Manage routing in an SVM

ONTAP 9

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Learn about SVM routing on the ONTAP network

The routing table for an SVM determines the network path the SVM uses to communicate with a destination. It's important to understand how routing tables work so that you can prevent network problems before they occur.

Routing rules are as follows:

- ONTAP routes traffic over the most specific available route.
- ONTAP routes traffic over a default gateway route (having 0 bits of netmask) as a last resort, when more specific routes are not available.

In the case of routes with the same destination, netmask, and metric, there is no guarantee that the system will use the same route after a reboot or after an upgrade. This is especially an issue if you have configured multiple default routes.

It is a best practice to configure one default route only for an SVM. To avoid disruption, you should ensure that the default route is able to reach any network address that is not reachable by a more specific route. For more information, see NetApp Knowledge Base: SU134 - Network access might be disrupted by incorrect routing configuration in clustered ONTAP

Create static routes for the ONTAP network

You can create static routes within a storage virtual machine (SVM) to control how LIFs use the network for outbound traffic.

When you create a route entry associated with an SVM, the route will be used by all LIFs that are owned by the specified SVM and that are on the same subnet as the gateway.

Step

Use the `network route create` command to create a route.

```
network route create -vserver vs0 -destination 0.0.0.0/0 -gateway
10.61.208.1
```

Learn more about `network route create` in the ONTAP command reference.

Enable multipath routing for the ONTAP network

If multiple routes have the same metric for a destination, only one of the routes is picked for outgoing traffic. This leads to other routes being unused for sending outgoing traffic. You can enable multipath routing to load balance across all available routes in proportion to their metrics, as opposed to ECMP routing, which load balances across available routes of the same metric.

Steps

1. Log in to the advanced privilege level:

   ```
   set -privilege advanced
   ```

2. Enable multipath routing:

   ```
   network options multipath-routing modify -is-enabled true
   ```

   Multipath routing is enabled for all nodes in the cluster.

   ```
   network options multipath-routing modify -is-enabled true
   ```

   Learn more about `network options multipath-routing modify` in the ONTAP command reference.

Delete static routes from the ONTAP network

You can delete an unneeded static route from a storage virtual machine (SVM).

Step

Use the `network route delete` command to delete a static route.

The following example deletes a static route associated with SVM vs0 with a gateway of 10.63.0.1 and a destination IP address of 0.0.0.0/0:

```
network route delete -vserver vs0 -gateway 10.63.0.1 -destination
0.0.0.0/0
```

Learn more about `network route delete` in the ONTAP command reference.

View ONTAP routing information

You can display information about the routing configuration for each SVM on your cluster. This can help you diagnose routing problems involving connectivity issues between client applications or services and a LIF on a node in the cluster.

Steps

1. Use the `network route show` command to display routes within one or more SVMs. The following example shows a route configured in the vs0 SVM:

```
network route show
  (network route show)
Vserver             Destination     Gateway         Metric
------------------- --------------- --------------- ------
vs0
                    0.0.0.0/0       172.17.178.1    20
```

2. Use the `network route show-lifs` command to display the association of routes and LIFs within one or more SVMs.

   The following example shows LIFs with routes owned by the vs0 SVM:

```
network route show-lifs
  (network route show-lifs)

Vserver: vs0
Destination             Gateway                 Logical Interfaces
----------------------  --------------          --------------------
0.0.0.0/0               172.17.178.1            cluster_mgmt,
                                                LIF-b-01_mgmt1,
                                                LIF-b-02_mgmt1
```

   Learn more about `network route show` and `network route show-lifs` in the ONTAP command reference.

3. Use the `network route active-entry show` command to display installed routes on one or more nodes, SVMs, subnets, or routes with specified destinations.

   The following example shows all installed routes on a specific SVM:

```
network route active-entry show -vserver Data0

Vserver: Data0
Node: node-1
Subnet Group: 0.0.0.0/0
Destination             Gateway              Interface   Metric  Flags
----------------------  -------------------  ---------   ------  -----
127.0.0.1               127.0.0.1            lo              10  UHS
127.0.10.1              127.0.20.1           losk            10  UHS
127.0.20.1              127.0.20.1           losk            10  UHS

Vserver: Data0
Node: node-1
Subnet Group: fd20:8b1e:b255:814e::/64
Destination             Gateway              Interface   Metric  Flags
```

```
---------------------  ------------------  ---------   ------  -----
default                fd20:8b1e:b255:814e::1
                                           e0d             20  UGS
fd20:8b1e:b255:814e::/64
                       link#4              e0d              0  UC

Vserver: Data0
Node: node-2
Subnet Group: 0.0.0.0/0
Destination            Gateway             Interface   Metric  Flags
---------------------  ------------------  ---------   ------  -----
127.0.0.1              127.0.0.1           lo              10  UHS

Vserver: Data0
Node: node-2
Subnet Group: 0.0.0.0/0
Destination            Gateway             Interface   Metric  Flags
---------------------  ------------------  ---------   ------  -----
127.0.10.1             127.0.20.1          losk            10  UHS
127.0.20.1             127.0.20.1          losk            10  UHS

Vserver: Data0
Node: node-2
Subnet Group: fd20:8b1e:b255:814e::/64
Destination            Gateway             Interface   Metric  Flags
---------------------  ------------------  ---------   ------  -----
default                fd20:8b1e:b255:814e::1
                                           e0d             20  UGS
fd20:8b1e:b255:814e::/64
                       link#4              e0d              0  UC
fd20:8b1e:b255:814e::1 link#4              e0d              0  UHL
11 entries were displayed.
```

Learn more about `network route active-entry show` in the ONTAP command reference.

Remove dynamic routes from routing tables for the ONTAP network

When ICMP redirects are received for IPv4 and IPv6, dynamic routes are added to the routing table. By default, the dynamic routes are removed after 300 seconds. If you want to maintain dynamic routes for a different amount of time, you can change the time out value.

About this task

You can set the timeout value from 0 to 65,535 seconds. If you set the value to 0, the routes never expire.

Removing dynamic routes prevents loss of connectivity caused by the persistence of invalid routes.

Steps

1. Display the current timeout value.
   - For IPv4:

     ```
     network tuning icmp show
     ```

   - For IPv6:

     ```
     network tuning icmp6 show
     ```

2. Modify the timeout value.
   - For IPv4:

     ```
     network tuning icmp modify -node node_name -redirect-timeout
     timeout_value
     ```

   - For IPv6:

     ```
     network tuning icmp6 modify -node node_name -redirect-v6-timeout
     timeout_value
     ```

3. Verify that the timeout value was modified correctly.
   - For IPv4:

     ```
     network tuning icmp show
     ```

   - For IPv6:

     ```
     network tuning icmp6 show
     ```

Learn more about `network tuning icmp` in the ONTAP command reference.

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