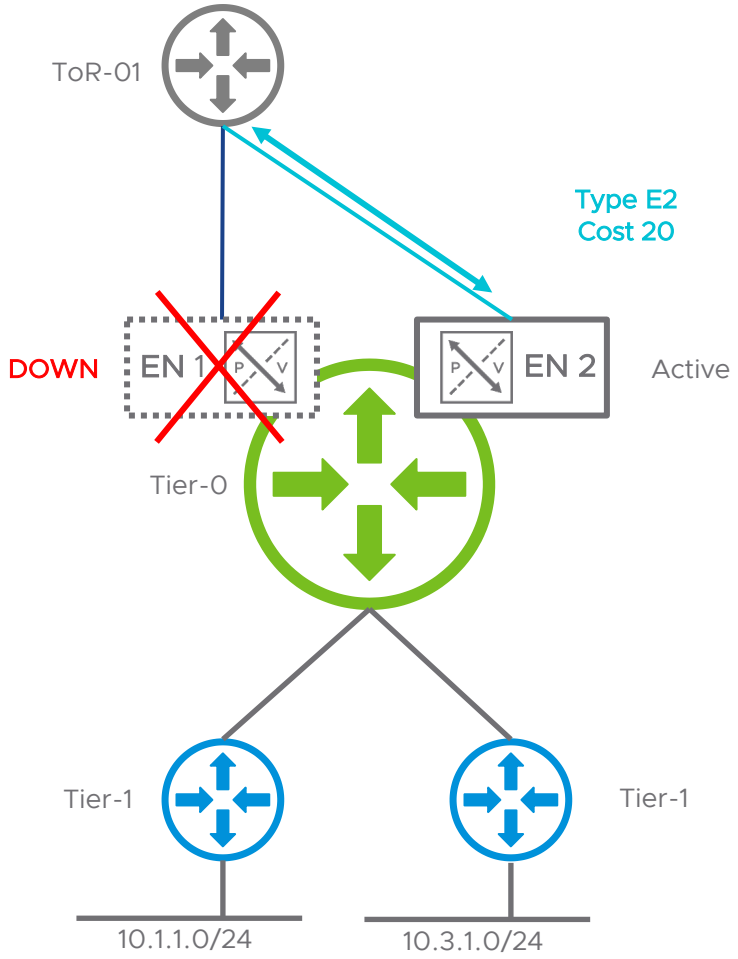


OSPF

Active/Standby Topology – ToR Verification

NSX-T 3.1.1

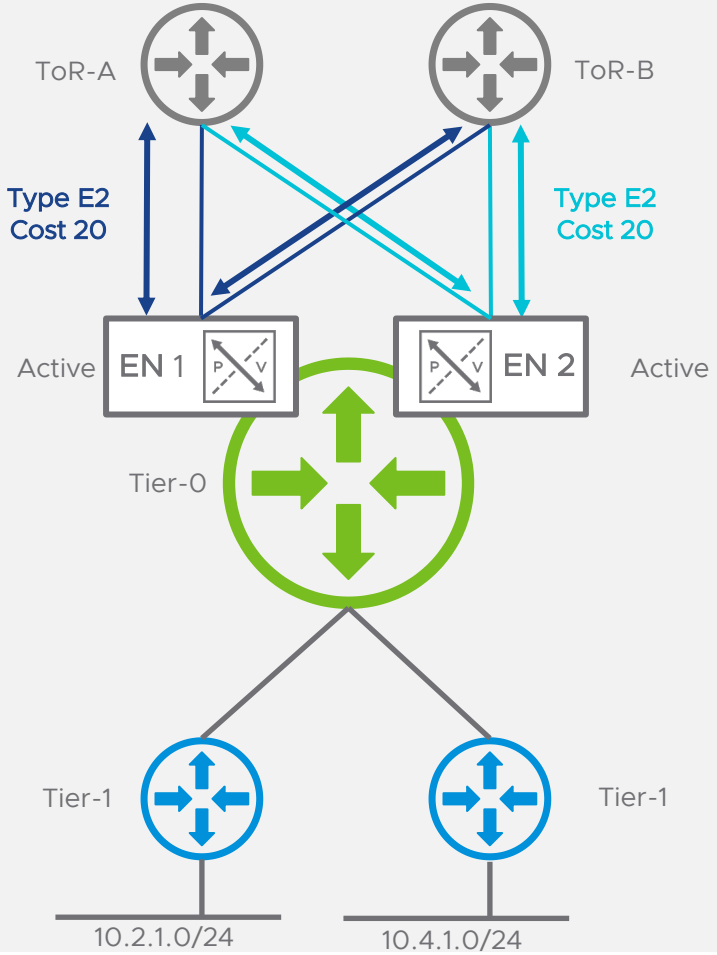
```
cumulus@TOR-01:mgmt:~$ net show ospf database external 10.1.1.0
OSPF Router with ID (10.10.10.10)

                AS External Link States

  LS age: 10
  Options: 0x2  : *|-|-|-|-|-|E|-
  LS Flags: 0x6
  LS Type: AS-external-LSA
  Link State ID: 10.1.1.0 (External Network Number)
  Advertising Router: 2.2.2.2
  LS Seq Number: 8000000c
  Checksum: 0x2cb3
  Length: 36

  Network Mask: /24
        Metric Type: 2 (Larger than any link state path)
        TOS: 0
        Metric: 20
        Forward Address: 0.0.0.0
        External Route Tag: 4016
```



OSPF

Active/Active Topology

NSX-T 3.1.1



OSPF ECMP supports 8 links
(2 interfaces can be enabled for OSPF per edge node)

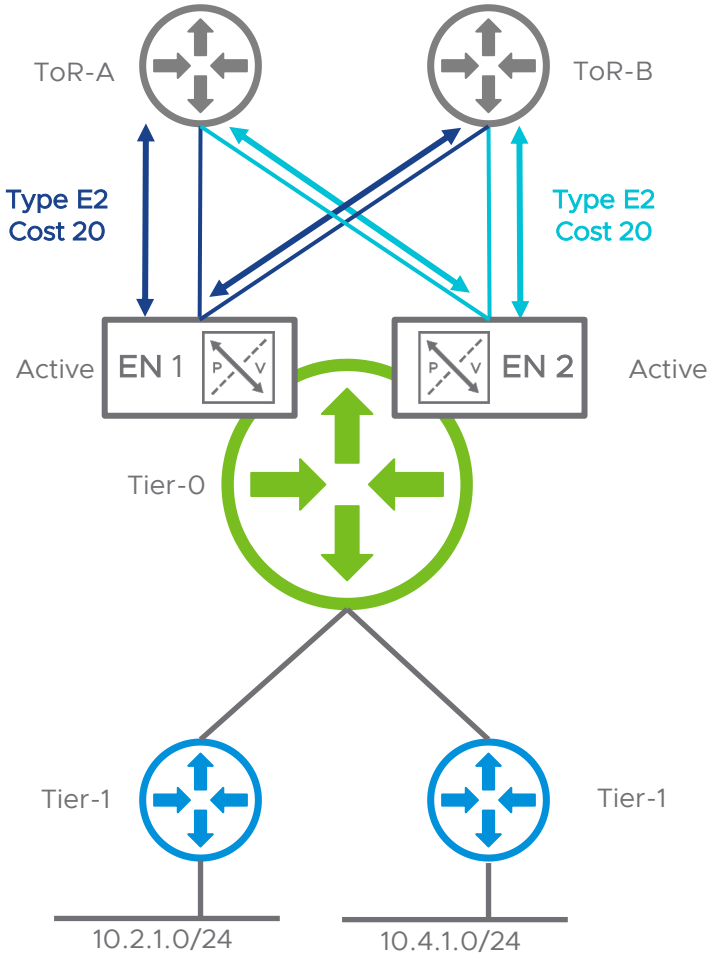
Metric sent by all the Tier-0 LR is 20

OSPF

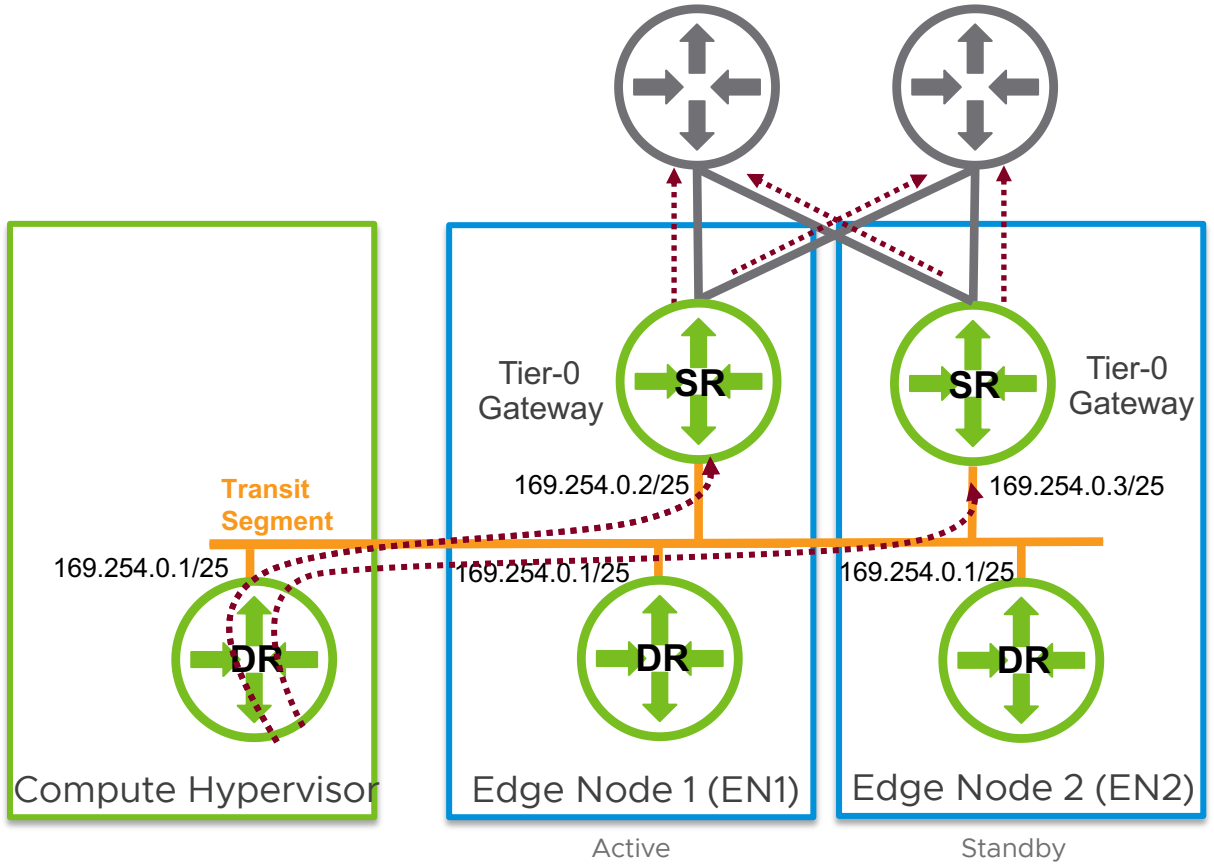
Active/Active Topology

NSX-T 3.1.1

Logical Topology



Physical Topology

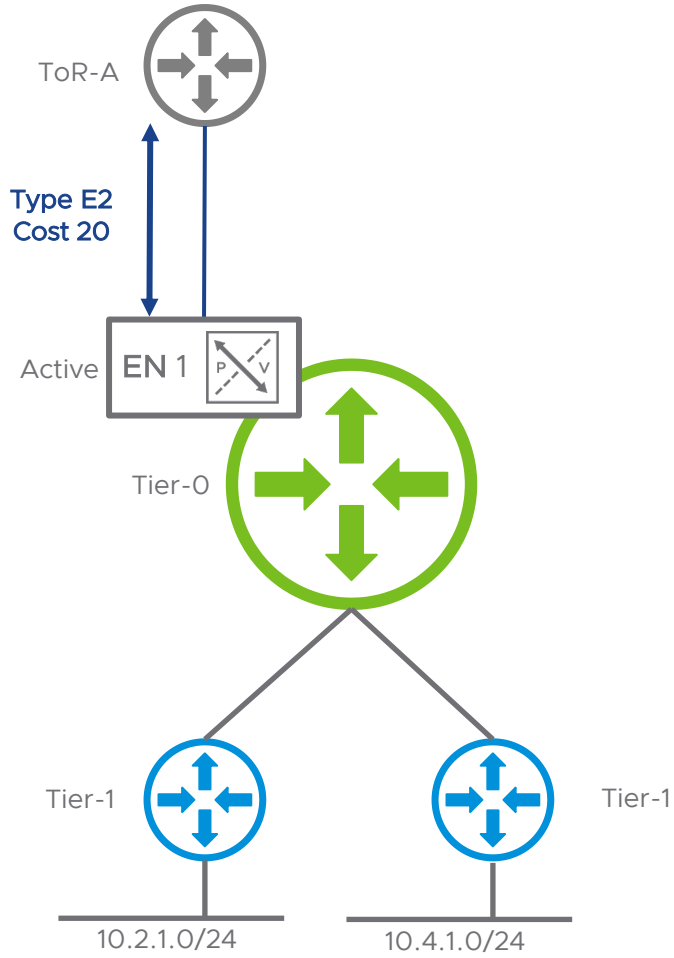


OSPF

Active/Active Topology – ToR Verification

NSX-T 3.1.1

```
cumulus@TOR-03:mgmt:~$ net show ospf database external 10.2.1.0
OSPF Router with ID (20.20.20.20)

                AS External Link States

  LS age: 449
  Options: 0x2  : *|-|-|-|-|-|E|-
  LS Flags: 0x6
  LS Type: AS-external-LSA
  Link State ID: 10.2.1.0 (External Network Number)
  Advertising Router: 172.16.20.3
  LS Seq Number: 80000001
  Checksum: 0x41dc
  Length: 36

  Network Mask: /24
        Metric Type: 2 (Larger than any link state path)
        TOS: 0
        Metric: 20
        Forward Address: 0.0.0.0
        External Route Tag: 4016
```

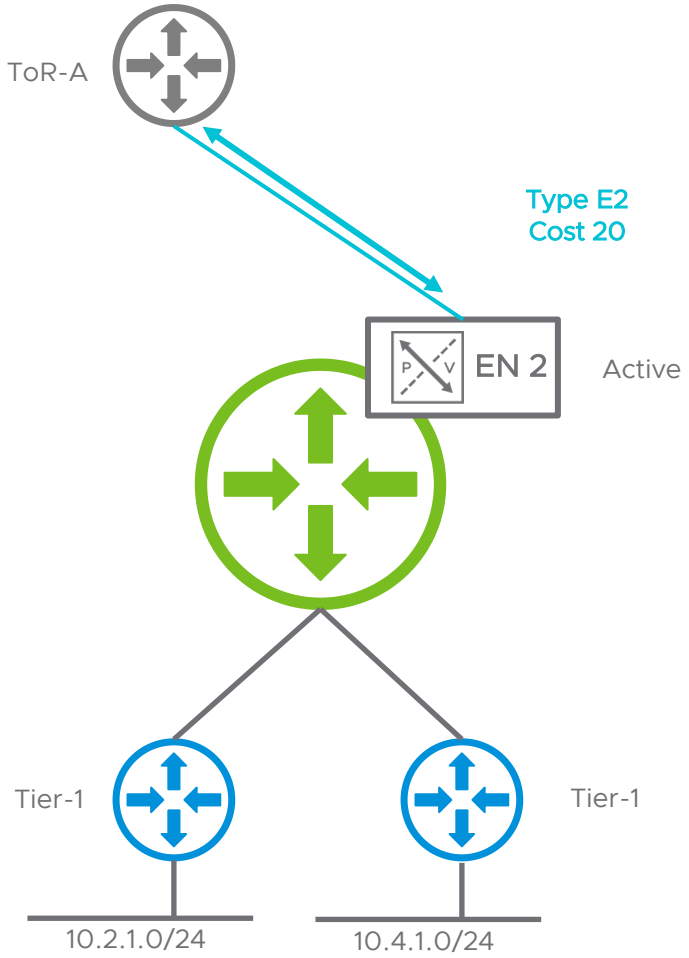


OSPF

Active/Active Topology – ToR Verification

NSX-T 3.1.1

```
cumulus@TOR-01:mgmt:~$ net show ospf database external 10.1.1.0

               AS External Link States

  LS age: 448
  Options: 0x2  : *|-|-|-|-|-|E|-
  LS Flags: 0x6
  LS Type: AS-external-LSA
  Link State ID: 10.2.1.0 (External Network Number)
  Advertising Router: 172.16.21.4
  LS Seq Number: 80000001
  Checksum: 0x34e7
  Length: 36

  Network Mask: /24
        Metric Type: 2 (Larger than any link state path)
        TOS: 0
        Metric: 20
        Forward Address: 0.0.0.0
        External Route Tag: 4016
```

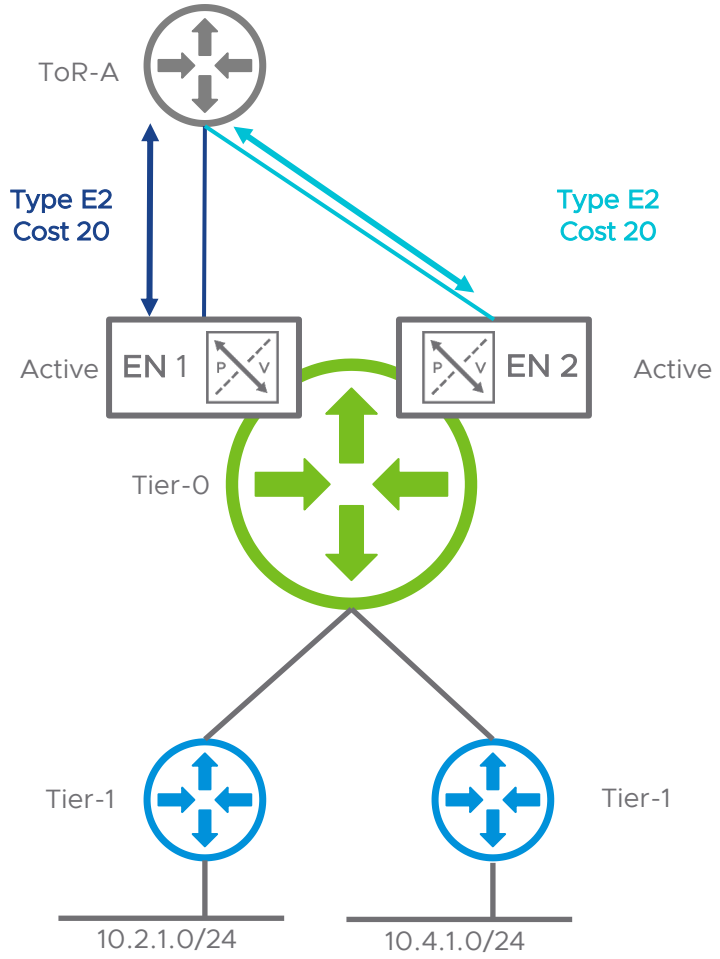


OSPF

Active/Active Topology – ToR Verification

NSX-T 3.1.1

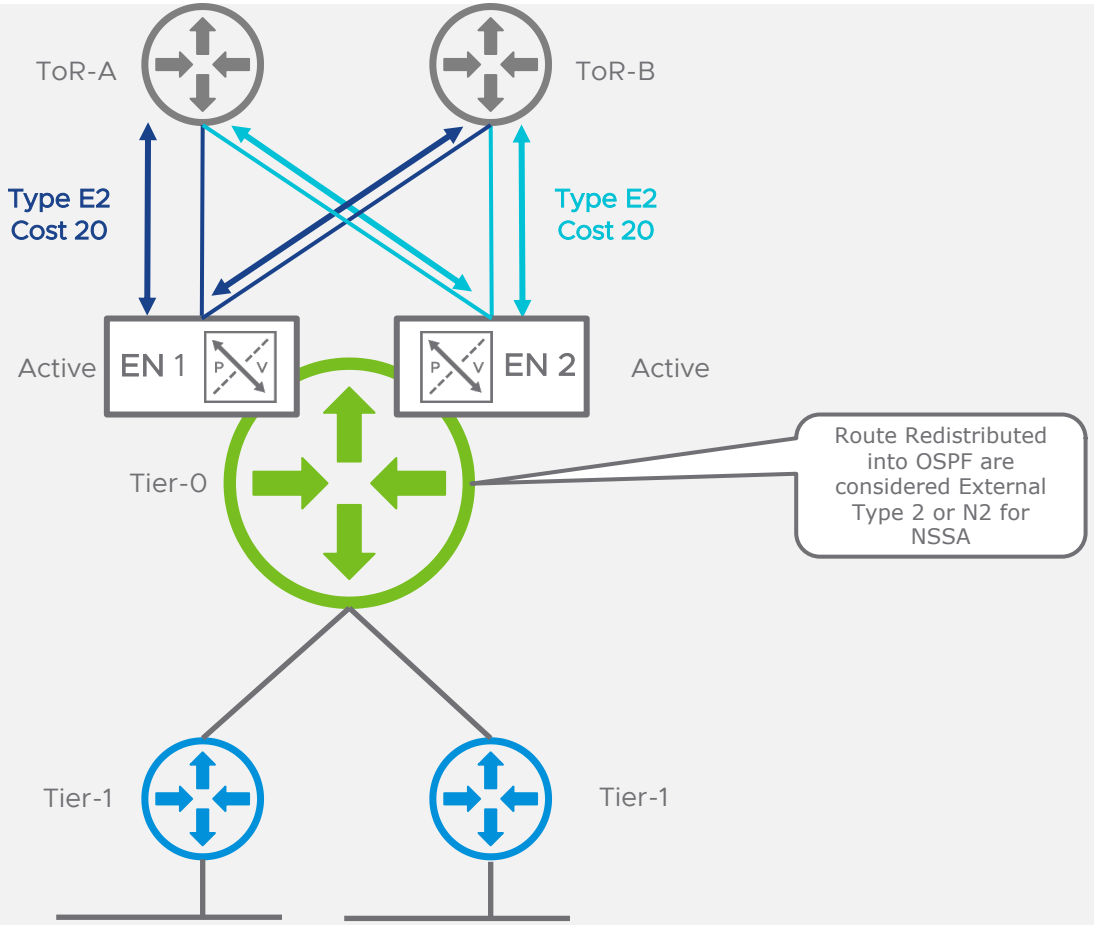
```
cumulus@TOR-03:mgmt:~$ net show route 10.2.1.0
RIB entry for 10.2.1.0
======================
Routing entry for 10.2.1.0/24
  Known via "ospf", distance 110, metric 20, tag 4016, best
  Last update 00:32:15 ago
  * 172.16.20.3, via swp1.20, weight 1
  * 172.16.20.4, via swp1.20, weight 1


FIB entry for 10.2.1.0
======================
10.2.1.0/24 proto ospf metric 20
            nexthop via 172.16.20.3 dev swp1.20 weight 1
            nexthop via 172.16.20.4 dev swp1.20 weight 1
```



OSPF

Route Redistribution

NSX-T 3.1.1



Tier-1 Segments are considered static routes from a Tier-0 standpoint.

These static routes are redistributed into OSPF on the Tier-0. The routes type is E2 or N2 for NSSA areas.

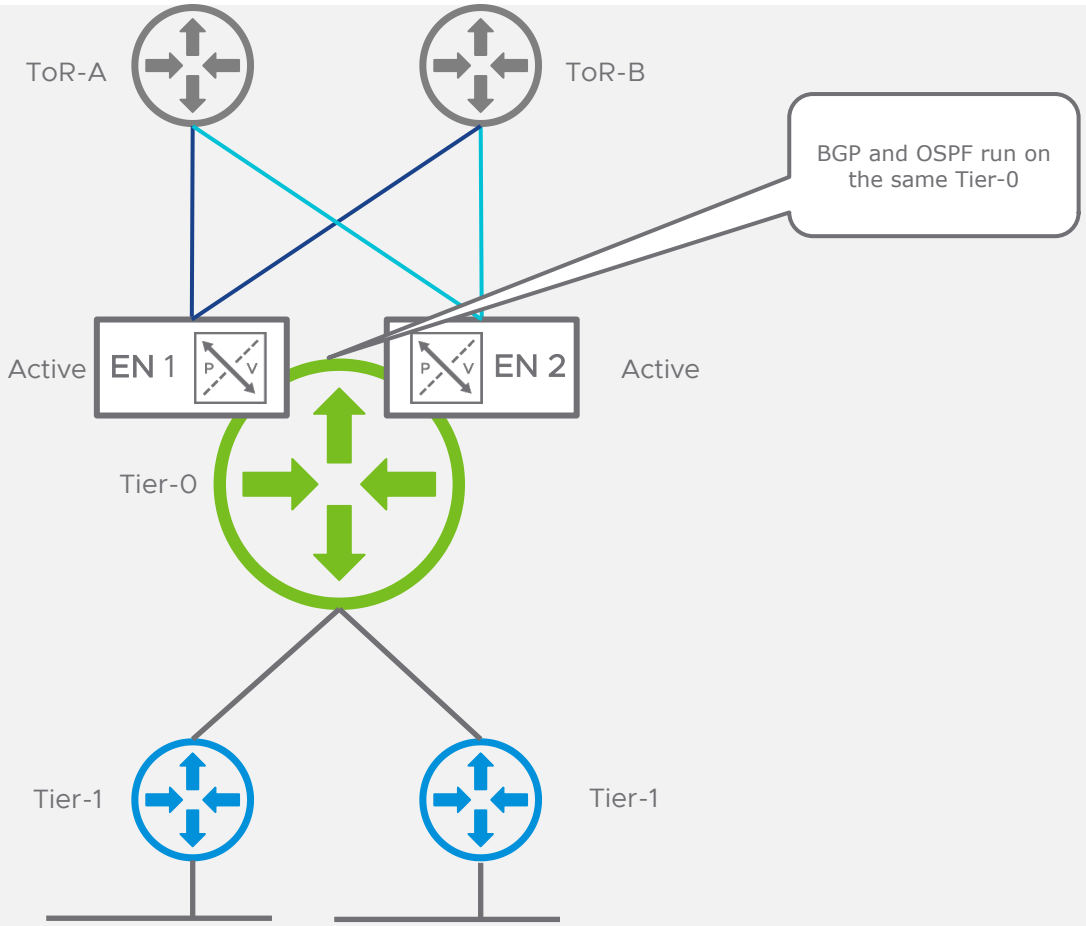
E2 and N2:

- Cost is always 20 (vs E1 where the internal links cost would be added on each router)

OSPF

Route Redistribution

NSX-T 3.1.1



Redistribution between BGP and OSPF is not supported.

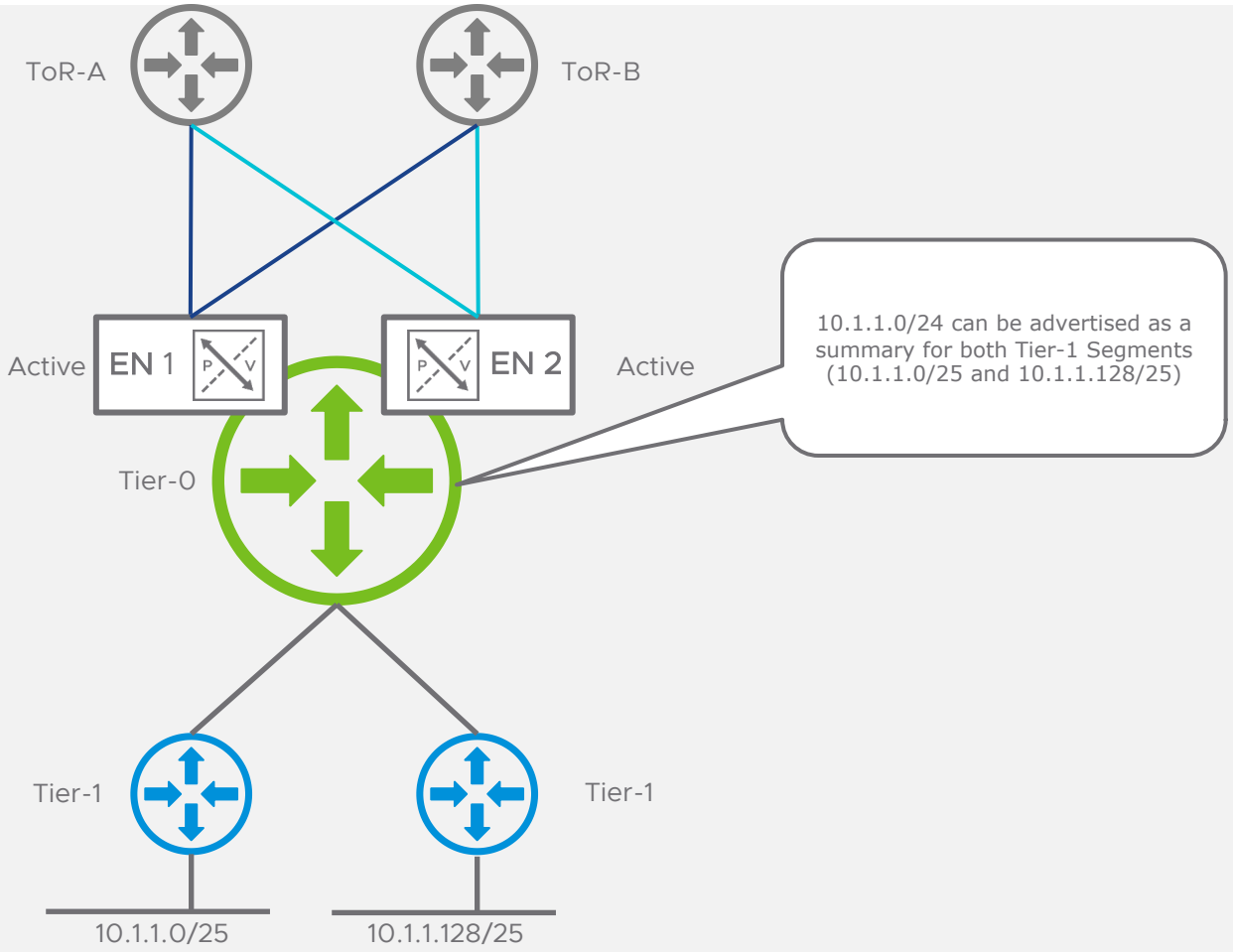
It is possible to use OSPF to learn the BGP Peer IP address in case of BGP multi-hop design.

Running both protocols can complicate operations (Hint: Administrative Distance).

OSPF

Route Summarization

NSX-T 3.1.1



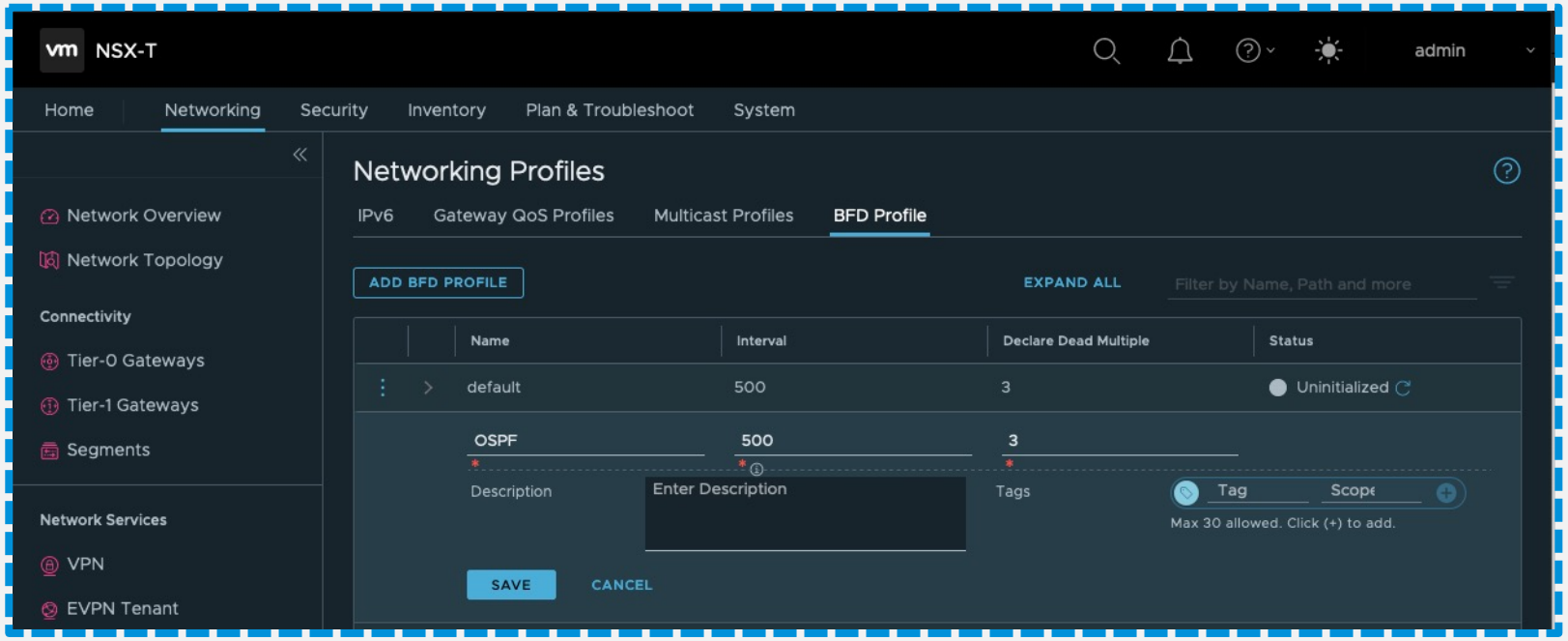
Summarization is supported on the Tier-0.

LSA for that summary route will still be advertised as a type 5 LSA in a standard area.

OSPF

Configuration – BFD Profile

NSX-T 3.1.1



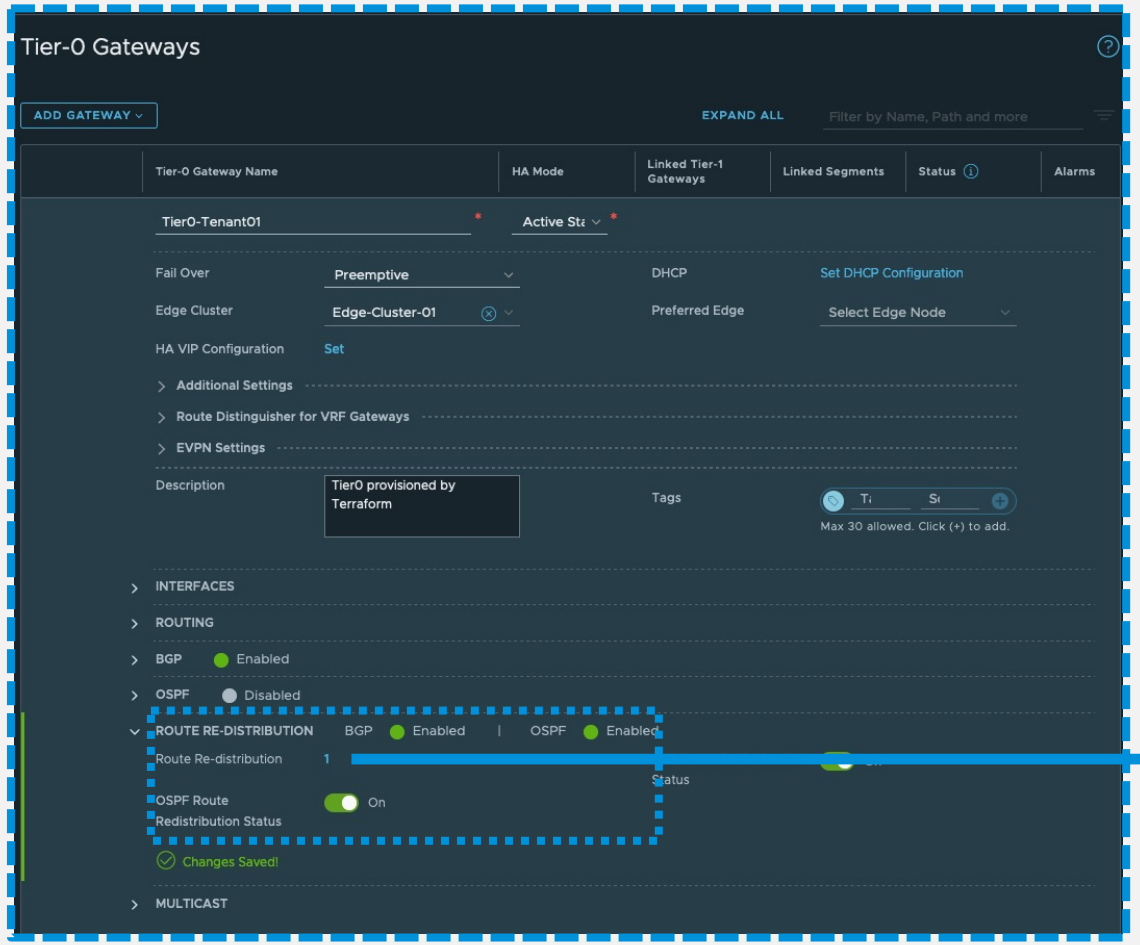
Possible to use either the Default or custom BFD Profile.

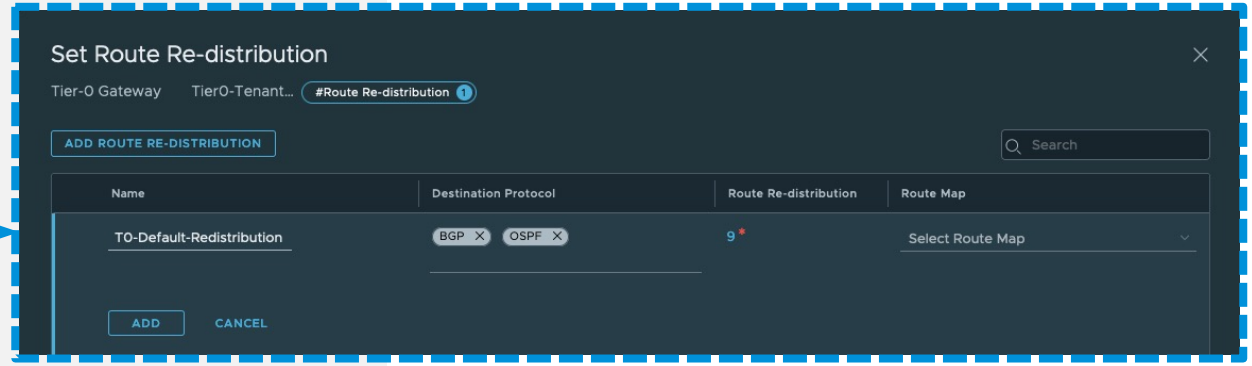
BFD Support with OSPFv2 (BM: 50ms – VM: 500ms – Multiplier: 3)

OSPF

Configuration – Redistribution

NSX-T 3.1.1





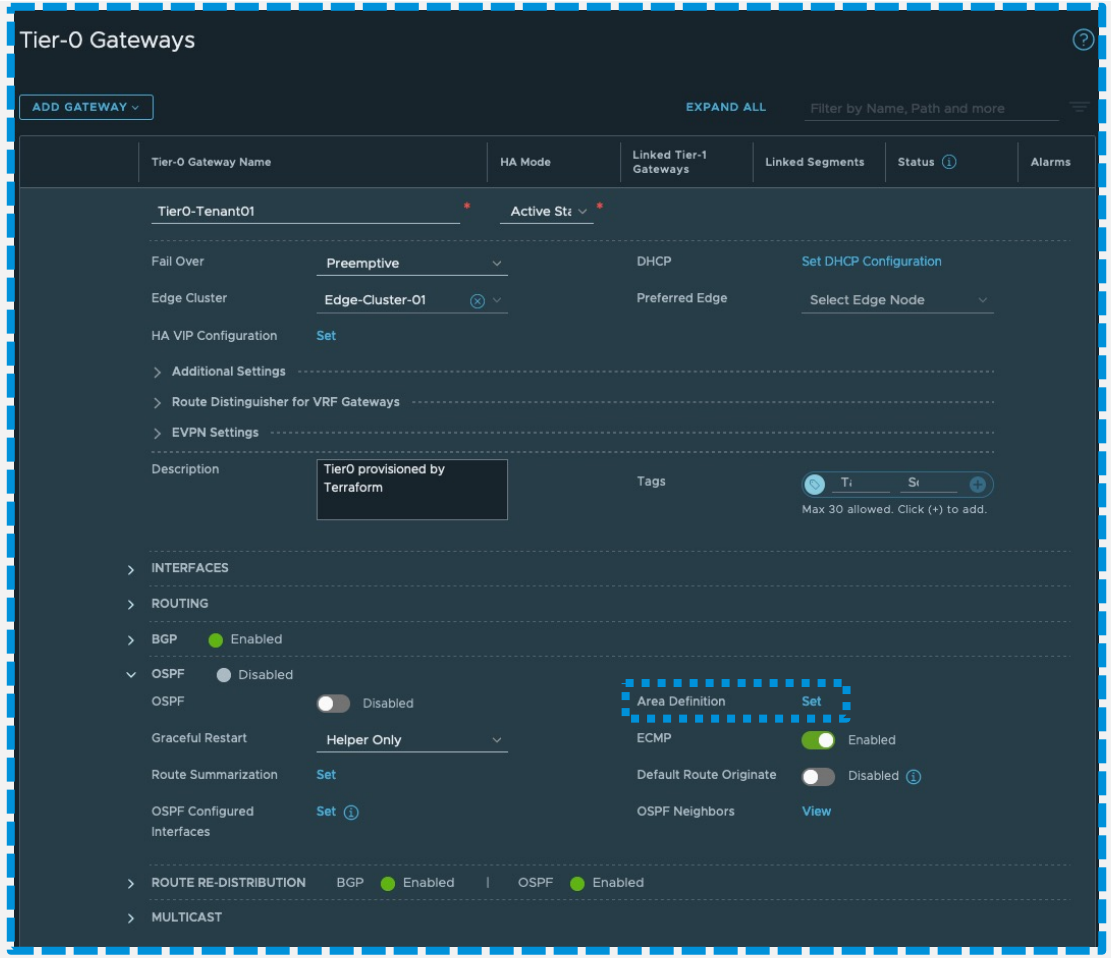
T1 segments needs to be redistributed in the OSPF process (same as BGP).

Prefixes will be advertised as E2 or N2 into OSPF

OSPF

Configuration – Area Definition

NSX-T 3.1.1



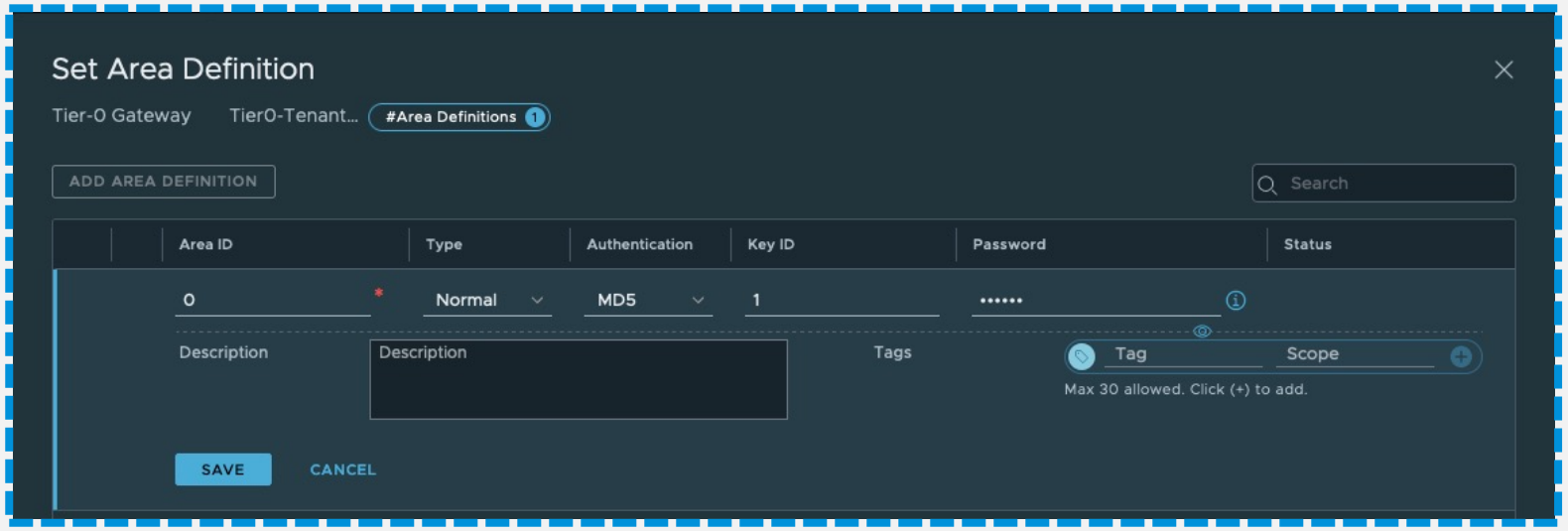
Area Definition:

- 1 Area per Tier-0 Gateway
  - Standard
  - Backbone (0)
  - NSSA

OSPF

Configuration – Area Definition

NSX-T 3.1.1



Area Definition:

- Area ID: Single Number (0) or dotted format (0.0.0.0)

Type:

- Normal or NSSA

Authentication:

- MD5 (hashing) or Password (plain text)

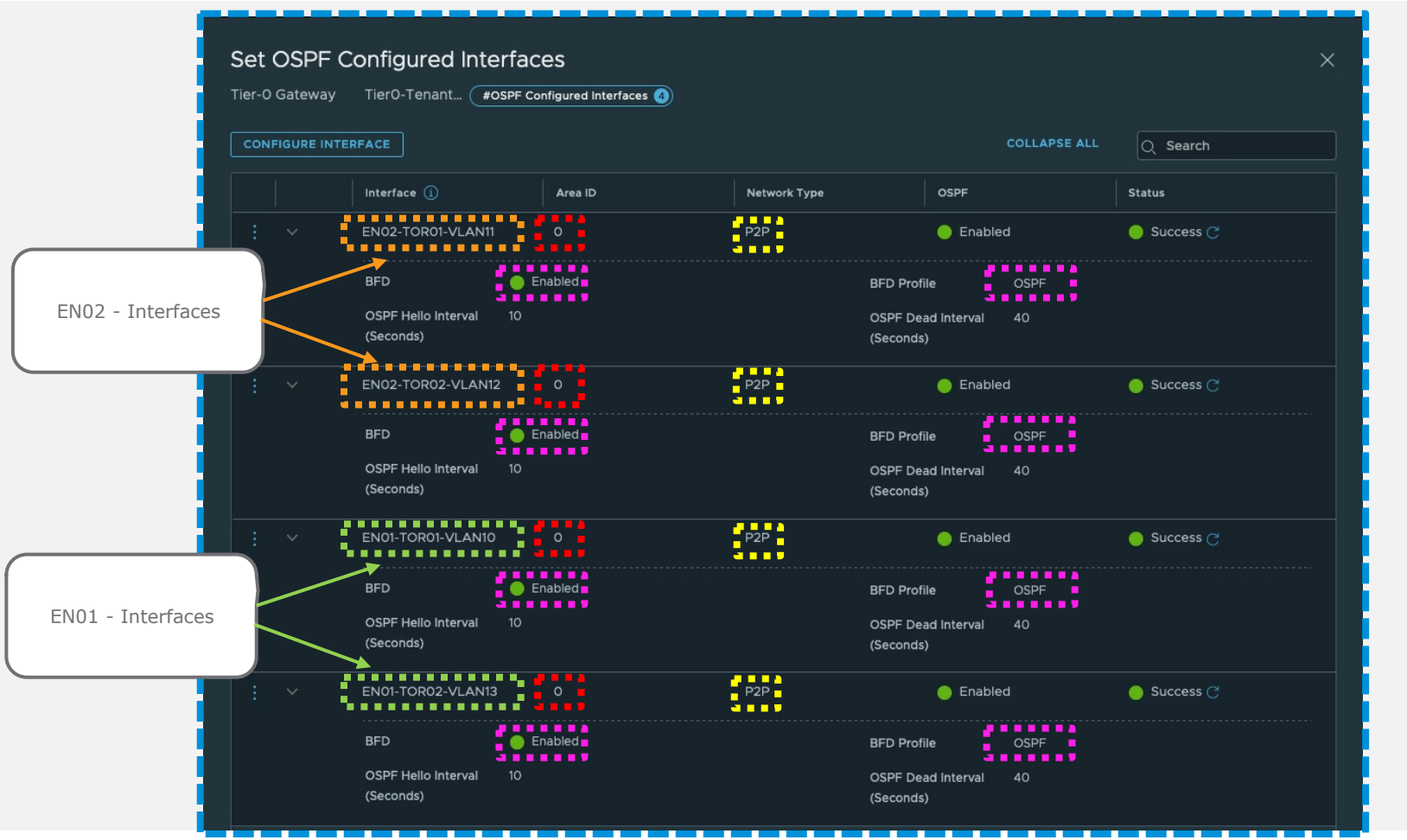
Key ID

Password: 8 Characters Max in MD5 and Password (PM/TPM discussing with Engineering to increase the number of charachters)

OSPF

Configuration – Interfaces

NSX-T 3.1.1



2 OSPF Interfaces per Edge Nodes maximum

Area:

- Same Area on all uplinks for a dedicated Tier-0

Network Type:

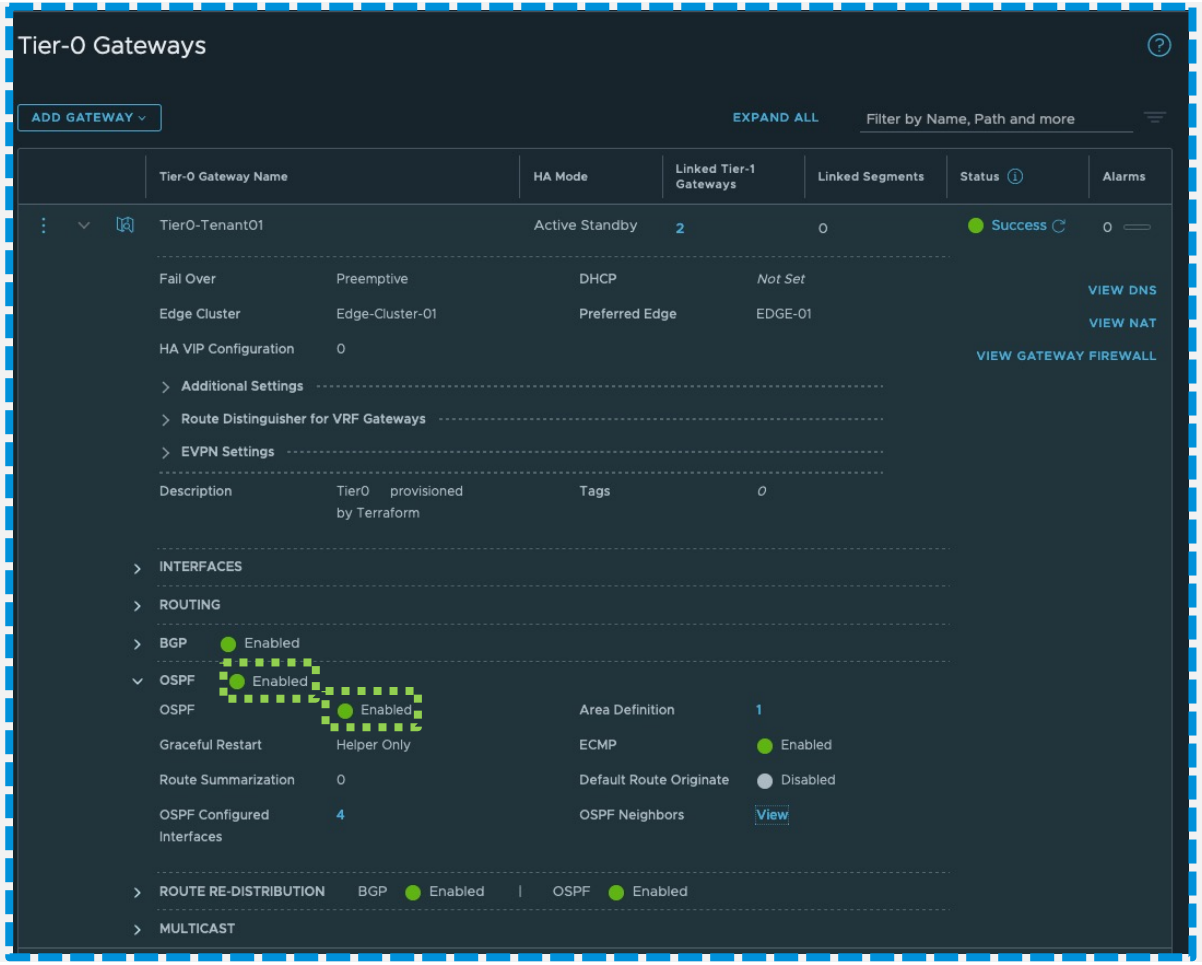
- P2P strongly recommended. Not recommended to mix network type

BFD: Profile must be used

OSPF

Configuration – Protocol

NSX-T 3.1.1



Protocol is not enabled by default when creating a Tier-0. OSPF must be toggled on.

OSPF

Useful commands

NSX-T 3.1.1

```
SRV-EDGE-01(tier0_sr)> get ospf
 OSPF Routing Process, Router ID: 172.16.13.0
 Supports only single TOS (TOS0) routes
 This implementation conforms to RFC2328
 RFC1583Compatibility flag is disabled
 OpaqueCapability flag is enabled
 Initial SPF scheduling delay 0 millisec(s)
 Minimum hold time between consecutive SPFs 50 millisec(s)
 Maximum hold time between consecutive SPFs 5000 millisec(s)
 Hold time multiplier is currently 2
 SPF algorithm last executed 3m53s ago
 Last SPF duration 0.002s
 SPF timer is inactive
 LSA minimum interval 5000 msecs
 LSA minimum arrival 1000 msecs
 Write Multiplier set to 20
 Refresh timer 10 secs
 Maximum multiple paths(ECMP) supported  8
 This router is an ASBR (injecting external routing information)
 Number of external LSA 36. Checksum Sum 0x0011b03f
 Number of opaque AS LSA 0. Checksum Sum 0x00000000
 Number of areas attached to this router: 1
 Area ID: 0.0.0.0 (Backbone)
   Number of interfaces in this area: Total: 2, Active: 2
   Number of fully adjacent neighbors in this area: 2
   SPF algorithm executed 53 times
   Number of LSA 13
   Number of router LSA 9. Checksum Sum 0x00047b79
   Number of network LSA 4. Checksum Sum 0x0002c314
   Number of summary LSA 0. Checksum Sum 0x00000000
   Number of ASBR summary LSA 0. Checksum Sum 0x00000000
   Number of NSSA LSA 0. Checksum Sum 0x00000000
   Number of opaque link LSA 0. Checksum Sum 0x00000000
   Number of opaque area LSA 0. Checksum Sum 0x00000000
```

```
SRV-EDGE-01(tier0_sr)> get ospf interface
uplink-611 is up
  ifindex 66, MTU 9000 bytes, BW 0 Mbit <UP,BROADCAST,RUNNING,MULTICAST>
  Internet Address 172.16.13.0/31, Area 0.0.0.0
  MTU mismatch detection: enabled
  Router ID 172.16.13.0, Network Type POINTOPOINT, Cost: 10
  Transmit Delay is 1 sec, State Point-To-Point, Priority 0
  No backup designated router on this network
  Multicast group memberships: OSPFAllRouters
  Timer intervals configured, Hello 10s, Dead 40s, Wait 40s, Retransmit 5
    Hello due in 9.911s
  Neighbor Count is 1, Adjacent neighbor count is 1
  Cryptographic authentication enabled
  Algorithm:MD5, keyId:1 Keydata:VMOSPF
uplink-634 is up
  ifindex 69, MTU 9000 bytes, BW 0 Mbit <UP,BROADCAST,RUNNING,MULTICAST>
  Internet Address 172.16.10.0/31, Area 0.0.0.0
  MTU mismatch detection: enabled
  Router ID 172.16.13.0, Network Type POINTOPOINT, Cost: 10
  Transmit Delay is 1 sec, State Point-To-Point, Priority 0
  No backup designated router on this network
  Multicast group memberships: OSPFAllRouters
  Timer intervals configured, Hello 10s, Dead 40s, Wait 40s, Retransmit 5
    Hello due in 9.911s
  Neighbor Count is 1, Adjacent neighbor count is 1
  Cryptographic authentication enabled
  Algorithm:MD5, keyId:1 Keydata:VMOSPF
```

OSPF

Useful commands

NSX-T 3.1.1

```
SRV-EDGE-01(tier0_sr)> get ospf neighbor

Neighbor ID     Pri State           UpTime          Dead Time Address         Interface                   RXmtL RqstL DBsmL
11.11.11.11       1 Full/-          2h19m59s        35.092s   172.16.13.1     uplink-611:172.16.13.0        0     0     0
10.10.10.10       1 Full/-          2h19m58s        34.846s   172.16.10.1     uplink-634:172.16.10.0        0     0     0
```

OSPF

Useful commands

NSX-T 3.1.1

```
SRV-EDGE-01(tier0_sr)> get ospf database

       OSPF Router with ID (172.16.13.0)

                Router Link States (Area 0.0.0.0)

Link ID         ADV Router      Age  Seq#       CkSum  Link count
3.3.3.3         3.3.3.3          674 0x80000018 0xc31e 4
10.10.10.10     10.10.10.10     1029 0x80000013 0x0971 5
11.11.11.11     11.11.11.11     1008 0x80000013 0xacb9 5
20.20.20.20     20.20.20.20      678 0x8000001e 0x2969 5
21.21.21.21     21.21.21.21      677 0x8000001e 0x126c 5
100.100.100.100 100.100.100.100 1529 0x80000017 0x8e4c 5
172.16.12.0     172.16.12.0      320 0x80000020 0xa65e 4
172.16.13.0     172.16.13.0      836 0x8000001b 0xa437 4
172.16.22.0     172.16.22.0      679 0x80000018 0xc390 4

                Net Link States (Area 0.0.0.0)

Link ID         ADV Router      Age  Seq#       CkSum
172.16.3.10     10.10.10.10     1519 0x80000007 0x8820
172.16.4.11     11.11.11.11     1608 0x80000007 0x8717
172.16.5.20     20.20.20.20     1610 0x80000007 0xd675
172.16.6.21     21.21.21.21     1618 0x80000007 0xd56c

                AS External Link States

Link ID         ADV Router      Age  Seq#       CkSum  Route
0.0.0.0         100.100.100.100 1569 0x80000007 0x1d1d E2 0.0.0.0/0 [0x0]
1.1.1.1         172.16.13.0      896 0x8000000b 0x7b6b E2 1.1.1.1/32 [0x0]
2.2.2.2         172.16.12.0      310 0x8000000e 0x7b7a E2 2.2.2.2/32 [0x0]
```

OSPF

Useful commands

NSX-T 3.1.1

```
SRV-EDGE-01(tier0_sr)> get ospf route
Codes: R - Router, N - Network, D - Discard,
       IA - Inter Area, E1 - Type1 external, E2 - Type2 external,
       N1 - Type1 NSSA external, N2 - Type2 NSSA external,
       ABR - Area Border Router, ASBR - Autonomous System Border Router
============ OSPF network routing table ============
N    172.16.2.0/24          [210] area: 0.0.0.0
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
N    172.16.3.0/24          [110] area: 0.0.0.0
                            via 172.16.10.1, uplink-634
N    172.16.4.0/24          [110] area: 0.0.0.0
                            via 172.16.13.1, uplink-611
N    172.16.5.0/24          [210] area: 0.0.0.0
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
N    172.16.6.0/24          [210] area: 0.0.0.0
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
N    172.16.10.0/31         [10] area: 0.0.0.0
                            directly attached to uplink-634
N    172.16.11.0/31         [110] area: 0.0.0.0
                            via 172.16.10.1, uplink-634
N    172.16.12.0/31         [110] area: 0.0.0.0
                            via 172.16.13.1, uplink-611
N    172.16.13.0/31         [10] area: 0.0.0.0
                            directly attached to uplink-611
N    172.16.20.0/31         [310] area: 0.0.0.0
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
```

```
SRV-EDGE-01(tier0_sr)> get ospf route
Codes: R - Router, N - Network, D - Discard,
       IA - Inter Area, E1 - Type1 external, E2 - Type2 external,
       N1 - Type1 NSSA external, N2 - Type2 NSSA external,
       ABR - Area Border Router, ASBR - Autonomous System Border Router
============ OSPF router routing table =============
R    3.3.3.3                [310] area: 0.0.0.0, ASBR
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
R    10.10.10.10            [10] area: 0.0.0.0, ASBR
                            via 172.16.10.1, uplink-634
R    11.11.11.11            [10] area: 0.0.0.0, ASBR
                            via 172.16.13.1, uplink-611
R    20.20.20.20            [210] area: 0.0.0.0, ASBR
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
R    21.21.21.21            [210] area: 0.0.0.0, ASBR
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
R    100.100.100.100        [110] area: 0.0.0.0, ASBR
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
R    172.16.12.0            [110] area: 0.0.0.0, ASBR
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
R    172.16.22.0            [310] area: 0.0.0.0, ASBR
                            via 172.16.10.1, uplink-634
                            via 172.16.13.1, uplink-611
```

OSPF

Useful commands

NSX-T 3.1.1

```
SRV-EDGE-01(tier0_sr)> get bfd-config
Wed Feb 03 2021 UTC 21:21:21.373
Logical Router
UUID           : 05ce9bec-4881-41c7-ac5b-1948654fae74
vrf            : 40
lr-id          : 202
name           : SR-Tier0-Tenant01
type           : PLR-SR

Global BFD configuration
    Enabled        : True
    Min RX Interval: 500
    Min TX Interval: 500
    Min RX TTL     : 255
    Multiplier     : 3

Port               : fed124b6-9cbb-4ed9-b712-cf1e776b2da3

Session BFD configuration

    Source         : 172.16.10.0
    Peer           : 172.16.10.1
    Enabled        : True
    Min RX Interval: 500
    Min TX Interval: 500
    Min RX TTL     : 255
    Multiplier     : 3

Port               : f0d9d25a-c428-4f8d-8692-0bc1b577fbc6
```

```
SRV-EDGE-01(tier0_sr)> get bfd-sessions
Wed Feb 03 2021 UTC 21:21:47.761
BFD Session
Dest_port                    : 3784
Diag                         : No Diagnostic
Encap                        : vlan
Forwarding                   : last true (current true)
Interface                    : f0d9d25a-c428-4f8d-8692-0bc1b577fbc6
Keep-down                    : false
Last_cp_diag                 : No Diagnostic
Last_cp_rmt_diag             : No Diagnostic
Last_cp_rmt_state            : up
Last_cp_state                : up
Last_fwd_state               : UP
Last_local_down_diag         : No Diagnostic
Last_remote_down_diag        : No Diagnostic
Last_up_time                 : 2021-02-03 18:38:58
Local_address                : 172.16.13.0
Local_discr                  : 3959728667
Min_rx_ttl                   : 255
Multiplier                   : 3
Received_remote_diag         : No Diagnostic
Received_remote_state        : up
Remote_address               : 172.16.13.1
Remote_min_rx_interval       : 500
Remote_min_tx_interval       : 500
Remote_multiplier            : 3
Remote_state                 : up
```

OSPF

OSPF vs BGP

OSPFv2

Link State routing protocol (LSA flooding).

No support with IPv6. Must run BGP with IPv6 AF or static routes.

Dijkstra algorithm is computed on ALL router of an area every time there is a change in the area.

OSPF is very common in enterprise networks.

Support of BFD (BM: 50ms / VM: 500ms)

VRF / Federation NOT supported

BGP (recommended)

BGP updates only sent between BGP Peers.

One protocol for both IPv4 and IPv6 (AF)

BGP is very flexible (route-maps/set actions/communities/Filtering/Summary).

BGP is very easy to troubleshoot (Best path algorithm / advertised routes)

Support of BFD (BM: 50ms / VM: 500ms)

VRF / Federation Supported

Richer feature Set than OSPFv2 for NSX-T

What's New in NSX-T 3.1.1

NVDS to VDS

PM: Aditya Vikram Mukherjee and Sonam Sinha
TPM: Francois Tallet

February 2021

NVDS to VDS Upgrade

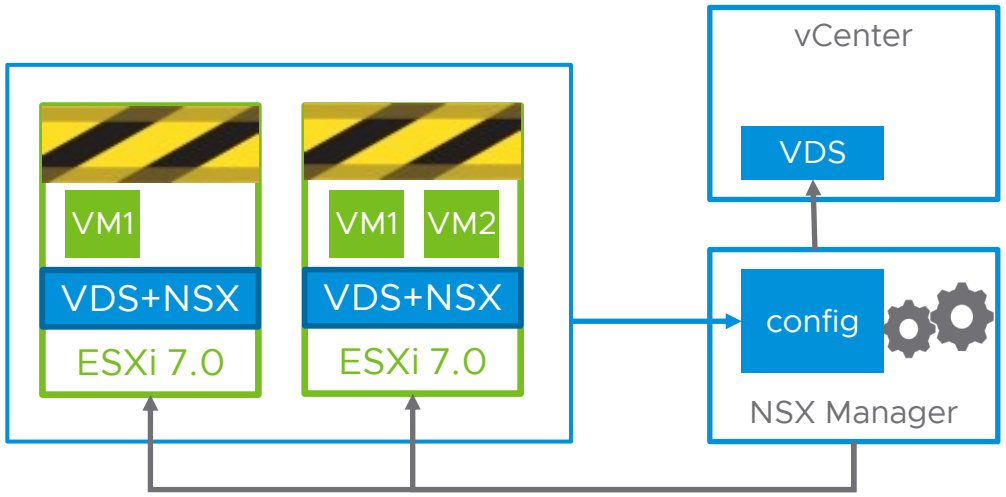
"Day 2" Switch Migrator Tool

NSX-T 3.1.1

Tool introduced in NSX-T 3.0.2

Migration entirely handled by the NSX Manager

Can be started via API or NSX Manager CLI



1. Do a pre-check and generate a configuration
2. Create a VDS in vCenter
3. NSX Manager coordinates the NVDS→VDS upgrade of each and every transport node

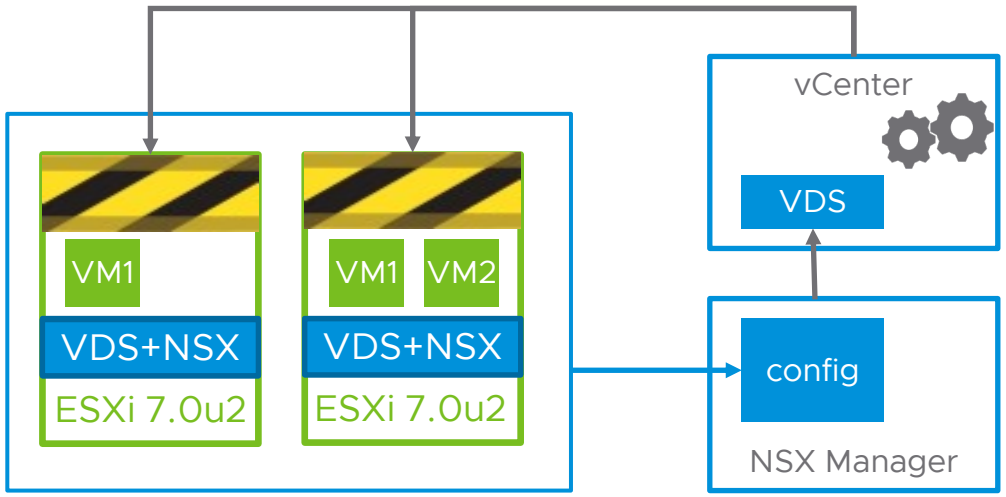
NVDS to VDS Upgrade

"Day 0" Switch Migrator Tool

NSX-T 3.1.1

NVDS→VDS Migration performed during the vSphere upgrade

Benefit: NVDS→VDS migration does not introduce additional downtime



First part of the procedure performed by NSX manager

- NSX-T 3.1.0 triggered via API only
- NSX-T 3.1.1 introduces an NSX UI new

1. Do a pre-check and generate a configuration
2. Create a VDS in vCenter
3. vCenter coordinates the NVDS→VDS upgrade and the ESXi upgrade of each and every transport node

Second part of the procedure is performed by the VUM (vSphere Upgrade Manager) in vCenter.

Will be available when upgrading to vSphere 7.0u2

What's New in NSX-T 3.1.1

V2T

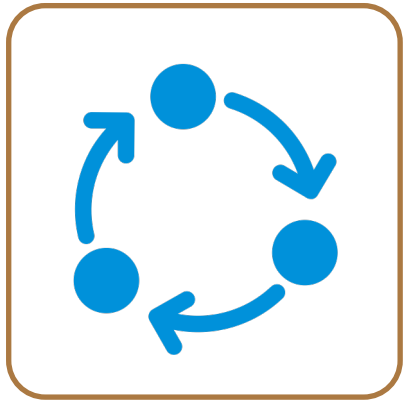
PM: Thomas Vigneron
TPM: Samuel Kommu

February 2021

Migration Coordinator

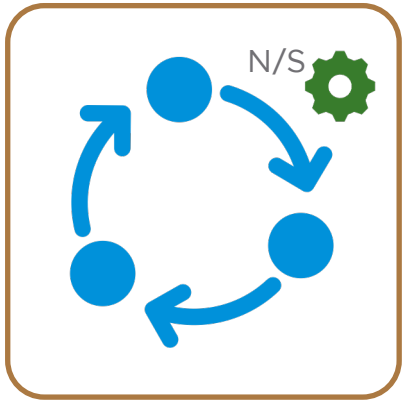
One Tool – Many Options

NSX-T 3.1.1



Use Same HW

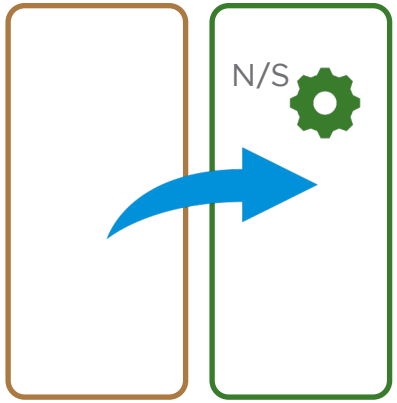
Migrate Everything



Use Same HW

Custom NSX-T Design (N/S)

Migrate DFW, Workloads



Use New HW

Custom NSX-T Design (N/S)

Migrate DFW

In-Place

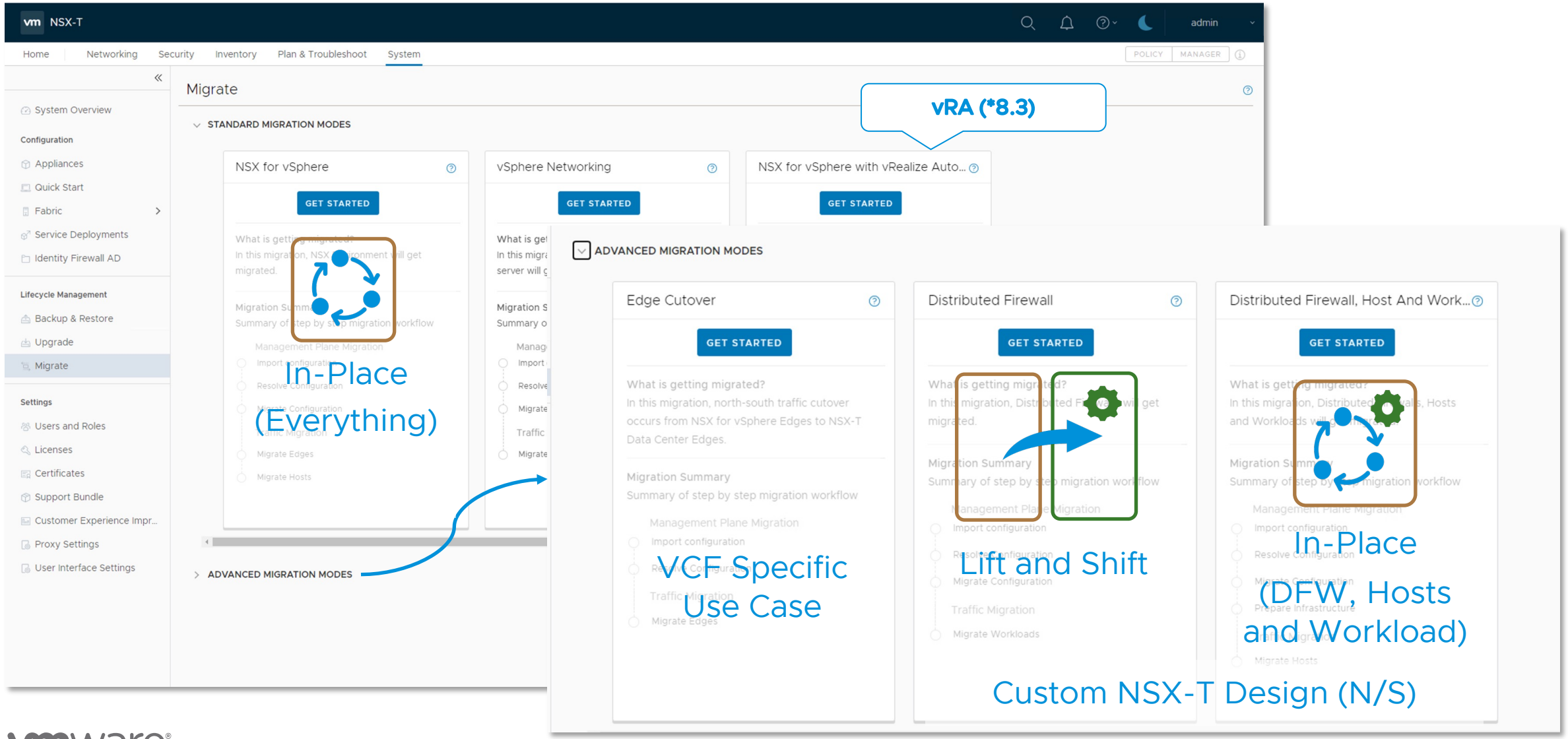
Lift and Shift

Resources: https://vault.vmware.com/group/nsx/v2t-migration-t

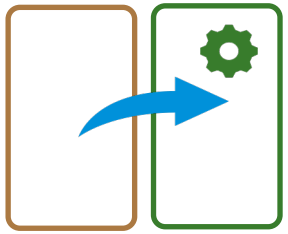
Migration Coordinator – Lift and Shift via GUI

One Tool – Many Options

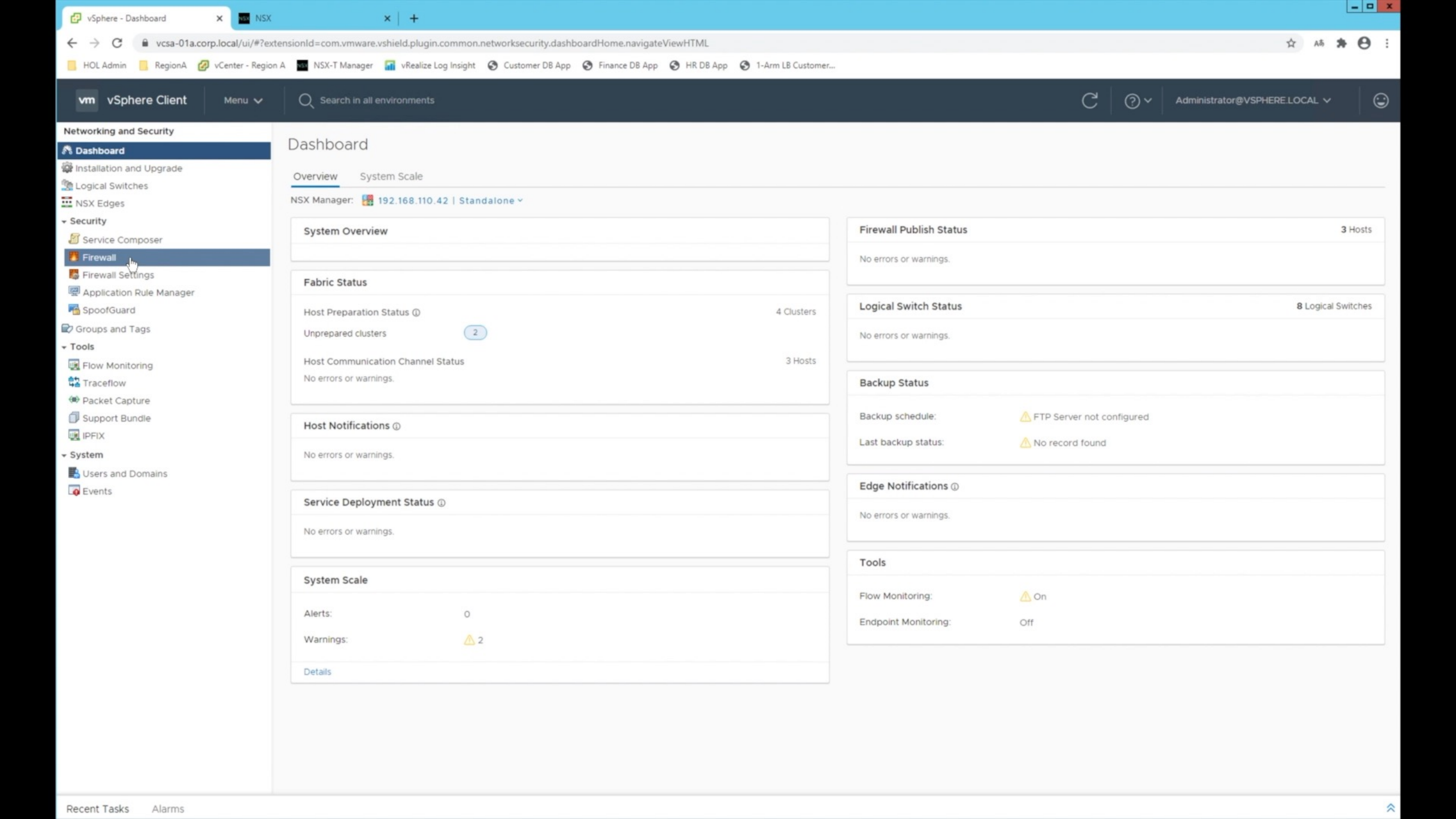
NSX-T 3.1.1



Demo



Migration Coordinator - Lift and Shift


vSphere - Dashboard
NSX
vcsa-01a.corp.local/ui/#?extensionId=com.vmware.vshield.plugin.common.networksecurity.dashboardHome.navigateViewHTML
HOL Admin
RegionA
vCenter - Region A
NSX-T Manager
vRealize Log Insight
Customer DB App
Finance DB App
HR DB App
1-Arm LB Customer...
vSphere Client
Menu
Search in all environments
Administrator@VSPHERE.LOCAL
Networking and Security
Dashboard
Installation and Upgrade
Logical Switches
NSX Edges
Security
Service Composer
Firewall
Firewall Settings
Application Rule Manager
SpoofGuard
Groups and Tags
Tools
Flow Monitoring
Traceflow
Packet Capture
Support Bundle
IPFIX
System
Users and Domains
Events
Dashboard
Overview
System Scale
NSX Manager: 192.168.110.42 | Standalone
System Overview
Fabric Status
Host Preparation Status
4 Clusters
Unprepared clusters
2
Host Communication Channel Status
3 Hosts
No errors or warnings.
Host Notifications
No errors or warnings.
Service Deployment Status
No errors or warnings.
System Scale
Alerts:
0
Warnings:
2
Details
Firewall Publish Status
3 Hosts
No errors or warnings.
Logical Switch Status
8 Logical Switches
No errors or warnings.
Backup Status
Backup schedule:
FTP Server not configured
Last backup status:
No record found
Edge Notifications
No errors or warnings.
Tools
Flow Monitoring:
On
Endpoint Monitoring:
Off
Recent Tasks
Alarms

Thank You