Installing the Tiebreaker software

ONTAP MetroCluster

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April 21, 2021

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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.

The MetroCluster software must be installed and configured.

System requirements for installing or upgrading Tiebreaker software

The Tiebreaker software is installed on a third site, which allows the software to distinguish between an Inter-Switch Link (ISL) failure (when inter-site links are down) and a site failure. Your host system must meet certain requirements before you can install or upgrade the Tiebreaker software on your local computer to monitor the MetroCluster configuration.

The MetroCluster Tiebreaker software has the following monitoring capabilities and requirements:

- No requirement for a special configuration for the different MetroCluster configurations.
- Monitoring capabilities for up to 15 MetroCluster configurations simultaneously.

You should have only one MetroCluster Tiebreaker monitor per MetroCluster configuration to avoid any conflict with multiple Tiebreaker monitors.

- Support for a combination of MetroCluster IP, MetroCluster FC, and stretch MetroCluster configurations.
- Hardware and software:
  - ONTAP 8.3.x, 9.0, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7 and 9.8
- Red Hat Enterprise Linux 7 to 7.6 or CentOS 7 to 7.6 64-bit (physical installation or virtual machine)
  - MariaDB 5.5.52.x
  - 4 GB RAM
  - Open Java Runtime Environment 8
- Red Hat Enterprise Linux 6.4 to 6.10 or CentOS 6.4 to 6.10 64-bit (physical installation or virtual machine)
  - MySQL Server 5.6.x
  - 2 GB RAM
  - Open Java Runtime Environment 8
- Disk capacity: 8 GB
- User: Root access
- Firewall:
  - Direct access for setting up AutoSupport messages
  - SSH (port 22/TCP), HTTPS (port 443/TCP), and ping (ICMP)
- Installation on FIPS-enabled hosts is not supported.

Installing MetroCluster Tiebreaker dependencies

You must install a MySQL or MariaDB server depending on the Linux operating system that is your host before installing or upgrading the Tiebreaker software.

Steps

1. Install Java Runtime Environment.

   Installing Java Runtime Environment 1.8

2. Install MySQL or MariaDB server:

If the Linux host is	Then…
Red Hat Enterprise Linux 6/CentOS 6	a. Install MySQL Installing MySQL Server 5.5.30 or later and 5.6.x versions on Red Hat Enterprise Linux 6 or CentOS 6
Red Hat Enterprise Linux 7/CentOS 7	a. Install MariaDB Installing MariaDB server on Red Hat Enterprise Linux 7 or CentOS 7

Installing Java Runtime Environment 1.8

You must install Java Runtime Environment 1.8 on your host system before installing or upgrading the Tiebreaker software.

Steps

1. Log in as `root` to the host system.

```
login as: root
root@mcctb's password:
Last login: Fri Jan  8 21:33:00 2017 from host.domain.com
```

2. Install Java Runtime Environment 1.8: `[root@mcctb ~]# yum install java-1.8.0-openjdk.x86_64`

```
[root@mcctb ~]# yum install java-1.8.0-openjdk.x86_64
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
... shortened....
Dependencies Resolved

================================================================================
=======================
Package               Arch    Version                      Repository
Size
================================================================================
=======================
Installing:
 java-1.8.0-openjdk  x86_64  1:1.8.0.144-0.b01.el7_4      updates
238 k
 ..
 ..
Transaction Summary
================================================================================
=======================
Install  1 Package  (+ 4 Dependent packages)

Total download size: 34 M
Is this ok [y/d/N]: y

Installed:
java-1.8.0-openjdk.x86_64 1:1.8.0.144-0.b01.el7_4
Complete!
```

Installing MySQL Server 5.5.30 or later and 5.6.x versions on Red Hat Enterprise Linux 6 or CentOS 6

You must install MySQL Server 5.5.30 or later and 5.6.x version on your host system before installing or upgrading the Tiebreaker software.

Steps

1. Log in as `root` to the host system.

```
login as: root
root@mcctb's password:
Last login: Fri Jan  8 21:33:00 2016 from host.domain.com
```

2. Add the MySQL repository to your host system: `[root@mcctb ~]# yum localinstall https://dev.mysql.com/get/mysql57-community-release-el6-11.noarch.rpm`

```
Loaded plugins: product-id, refresh-packagekit, security, subscription-
manager
Setting up Local Package Process
Examining /var/tmp/yum-root-LLUw0r/mysql-community-release-el6-
5.noarch.rpm: mysql-community-release-el6-5.noarch
Marking /var/tmp/yum-root-LLUw0r/mysql-community-release-el6-
5.noarch.rpm to be installed
Resolving Dependencies
--> Running transaction check
---> Package mysql-community-release.noarch 0:el6-5 will be installed
--> Finished Dependency Resolution
Dependencies Resolved
================================================================================
========
Package               Arch   Version
                                      Repository
Size
================================================================================
========
Installing:
mysql-community-release
                       noarch el6-5 /mysql-community-release-el6-
5.noarch 4.3 k
Transaction Summary
================================================================================
========
Install       1 Package(s)
Total size: 4.3 k
Installed size: 4.3 k
Is this ok [y/N]: y
Downloading Packages:
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : mysql-community-release-el6-5.noarch
1/1
  Verifying  : mysql-community-release-el6-5.noarch
1/1
Installed:
  mysql-community-release.noarch 0:el6-5
Complete!
```

3. Disable the mysql 57 repository: `[root@mcctb ~]# yum-config-manager --disable mysql57-community`

4. Enable the mysql 56 repository: `[root@mcctb ~]# yum-config-manager --enable mysql56-community`
5. Enable the repository: `[root@mcctb ~]# yum repolist enabled | grep "mysql.-community."`

```
mysql-connectors-community           MySQL Connectors Community
21
mysql-tools-community                MySQL Tools Community
35
mysql56-community                    MySQL 5.6 Community Server
231
```

6. Install the MySQL Community server: `[root@mcctb ~]# yum install mysql-community-server`

```
Loaded plugins: product-id, refresh-packagekit, security, subscription-
manager
This system is not registered to Red Hat Subscription Management. You
can use subscription-manager
to register.
Setting up Install Process
Resolving Dependencies
--> Running transaction check
....Output truncated....
---> Package mysql-community-libs-compat.x86_64 0:5.6.29-2.el6 will be
obsoleting
--> Finished Dependency Resolution
Dependencies Resolved
================================================================================
==========================
Package                                    Arch         Version
Repository         Size
================================================================================
==========================
Installing:
 mysql-community-client                     x86_64       5.6.29-2.el6
mysql56-community  18  M
     replacing  mysql.x86_64 5.1.71-1.el6
 mysql-community-libs                       x86_64       5.6.29-2.el6
mysql56-community  1.9 M
     replacing  mysql-libs.x86_64 5.1.71-1.el6
 mysql-community-libs-compat                x86_64       5.6.29-2.el6
mysql56-community  1.6 M
     replacing  mysql-libs.x86_64 5.1.71-1.el6
 mysql-community-server                     x86_64       5.6.29-2.el6
mysql56-community  53  M
```

```
     replacing  mysql-server.x86_64 5.1.71-1.el6
Installing for dependencies:
mysql-community-common                      x86_64       5.6.29-2.el6
mysql56-community   308 k

Transaction Summary
================================================================================
===========================
Install       5 Package(s)
Total download size: 74 M
Is this ok [y/N]: y
Downloading Packages:
(1/5): mysql-community-client-5.6.29-2.el6.x86_64.rpm
|  18 MB     00:28
(2/5): mysql-community-common-5.6.29-2.el6.x86_64.rpm
| 308 kB     00:01
(3/5): mysql-community-libs-5.6.29-2.el6.x86_64.rpm
| 1.9 MB     00:05
(4/5): mysql-community-libs-compat-5.6.29-2.el6.x86_64.rpm
| 1.6 MB     00:05
(5/5): mysql-community-server-5.6.29-2.el6.x86_64.rpm
|  53 MB     03:42
--------------------------------------------------------------------------------
---------------------------
Total
289 kB/s |  74 MB     04:24
warning: rpmts_HdrFromFdno: Header V3 DSA/SHA1 Signature, key ID
5072e1f5: NOKEY
Retrieving key from file:/etc/pki/rpm-gpg/RPM-GPG-KEY-mysql
Importing GPG key 0x5072E1F5:
 Userid : MySQL Release Engineering <mysql-build@oss.oracle.com>
Package: mysql-community-release-el6-5.noarch (@/mysql-community-
release-el6-5.noarch)
 From   : file:/etc/pki/rpm-gpg/RPM-GPG-KEY-mysql
Is this ok [y/N]: y
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : mysql-community-common-5.6.29-2.el6.x86_64
....Output truncated....
1.el6.x86_64
7/8
  Verifying  : mysql-5.1.71-1.el6.x86_64
8/8
Installed:
```

```
  mysql-community-client.x86_64 0:5.6.29-2.el6          mysql-community-
libs.x86_64 0:5.6.29-2.el6
  mysql-community-libs-compat.x86_64 0:5.6.29-2.el6   mysql-community-
server.x86_64 0:5.6.29-2.el6

Dependency Installed:
  mysql-community-common.x86_64 0:5.6.29-2.el6

Replaced:
  mysql.x86_64 0:5.1.71-1.el6 mysql-libs.x86_64 0:5.1.71-1.el6  mysql-
server.x86_64 0:5.1.71-1.el6
Complete!
```

7. Start MySQL server: `[root@mcctb ~]# service mysqld start`

```
Initializing MySQL database:  2016-04-05 19:44:38 0 [Warning] TIMESTAMP
with implicit DEFAULT
value is deprecated. Please use --explicit_defaults_for_timestamp server
option (see documentation
 for more details).
2016-04-05 19:44:38 0 [Note] /usr/sbin/mysqld (mysqld 5.6.29) starting
as process 2487 ...
2016-04-05 19:44:38 2487 [Note] InnoDB: Using atomics to ref count
buffer pool pages
2016-04-05 19:44:38 2487 [Note] InnoDB: The InnoDB memory heap is
disabled
....Output truncated....
2016-04-05 19:44:42 2509 [Note] InnoDB: Shutdown completed; log sequence
number 1625987

PLEASE REMEMBER TO SET A PASSWORD FOR THE MySQL root USER!
To do so, start the server, then issue the following commands:

  /usr/bin/mysqladmin -u root password 'new-password'
  /usr/bin/mysqladmin -u root -h mcctb password 'new-password'

Alternatively, you can run:
  /usr/bin/mysql_secure_installation

which will also give you the option of removing the test
databases and anonymous user created by default.  This is
strongly recommended for production servers.
....Output truncated....
WARNING: Default config file /etc/my.cnf exists on the system
This file will be read by default by the MySQL server
If you do not want to use this, either remove it, or use the
--defaults-file argument to mysqld_safe when starting the server

                                                           [  OK  ]
Starting mysqld:                                           [  OK  ]
```

8. Confirm that MySQL server is running: `[root@mcctb ~]# service mysqld status`

```
mysqld (pid  2739) is running...
```

9. Configure security and password settings: `[root@mcctb ~]# mysql_secure_installation`

```
NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MySQL
      SERVERS IN PRODUCTION USE!  PLEASE READ EACH STEP CAREFULLY!
```

```
 In order to log into MySQL to secure it, we'll need the current
 password for the root user.  If you've just installed MySQL, and
 you haven't set the root password yet, the password will be blank,
 so you should just press enter here.

 Enter current password for root (enter for none):   <== on default
install hit enter here
 OK, successfully used password, moving on...

 Setting the root password ensures that nobody can log into the MySQL
 root user without the proper authorisation.

 Set root password? [Y/n] y
 New password:
 Re-enter new password:
 Password updated successfully!
 Reloading privilege tables..
  ... Success!

 By default, a MySQL installation has an anonymous user, allowing anyone
 to log into MySQL without having to have a user account created for
 them.  This is intended only for testing, and to make the installation
 go a bit smoother.  You should remove them before moving into a
 production environment.

 Remove anonymous users? [Y/n] y
  ... Success!

 Normally, root should only be allowed to connect from 'localhost'.
This
 ensures that someone cannot guess at the root password from the
network.

 Disallow root login remotely? [Y/n] y
  ... Success!

 By default, MySQL comes with a database named 'test' that anyone can
 access.  This is also intended only for testing, and should be removed
 before moving into a production environment.

 Remove test database and access to it? [Y/n] y
  - Dropping test database...
 ERROR 1008 (HY000) at line 1: Can't drop database 'test'; database
doesn't exist
  ... Failed!  Not critical, keep moving...
```

```
 - Removing privileges on test database...
 ... Success!

Reloading the privilege tables will ensure that all changes made so far
will take effect immediately.

Reload privilege tables now? [Y/n] y
 ... Success!

All done!  If you've completed all of the above steps, your MySQL
installation should now be secure.

Thanks for using MySQL!

Cleaning up...
```

10. Verify that the MySQL login is working: `[root@mcctb ~]# mysql -u root -p`

```
Enter password: <configured_password>
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 17
Server version: 5.6.29 MySQL Community Server (GPL)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input
statement.
mysql>
```

If the MySQL login is working, the output will end at the `mysql>` prompt.

Enabling the MySQL autostart setting

You should ensure that the autostart feature is turned on for the MySQL deamon. Turning on the MySQL daemon automatically restarts MySQL if the system on which the MetroCluster Tiebreaker software resides reboots. If the MySQL daemon is not running, the Tiebreaker software continues running, but it cannot be restarted and configuration changes cannot be made.

See the MySQL documentation to enable autostart on your installation.

Installing MariaDB server on Red Hat Enterprise Linux 7 or CentOS 7

You must install MariaDB server on your host system before installing or upgrading the Tiebreaker software.

Your host system must be running on Red Hat Enterprise Linux (RHEL) 7 or CentOS 7.

Steps

1. Log in as `root` to the host system.

```
login as: root
root@mcctb's password:
Last login: Fri Jan  8 21:33:00 2017 from host.domain.com
```

2. Install MariaDB server: `[root@mcctb ~]# yum install mariadb-server.x86_64`

```
 [root@mcctb ~]# yum install mariadb-server.x86_64
Loaded plugins: fastestmirror, langpacks
...
...

================================================================================
===============
 Package                        Arch    Version          Repository
Size
================================================================================
===============
Installing:
mariadb-server                x86_64   1:5.5.56-2.el7   base
11 M
Installing for dependencies:

Transaction Summary
================================================================================
===============
Install  1 Package  (+8 Dependent packages)
Upgrade             ( 1 Dependent package)

Total download size: 22 M
Is this ok [y/d/N]: y
Downloading packages:
No Presto metadata available for base
warning: /var/cache/yum/x86_64/7/base/packages/mariadb-libs-5.5.56-
2.el7.x86_64.rpm:
Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY] 1.4 MB/s | 3.3
```

```
MB  00:00:13 ETA
Public key for mariadb-libs-5.5.56-2.el7.x86_64.rpm is not installed
(1/10): mariadb-libs-5.5.56-2.el7.x86_64.rpm  | 757 kB  00:00:01
..
..
(10/10): perl-Net-Daemon-0.48-5.el7.noarch.rpm|  51 kB  00:00:01
--------------------------------------------------------------------------------
Installed:
  mariadb-server.x86_64 1:5.5.56-2.el7

Dependency Installed:
mariadb.x86_64 1:5.5.56-2.el7         perl-Compress-Raw-Bzip2.x86_64
0:2.061-3.el7
perl-Compress-Raw-Zlib.x86_64 1:2.061-4.el7 perl-DBD-MySQL.x86_64
0:4.023-5.el7
perl-DBI.x86_64 0:1.627-4.el7  perl-IO-Compress.noarch 0:2.061-2.el7
perl-Net-Daemon.noarch 0:0.48-5.el7          perl-PlRPC.noarch 0:0.2020-
14.el7

Dependency Updated:
  mariadb-libs.x86_64 1:5.5.56-2.el7
Complete!
```

3. Start MariaDB server: `[root@mcctb ~]# systemctl start mariadb`

```
[root@mcctb ~]# systemctl start mariadb
```

4. Verify MariaDB server has started: `[root@mcctb ~]# systemctl status mariadb`

```
[root@mcctb ~]# systemctl status mariadb
mariadb.service - MariaDB database server
...
Nov 08 21:28:59 mcctb systemd[1]: Starting MariaDB database server...
...
Nov 08 21:29:01 scspr0523972001 systemd[1]: Started MariaDB database
server.
```

Ensure that the enable autostart setting is turned on for MariaDB.

5. Configure the security and password settings: `[root@mcctb ~]# mysql_secure_installation`

```
[root@mcctb ~]# mysql_secure_installation
NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!
Set root password? [Y/n] y
New password:
Re-enter new password:
Password updated successfully!
Remove anonymous users? [Y/n] y
... Success!
Normally, root should only be allowed to connect from 'localhost'. This
ensures that someone cannot guess at the root password from the network.
Disallow root login remotely? [Y/n] y
... Success!
Remove test database and access to it? [Y/n] y
- Dropping test database...
... Success!
- Removing privileges on test database...
... Success!
Reload privilege tables now? [Y/n]
... Success!
Cleaning up...
All done! If you've completed all of the above steps, your MariaDB
installation should now be secure.
Thanks for using MariaDB!
```

Installing or upgrading the software package

You must install or upgrade the MetroCluster Tiebreaker software on your local computer to monitor MetroCluster configurations.

- Your storage system must be running ONTAP 8.3.x or later.
- You must have installed OpenJDK by using the yum install java-1.8.0-openjdk command.

Steps

1. Download the NetApp-MetroCluster-Tiebreaker-Software-1.21P3-1.x86_64.rpm file.

   NetApp Support

2. Log in to the host as the root user.
3. Install or upgrade the Tiebreaker software:

If you are…	Issue this command…

Performing a new installation	rpm -ivh NetApp-MetroCluster-Tiebreaker-Software-1.21P3-1.x86_64.rpm
	
	The system displays the following output for a successful installation:
	
	`[root@scspr0523972001 mcctb]# rpm -ivh NetApp-MetroCluster-Tiebreaker-Software-1.21P3-1.x86_64.rpm`
	`Preparing...`
	`##################################[100%]`
	`Updating / installing...`
	`1:NetApp-MetroCluster-Tiebreaker-So##################################[100%]`
	`Post installation start Wed Sep 5 05:56:18 EDT 2018`
	`Enter MetroCluster Tiebreaker user password:`
	
	`Please enter mysql root password when prompted`
	`Enter password:`
	`Created symlink from /etc/systemd/system/multi-user.target.wants/netapp-metrocluster-tiebreaker-software.service to /etc/systemd/system/netapp-metrocluster-tiebreaker-software.service.`
	`Enabled autostart of NetApp MetroCluster Tiebreaker software daemon during boot`
	`Created symbolic link for NetApp MetroCluster Tiebreaker software CLI`
	`Post installation end Wed Sep 5 05:56:24 EDT 2018`
	`Successfully installed NetApp MetroCluster Tiebreaker software version 1.21P3`

If you are…	Issue this command…

Upgrading an existing installation	rpm -Uvh NetApp-MetroCluster-Tiebreaker-Software-1.21P3-1.x86_64.rpm
	
	The system displays the following output for a successful upgrade:
	
	`[root@scspr0523972001 mcctb]# rpm -Uvh NetApp-MetroCluster-Tiebreaker-Software-1.21P3-1.x86_64.rpm`
	`Preparing...`
	`##################################[100%]`
	`Upgrading NetApp MetroCluster Tiebreaker software....`
	`Stopping NetApp MetroCluster Tiebreaker software services before upgrade.`
	`Stopping NetApp MetroCluster Tiebreaker software daemon [ OK ]`
	`Updating / installing...`
	`1:NetApp-MetroCluster-Tiebreaker-So##################################[ 50%]`
	`Post installation start Wed Sep 5 05:59:13 EDT 2018`
	`Enabled autostart of NetApp MetroCluster Tiebreaker software daemon during boot`
	`Created symbolic link for NetApp MetroCluster Tiebreaker software CLI`
	`Post installation end Wed Sep 5 05:59:13 EDT 2018`
	`Successfully installed NetApp MetroCluster Tiebreaker software version 1.21P3`
	`Cleaning up / removing...`
	`2:NetApp-MetroCluster-Tiebreaker-So##################################[100%]`

If you enter the wrong MySQL root password, the Tiebreaker software indicates that it was installed successfully, but displays Access denied messages. To resolve the issue, you must uninstall the Tiebreaker software by using the rpm -e command, and then reinstall the software by using the correct MySQL root password.

Steps

1. Verify the Tiebreaker connectivity to the MetroCluster software by opening an SSH connection from the Tiebreaker host to each of the node management LIFs and cluster management LIFs.

Related information

NetApp Support

Upgrading the host where the Tiebreaker monitor is running

You can upgrade the host where the Tiebreaker monitor is running with minimal disruption if you place the monitors in observer mode before the upgrade.

Steps

1. Verify the monitors are in observer mode: `monitor show -status`

```
NetApp MetroCluster Tiebreaker:> monitor show -status
MetroCluster: cluster_A
    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_B(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
```

2. Change all of the monitors to observer mode.

```
NetApp MetroCluster Tiebreaker :> monitor modify -monitor-name
monitor_name -observer-mode true
```

3. To upgrade the Tiebreaker host, follow all of the steps in the following procedure:

   Installing or upgrading the software package

4. Disable observer mode to move all the of the monitors back to online mode.

```
NetApp MetroCluster Tiebreaker :> monitor modify -monitor-name
monitor_name -observer-mode false
```

Selecting the NTP source for the Tiebreaker software

You should use a local Network Time Protocol (NTP) source for the Tiebreaker software. It should not use the same source as the MetroCluster sites that the Tiebreaker software monitors.