Overlay Transport Virtualization (OTV) Unicast-Mode Transport Infrastructure Deployment

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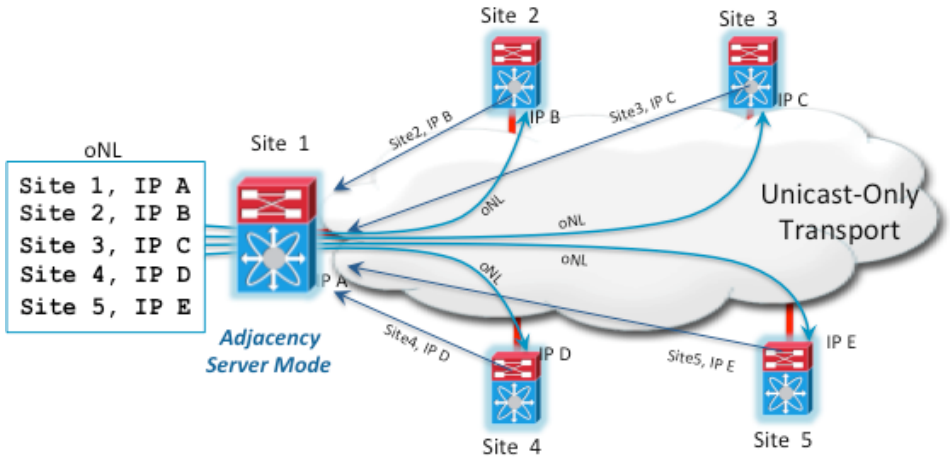
OTV Unicast-Mode Transport Infrastructure Deployment

Starting with NX-OS 5.2(1) release, OTV has the option to be deployed with unicast-only transport instead of multicast transport. The OTV control plane over a unicast-only transport works generally the same way as OTV with multicast mode. The only difference is that each OTV device would need to create multiple copies of each control plane packet and unicast them to each remote OTV device part of the same logical overlay. The operational simplification brought by the unicast-only model (removing the need for multicast deployment) can make this deployment option very appealing in scenarios where LAN extension connectivity is required only between few (2-3) DC sites.

To be able to communicate with all the remote OTV devices, each OTV node needs to know a list of neighbors to replicate the control packets to. Rather than statically configuring in each OTV node the list of all neighbors, a simple dynamic means is used to provide this information. This is achieved by designating one (or more) OTV Edge device to perform as an Adjacency Server. Every OTV device wishing to join a specific OTV logical overlay, needs to first "register" with the Adjacency Server (by sending OTV Hello messages to it). All other OTV neighbor addresses are discovered dynamically through the Adjacency Server. Thereby, when the OTV service needs to be extended to a new DC site, only the OTV edge devices for the new site need to be configured with the Adjacency Server addresses. No other sites need additional configuration.

Figure 1 shows each OTV Edge device registering with the Adjacency Server.

Figure 1 Adjacency Server Functionality



OTV Adjacency Server Configuration Procedure

The adjacency server is configured directly on the OTV device. Configure the local edge device to act as an adjacency server, or configure a remote adjacency server.

The following procedure, using the appropriate corresponding NX-OS commands, allows you to enable the adjacency server. Configuration examples are included.

Step 1 Enable the OTV feature.

Step 2 Enter global configuration mode.

configure terminal

```
switch# configure terminal
switch(config)#
```

Step 3 Create an OTV overlay interface and enters interface configuration mode.

interface overlay *interface*

```
switch(config)# interface overlay 1
switch(config-if-overlay)#
```

Step 4 (Optional) Configure the local edge device to act as an adjacency server.

otv adjacency-server unicast-only

```
switch(config-if-overlay)# otv adjacency-server unicast-only
```

Step 5 (Optional) Configure the local edge device to use a remote adjacency server. The IP address format is in dotted decimal notation. The *secondary-ip-address* argument is the IP address of the backup adjacency server, if you have configured a backup adjacency server.

otv use-adjacency-server *primary-ip-address* [*secondary-ip-address*] **unicast-only**

```
switch(config-if-overlay)# otv use-adjacency-server 192.0.2.1 unicast-only
```

Step 6 (Optional) Display the OTV adjacency information. The *if-number* range is from 0 to 65503. The *vpn-name* is any case-sensitive, alphanumeric string up to 80 characters.

show otv adjacency [**overlay** *if-number* | **vpn** *vpn-name*] [**detail**]

```
switch(config-if-overlay)# show otv adjacency overlay 1
```

Step 7 (Optional) Copy the running configuration to the startup configuration.

copy running-config startup-config

```
switch(config-if-overlay)# copy running-config startup-config
```

Step 8 Exit configuration mode.

exit

OTV Adjacency Server Configuration Example

A pair of Adjacency Servers can be deployed for redundancy purposes. These Adjacency Server devices are completely stateless between them, which implies that every OTV edge device (OTV clients) should register its existence with both of them. For this purpose, the primary and secondary Adjacency Servers are configured in each OTV edge device. However, an OTV client will not process an alternate server's replication list until it detects that the primary Adjacency Server has timed out. Once that happens, each OTV edge device will start using the replication list from the secondary Adjacency Server and push the difference to OTV. OTV will stale the replication list entries with a timer of 10 minutes. If the Primary Adjacency Server comes back up within 10 mins, OTV will always revert back to the primary replication list. In case the Primary Adjacency Server comes back up after replication list is deleted, a new replication list will be pushed by the Primary after learning all OTV neighbors by means of OTV Hellos that are sent periodically.

OTV also uses graceful exit of Adjacency Server. When a Primary Adjacency Server is de-configured or is rebooted, it can let its client know about it and can exit gracefully. Following this, all OTV clients can start using alternate Server's replication list without waiting for primary Adjacency Server to time out.

There is no designation in the configuration to denote the distinction between the primary and secondary adjacency server when configuring the adjacency server itself. When pointing the edge devices to the adjacency server, the primary and secondary designation is implied in the command (see table 1 above).

The following exhibits show sample configuration for Adjacency server (Primary and Secondary).

1. Primary Adjacency Server Configuration (20.1.1.1)

```
feature otv
otv site-vlan 1999
otv site-identifier 0x111
interface Overlay200
      otv adjacency-server unicast-only
otv join-interface Ethernet1/2
otv extend-vlan 178, 181, 2500-2563
no otv suppress-arp-nd
no shutdown
```

2. Secondary Adjacency Server Configuration (20.2.1.1)

```
feature otv
otv site-vlan 1999
otv site-identifier 0x111
interface Overlay200
otv join-interface Ethernet1/2
otv extend-vlan 178, 181, 2500-2563
otv use-adjacency-server 20.1.1.1 unicast-only
otv adjacency-server unicast-only
no otv suppress-arp-nd
no shutdown
```

The adjacency servers were placed in separate data centers on one of the two Nexus 7000 switches. It is important to note that even though the Nexus is configured as an adjacency server, it is also an OTV edge device. As shown above, the configuration on the Primary Adjacency Server is very simple and limited to enable AS functionality (otv adjacency-server command). The same command is also required on the Secondary Adjacency Server device, but also needs to point to the Primary AS (leveraging the otv use-adjacency-server command).

All OTV edge devices must be configured to point to the adjacency servers and can be configured using the following as an example:

```
feature otv
otv site-vlan 1999
```

```
otv site-identifier 0x111
interface Overlay200
  otv join-interface Ethernet1/2
  otv extend-vlan 178, 181, 2500-2563
  otv use-adjacency-server 20.1.1.1 20.2.1.1 unicast-only
  no otv suppress-arp-nd
  no shutdown
```

The OTV Edge Device must be configured to use both the Primary and Secondary Adjacency Servers. The sequence of adjacency server address in the configuration determine primary or secondary adjacency server role. This order is relevant since an OTV edge device will always use the neighbor-list provided by the Primary Adjacency Server, unless it detects that specific device is not available anymore.

OTV Adjacency Server Configuration Verification

To verify OTV is utilizing the Unicast-only mode, you can use the **show otv** command. The output shows Unicast-Only capability and addresses of the adjacency servers:

```
dc1a-agg-7k1-otv# show otv
OTV Overlay Information
Site Identifier 0000.0000.0111
Overlay interface Overlay200
VPN name            : Overlay200
 VPN state          : UP
 Extended vlans     : 178 2500-2563 (Total:65)
 Join interface(s)  : Eth1/2 (20.1.1.1)
 Site vlan          : 1999 (up)
 AED-Capable        : Yes
 Capability         : Unicast-Only
 Is Adjacency Server : Yes
 Adjacency Server(s) : 20.1.1.1 / 20.2.1.1
```

To view the replication list that the OTV devices are using, use the **show otv internal adjacency-server replication-list** command.

```
dc1a-agg-7k1-otv# show otv internal adjacency-server replication-list
Overlay Repl List database
Overlay-Interface Overlay200,
Dest Addr                                Capability
20.1.1.1                                 U
20.1.2.1                                 U
20.2.1.1                                 U
20.2.2.1                                 U
20.3.1.1                                 U
```

The same commands that are useful for multicast mode OTV display similar information in Unicast-only mode. For example, **show otv adjacency** shows the other OTV edge devices in the network and their status.

```
dc1a-agg-7k1-otv# show otv adjacency
Overlay Adjacency database
Overlay-Interface Overlay200  :
Hostname                         System-ID      Dest Addr       Up Time   State
dc1a-agg-7k2-otv                 001b.54c2.e142 20.1.2.1        6d03h     UP
dc2a-agg-7k1-otv                 0023.ac64.7042 20.2.1.1        6d03h     UP
dc2a-agg-7k2-otv                 0022.5579.0f42 20.2.2.1        5d01h     UP
dc3a-agg-7k-otv                  0026.982f.a0c2 20.3.1.1        4d23h     UP
```

This document assumes a working knowledge of OTV. Other required portions of the OTV configuration were not in the scope of this document. For more information on OTV configurations and design considerations, please refer to:

http://www.cisco.com/en/US/docs/solutions/Enterprise/Data_Center/DCI/whitepaper/DCI3_OTV_Intro_WP.pdf

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