



MetroCluster Systems running clustered Data ONTAP

Tiebreaker Software Installation and Configuration Guide

Software Version 1.0



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Overview of the Tiebreaker software

It is helpful to understand what the NetApp MetroCluster Tiebreaker software is and how it distinguishes between types of failures so that you can monitor your MetroCluster configurations efficiently. You use the Tiebreaker CLI to manage settings and monitor the status and operations of MetroCluster configurations.

Detecting failures with NetApp MetroCluster Tiebreaker software

The Tiebreaker software resides on a Linux host. You need the Tiebreaker software only if you want to monitor two clusters and the connectivity status between them from a third site. Doing so enables each partner in a cluster to distinguish between an ISL failure, when inter-site links are down, from a site failure.

After you install the Tiebreaker software on a Linux host, you can configure the clusters in a MetroCluster configuration to monitor for disaster conditions.

How the Tiebreaker software detects site failures

NetApp MetroCluster Tiebreaker software looks at reachability of all four nodes in a MetroCluster configuration, the HA pair, and the cluster to determine whether a site failure has occurred.

Monitoring the nodes

The Tiebreaker software monitors each controller in the MetroCluster nodes by establishing redundant SSH sessions through multiple paths to a node management LIF (hosted on the IP network) and communicating with the nodes.

Upon loss of all the SSH connections and a subsequent failure to reconnect, the Tiebreaker software checks the status of the HA partner. The HA partner can be in one of the following states: *taken over* because it has failed, panicked, rebooted, or shut down; *normal*, or *unreachable* over the node management LIF.

The Tiebreaker software can detect an SSH session failure in three to five seconds by setting the TCP keep-alive timer to one second and the retry interval to three seconds.

Monitoring the HA pairs

The Tiebreaker software monitors the status of the HA pairs by determining whether the nodes in the HA pairs are reachable. Upon loss of connectivity to a node, the Tiebreaker software checks the

status of the HA pair. The HA pair can be in one of the following states: *taken over*, *normal*, or *unreachable*.

Monitoring the clusters

The Tiebreaker software monitors each controller in the MetroCluster nodes by establishing redundant SSH sessions through multiple paths to a cluster LIF (hosted on the IP network). If the Tiebreaker software loses the SSH connection to the cluster, it checks the status of the HA pairs, which in turn report on the aggregate status of the nodes in the cluster.

The Tiebreaker software can indirectly monitor the cluster by checking the status of its DR partner cluster. If the DR partner cluster reports that all node links are down, there is a strong possibility of a site failure at the cluster. The DR partner cluster might also report that the nodes are reachable and are considered to be healthy, but the nodes are isolated from the Tiebreaker software from all the paths (also called *ISL failures*).

The Tiebreaker software can detect an SSH session failure in three to five seconds by setting the TCP keep-alive timer to one second and the retry interval to three seconds.

How the Tiebreaker software detects ISL failures

In addition to monitoring the nodes in a MetroCluster configuration, the HA pair, and the cluster, the NetApp MetroCluster Tiebreaker software monitors the network paths between the MetroCluster clusters. A loss of connection between a node and DR partner triggers a health check of the intercluster peering network to detect an ISL failure.

Types of network paths

There are two types of network paths between the two clusters in a MetroCluster configuration:

FC network

This type of network is composed of two, redundant FC switch fabrics. Each switch fabric has two FC switches, and one switch of each switch fabric is co-located with a cluster. Each cluster has two FC switches, one from each switch fabric. Each switch fabric includes interswitch links (ISLs) of up to 200 km that connect the clusters. All the nodes have FC (FC-VI and FCP initiator) connectivity to each of the co-located FC switches. Data is replicated from cluster to cluster over the ISL.

Intercluster peering network

This type of network is composed of a redundant IP network path between the two clusters. Each node has redundant FC-VI connectivity with its nodes on the DR partner cluster.

Monitoring the intercluster peering network

The Tiebreaker software regularly pings the intercluster peering network to monitor its health. When the FC-VI connection is lost between the node and its DR partner cluster and the intercluster peering

network does not respond to pings, the Tiebreaker software assumes that the network is isolated. Isolation occurs when the nodes are reachable but the inter-site links are down.

About the Tiebreaker CLI and man pages

The Tiebreaker CLI provides commands that enable you to remotely configure the Tiebreaker software and monitor the MetroCluster configurations.

The CLI command prompt is represented as `NetApp MetroCluster Tiebreaker::>`.

The man pages are available in the CLI by entering the applicable command name at the prompt.

Installing the Tiebreaker software

The Tiebreaker software provides monitoring capabilities for a clustered storage environment. It also sends SNMP notifications in the event of node connectivity issues and site disasters.

Before you begin

The MetroCluster software must be installed and configured on both the nodes of the cluster.

Installing the software package

You need to install the Tiebreaker software on your local computer to complete the setup of the MetroCluster configuration.

Before you begin

Your storage system must be running Data ONTAP 8.3, and you must have met the following minimum hardware and software requirements:

- RedHat Linux 6.5 64-bit only
- 1.5 to 2 GB RAM
- Java version 1.6 or greater
- MySql server version 5.5.30 or greater
- p 7zip

Steps

1. Before installing the Tiebreaker software, you must download the NetApp-MetroCluster-Tiebreaker-Software-1.0-x86_64.rpm file from the NetApp Support Site.
2. Issue the following command while logged in as root:

Example

The following example shows a successful installation of Red Hat Linux package:

```
root@scspr0013458001:~# rpm -ivh NetApp-MetroCluster-Tiebreaker-
Software-1.0.x86_64.rpm
Preparing... ##### [100%]
1:NetApp-MetroCluster-Tie#####
[100%]
```

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```
Post installation start Tue Sep 9 06:34:05 EDT 2014
Please enter mysql root password when prompted
Enter password:
Enabled autostart of NetApp MetroCluster Tiebreaker software daemon
during boot
Starting NetApp MetroCluster Tiebreaker software daemon
Created symbolic link for NetApp MetroCluster Tiebreaker software CLI
Post installation end Tue Sep 9 06:34:09 EDT 2014
Successfully installed NetApp MetroCluster Tiebreaker software
version 1.0
```

Related information

[NetApp Support Site: mysupport.netapp.com](http://mysupport.netapp.com)

Configuring the Tiebreaker software

After installation of the Tiebreaker software, you can add or modify MetroCluster configurations, or remove them from the Tiebreaker software.

Adding MetroCluster configurations

After installing the NetApp MetroCluster Tiebreaker software for the first time, you must add the MetroCluster configurations on both clusters, one at a time. You can add more than two MetroCluster configurations and use this procedure at any time.

Before you begin

You must have installed the MetroCluster configuration in a clustered Data ONTAP environment and enabled the settings in the software.

Steps

1. Use the Tiebreaker CLI `monitor add` command to add MetroCluster configurations.

If you are using the host name, it must be the fully qualified domain name (FQDN).

Example

The following example shows the configuration of cluster_A:

```
NetApp MetroCluster Tiebreaker :> monitor add wizard
Enter monitor Name: cluster_A
Enter Cluster IP Address: 10.222.196.130
Enter Cluster Username: admin
Enter Cluster Password:
Enter Peer Cluster IP Address: 222.196.140
Enter Peer Cluster Username: admin
Enter Peer Cluster Password:
Successfully added monitor to NetApp MetroCluster Tiebreaker software.
```

2. Confirm that the MetroCluster configuration is added properly by using the Tiebreaker CLI `monitor show -status` command.

Example

```
NetApp MetroCluster Tiebreaker :> monitor show -status
```

Modifying MetroCluster configurations

You can modify the MetroCluster configuration whenever you need to change the settings.

Steps

1. Use the Tiebreaker CLI `monitor modify` command with any of the following options:

Option	Description
<code>-monitor-name</code>	Name of the MetroCluster configuration
<code>-enable-monitor</code>	Enables and disables monitoring of the MetroCluster configuration
<code>-override-vetoes</code>	Triggers switchover with the <code>override-vetoes</code> option
<code>-silent-period</code>	Period for which NetApp MetroCluster Tiebreaker software waits to confirm a site failure after detection

Example

```
NetApp MetroCluster Tiebreaker :> monitor modify -monitor-name
cluster_B -silent-period 15
Successfully modified monitor in NetApp MetroCluster Tiebreaker
software.
```

2. Confirm that the MetroCluster configuration is modified properly by using the Tiebreaker CLI `monitor show -status` command.

Removing MetroCluster configurations

You can remove the MetroCluster configuration that is being monitored by the Tiebreaker software when you no longer want to monitor a MetroCluster configuration.

Steps

1. Use the Tiebreaker CLI `monitor remove` command to remove the MetroCluster configuration.

Example

In the following example, `cluster_B` is removed from the software:

```
NetApp MetroCluster Tiebreaker :> monitor remove -monitor-name  
cluster_B  
Successfully removed monitor from NetApp MetroCluster Tiebreaker  
software.
```

2. Confirm that the MetroCluster configuration is removed properly by using the Tiebreaker CLI `monitor show -status` command.

Example

```
NetApp MetroCluster Tiebreaker :> monitor show -status
```

Configuring SNMP settings for Tiebreaker software

To use SNMP with the Tiebreaker software, you must configure SNMP settings.

Step

1. Use the Tiebreaker CLI `snmp config wizard` command to add MetroCluster configurations.

Example

The following example shows the configuration of an SNMP receiver that supports SNMP v1 with an IP address of 10.222.210.234, port number 162 for trap messages, and the community string set to **public**:

```
NetApp MetroCluster Tiebreaker :> snmp config wizard
Enter SNMP Version [V1/V3]: V1
Enter SNMP Host: 10.222.210.234
Enter SNMP Port: 162
Enter SNMP V1 Community: public
Successfully added SNMP properties to NetApp MetroCluster Tiebreaker
software.
NetApp MetroCluster Tiebreaker :>
```

The Tiebreaker software is now ready to send traps to the SNMP receiver you specified.

Monitoring the MetroCluster configuration

MetroCluster Tiebreaker software automates the recovery process by enabling you to monitor the MetroCluster configuration status, evaluate SNMP events and traps that are sent to NetApp customer support, and view the status of monitoring operations.

Configuring AutoSupport

By default, AutoSupport messages are sent to NetApp once a week upon installation of the Tiebreaker software. Events that trigger AutoSupport notification include Tiebreaker software panics, detection of disaster conditions on MetroCluster configurations, or unknown MetroCluster configuration status.

Step

1. Use the Tiebreaker CLI `autosupport` command with any of the following options:

Option	Description
-invoke	Sends an AutoSupport message to customer support
-enable	Enables AutoSupport notification (This is the default.)
-disable	Disables AutoSupport notification
-show	Displays AutoSupport status

Example

The following example shows that AutoSupport is enabled and AutoSupport content was sent to customer support:

```
NetApp MetroCluster Tiebreaker :> autosupport enable
Successfully enabled AutoSupport

NetApp MetroCluster Tiebreaker :> autosupport show
AutoSupport is enabled.

NetApp MetroCluster Tiebreaker :> autosupport invoke
Successfully sent AutoSupport data to NetApp.
```

SNMP events and traps

NetApp MetroCluster Tiebreaker software uses SNMP traps to notify you of significant events. These traps are part of the NetApp MIB file. Each trap contains the following information: trap name, severity, impact level, timestamp, and message.

Event name	Event detail	Trap number
MetroCluster Tie-Breaker is unable to reach the MetroCluster configuration	Warns the administrator that the software cannot detect a disaster. This event occurs when both clusters are not reachable.	25000
MetroCluster Tie-Breaker is unable to reach cluster	Warns the administrator that the software cannot reach one of the clusters.	25001
MetroCluster Tie-Breaker detected disaster at cluster	Notifies the administrator that the software detects a site failure. A notification will be delivered.	25002
All links between partner cluster are severed.	The software detects that both clusters are reachable, but all the network paths between the two cluster are down, and the clusters cannot communicate with each other.	25005

Displaying status of monitoring operations

You can display the overall status of monitoring operations for the MetroCluster configuration.

Step

1. Use the Tiebreaker CLI `monitor show -status` command to display the status of a MetroCluster operation with any of the following options:

Option	Description
-monitor name	Display status for the specified monitor name
operation history	Dumps up to 10 monitoring operations last performed on a cluster
-stats	Prints the statistics related to the specified cluster
-status	Prints the status of the specified cluster

Example

The following example shows that the clusters cluster_Ba and cluster_Bb are connected and healthy:

```
NetApp MetroCluster Tiebreaker:> monitor show -status
MetroCluster: cluster_B
  Disaster: false
  Monitor State: Normal
  Observer Mode: true
  Silent Period: 15
  Override Vetoes: false
  Cluster: cluster_Ba(UUID:4d9ccf24-080f-11e4-9df2-00a098168e7c)
    Reachable: true
    All-Links-Severed: FALSE
      Node: mcc5-a1(UUID:78b44707-0809-11e4-9be1-e50dab9e83e1)
        Reachable: true
        All-Links-Severed: FALSE
        State: normal
      Node: mcc5-a2(UUID:9a8b1059-0809-11e4-9f5e-8d97cdec7102)
        Reachable: true
        All-Links-Severed: FALSE
        State: normal
  Cluster: cluster_Bb(UUID:70dacd3b-0823-11e4-a7b9-00a0981693c4)
    Reachable: true
    All-Links-Severed: FALSE
      Node: mcc5-b1(UUID:961fce7d-081d-11e4-9ebf-2f295df8fcb3)
        Reachable: true
        All-Links-Severed: FALSE
        State: normal
      Node: mcc5-b2(UUID:9393262d-081d-11e4-80d5-6b30884058dc)
        Reachable: true
        All-Links-Severed: FALSE
        State: normal
```

Example

In the following example, the last seven operations run on cluster_B are displayed:

```

NetApp MetroCluster Tiebreaker:> monitor show -operation-history
MetroCluster: cluster_B
[ 2014-09-15 04:48:32.274 ] MetroCluster Monitor is initialized
[ 2014-09-15 04:48:32.278 ] Started Discovery and validation of
MetroCluster Setup
[ 2014-09-15 04:48:35.078 ] Discovery and validation of MetroCluster
Setup succeeded. Started monitoring.
[ 2014-09-15 04:48:35.246 ] NetApp MetroCluster Tiebreaker software
is able to reach cluster "mcc5a"
[ 2014-09-15 04:48:35.256 ] NetApp MetroCluster Tiebreaker software
is able to reach cluster "mcc5b"
[ 2014-09-15 04:48:35.298 ] Link to remote DR cluster is up for
cluster "mcc5a"
[ 2014-09-15 04:48:35.308 ] Link to remote DR cluster is up for
cluster "mcc5b"

```

Displaying MetroCluster configuration information

You can display the monitor name and IP address of all instances of MetroCluster configurations in the Tiebreaker software.

Step

1. Use the Tiebreaker CLI configuration `show` command to display the MetroCluster configuration information.

Example

The following example shows the information for clusters `mcc5a` and `mcc5b`:

```

NetApp MetroCluster Tiebreaker:> configuration show
MetroCluster: mcc5
  ClusterA name: mcc5a
  ClusterA IPAddress: 10.222.194.132
  ClusterB name: mcc5b
  ClusterB IPAddress: 10.222.194.136

```

Creating dump files

You save the overall status the Tiebreaker software to a dump file for debugging purposes.

Step

1. Use the Tiebreaker CLI `monitor dump -status` command to create a dump file of the overall status of all MetroCluster configurations.

Example

The following example shows the successful creation of the `/var/log/netapp/mcctb/metrocluster-tiebreaker-status.xml` dump file:

```
NetApp MetroCluster Tiebreaker :> monitor dump -status
MCCTB status successfully dumped in file /var/log/netapp/mcctb/
metrocluster-tiebreaker-status.xml
```

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