Perform basic infrastructure checks

ONTAP 9

NetApp
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Check the NFS TCP maximum transfer size

For NFS, you can check whether the TCP maximum transfer size for reads and writes might be causing a performance issue. If you think the size is slowing performance, you can increase it.

What you'll need

- You must have cluster administrator privileges to perform this task.
- You must use advanced privilege level commands for this task.

Steps

1. Change to the advanced privilege level:

   ```
   set -privilege advanced
   ```

2. Check the TCP maximum transfer size:

   ```
   vserver nfs show -vserver vserver_name -instance
   ```

3. If the TCP maximum transfer size is too small, increase the size:

   ```
   vserver nfs modify -vserver vserver_name -tcp-max-xfer-size integer
   ```

4. Return to the administrative privilege level:

   ```
   set -privilege admin
   ```

Example

The following example changes the TCP maximum transfer size of `SVM1` to 1048576:

```
cluster1::*> vserver nfs modify -vserver SVM1 -tcp-max-xfer-size 1048576
```

Check the iSCSI TCP read/write size

For iSCSI, you can check the TCP read/write size to determine if the size setting is creating a performance issue. If the size is the source of an issue, you can correct it.

What you'll need

Advanced privilege level commands are required for this task.

Steps

1. Change to advanced privilege level:

```
set -privilege advanced
```

2. Check the TCP window size setting:

```
vserver iscsi show -vserv,er vserver_name -instance
```

3. Modify the TCP window size setting:

```
vserver iscsi modify -vserver vserver_name -tcp-window-size integer
```

4. Return to administrative privilege:

```
set -privilege admin
```

Example

The following example changes the TCP window size of `SVM1` to 131,400 bytes:

```
cluster1::*> vserver iscsi modify -vserver vs1 -tcp-window-size 131400
```

Check the CIFS multiplex settings

If slow CIFS network performance causes a performance issue, you can modify the multiplex settings to improve and correct it.

Steps

1. Check the CIFS multiplex setting:

```
vserver cifs options show -vserver -vserver_name -instance
```

2. Modify the CIFS multiplex setting:

```
vserver cifs options modify -vserver -vserver_name -max-mpx integer
```

Example

The following example changes the maximum multiplex count on `SVM1` to 255:

```
cluster1::> vserver cifs options modify -vserver SVM1 -max-mpx 255
```

Check the FC adapter port speed

The adapter target port speed should match the speed of the device to which it connects, to optimize performance. If the port is set to autonegotiation, it can take longer to reconnect after a takeover and giveback or other interruption.

What you'll need

All LIFs that use this adapter as their home port must be offline.

Steps

1. Take the adapter offline:

   ```
   network fcp adapter modify -node nodename -adapter adapter -state down
   ```

2. Check the maximum speed of the port adapter:

   ```
   fcp adapter show -instance
   ```

3. Change the port speed, if necessary:

   ```
   network fcp adapter modify -node nodename -adapter adapter -speed
   {1|2|4|8|10|16|auto}
   ```

4. Bring the adapter online:

   ```
   network fcp adapter modify -node nodename -adapter adapter -state up
   ```

5. Bring all the LIFs on the adapter online:

   ```
   network interface modify -vserver * -lif * { -home-node node1 -home-port e0c }
   -status-admin up
   ```

Example

The following example changes the port speed of adapter `0d` on `node1` to 2 Gbps:

```
cluster1::> network fcp adapter modify -node node1 -adapter 0d -speed 2
```

Check the network settings on the data switches

Although you must maintain the same MTU settings on your clients, servers and storage systems (that is, network endpoints), intermediate network devices such as NICs and switches should be set to their maximum MTU values to ensure that performance is not impacted.

For best performance, all components in the network must be able to forward jumbo frames (9000 bytes IP, 9022 bytes including Ethernet). Data switches should be set to at least 9022 bytes, but a typical value of 9216 is possible with most switches.

Procedure

For data switches, check that the MTU size is set to 9022 or higher.

For more information, see the switch vendor documentation.

Check the MTU network setting on the storage system

You can change the network settings on the storage system if they are not the same as on the client or other network endpoints. Whereas the management network MTU setting

is set to 1500, the data network MTU size should be 9000.

About this task

All ports within a broadcast-domain have the same MTU size, with the exception of the e0M port handling management traffic. If the port is part of a broadcast-domain, use the `broadcast-domain modify` command to change the MTU for all ports within the modified broadcast-domain.

Note that intermediate network devices such as NICs and data switches can be set to higher MTU sizes than network endpoints. For more information, see Check the network settings on the data switches.

Steps

1. Check the MTU port setting on the storage system:

   ```
   network port show -instance
   ```

2. Change the MTU on the broadcast domain used by the ports:

   ```
   network port broadcast-domain modify -ipspace ipspace -broadcast-domain
   broadcast_domain -mtu new _mtu
   ```

Example

The following example changes the MTU port setting to 9000:

```
network port broadcast-domain modify -ipspace Cluster -broadcast-domain
Cluster -mtu 9000
```

Check disk throughput and latency

You can check the disk throughput and latency metrics for cluster nodes to assist you in troubleshooting.

About this task

Advanced privilege level commands are required for this task.

Steps

1. Change to advanced privilege level:

   ```
   set -privilege advanced
   ```

2. Check the disk throughput and latency metrics:

   ```
   statistics disk show -sort-key latency
   ```

Example

The following example displays the totals in each user read or write operation for `node2` on `cluster1`:

```
::*> statistics disk show -sort-key latency
cluster1 : 8/24/2015 12:44:15
                    Busy Total Read  Write  Read    Write   *Latency
  Disk       Node   (%)   Ops   Ops   Ops   (Bps)    (Bps)       (us)
------------ ----   ---- ----   ----- ----- ------   -----    -----

1.10.20      node2     4    5       3     2  95232  367616    23806
1.10.8       node2     4    5       3     2 138240  386048    22113

1.10.6       node2     3    4       2     2  48128  371712    19113
1.10.19      node2     4    6       3     2 102400  443392    19106

1.10.11      node2     4    4       2     2 122880  408576    17713
```

Check throughput and latency between nodes

You can use the `network test-path` command to identify network bottlenecks, or to prequalify network paths between nodes. You can run the command between intercluster nodes or intracluster nodes.

What you'll need

- You must be a cluster administrator to perform this task.
- Advanced privilege level commands are required for this task.
- For an intercluster path, the source and destination clusters must be peered.

About this task

Occasionally, network performance between nodes may not meet expectations for your path configuration. A 1 Gbps transmission rate for the kind of large data transfers seen in SnapMirror replication operations, for example, would not be consistent with a 10 GbE link between the source and destination clusters.

You can use the `network test-path` command to measure throughput and latency between nodes. You can run the command between intercluster nodes or intracluster nodes.

The test saturates the network path with data, so you should run the command when the system is not busy and when network traffic between nodes is not excessive. The test times out after ten seconds. The command can be run only between ONTAP 9 nodes.

The `session-type` option identifies the type of operation you are running over the network path—for example, "AsyncMirrorRemote" for SnapMirror replication to a remote destination. The type dictates the amount of data used in the test. The following table defines the session types:

Session Type	Description
AsyncMirrorLocal	Settings used by SnapMirror between nodes in the same cluster

AsyncMirrorRemote	Settings used by SnapMirror between nodes in different clusters (default type)
RemoteDataTransfer	Settings used by ONTAP for remote data access between nodes in the same cluster (for example, an NFS request to a node for a file stored in a volume on a different node)

Steps

1. Change to advanced privilege level:

   ```
   set -privilege advanced
   ```

2. Measure throughput and latency between nodes:

   ```
   network test-path -source-node source_nodename |local -destination-cluster
   destination_clustername -destination-node destination_nodename -session-type
   Default|AsyncMirrorLocal|AsyncMirrorRemote|SyncMirrorRemote|RemoteDataTransfer
   ```

   The source node must be in the local cluster. The destination node can be in the local cluster or in a peered cluster. A value of "local" for `-source-node` specifies the node on which you are running the command.

   The following command measures throughput and latency for SnapMirror-type replication operations between `node1` on the local cluster and `node3` on `cluster2`:

   ```
   cluster1::> network test-path -source-node node1 -destination-cluster
   cluster2 -destination-node node3 -session-type AsyncMirrorRemote
   Test Duration:      10.88 secs
   Send Throughput:    18.23 MB/sec
   Receive Throughput: 18.23 MB/sec
   MB sent:            198.31
   MB received:        198.31
   Avg latency in ms:  2301.47
   Min latency in ms:  61.14
   Max latency in ms:  3056.86
   ```

3. Return to administrative privilege:

   ```
   set -privilege admin
   ```

After you finish

If performance does not meet expectations for the path configuration, you should check node performance statistics, use available tools to isolate the problem in the network, check switch settings, and so forth.

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