



安裝**Tiebreaker**軟體

ONTAP MetroCluster

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安裝Tiebreaker軟體

tiebreaker 安裝工作流程

Tiebreaker軟體提供叢集式儲存環境的監控功能。當節點連線問題和站台災難發生時、也會傳送SNMP通知。

關於此工作流程

您可以使用此工作流程來安裝或升級 tiebreaker 軟體。

1

"準備安裝 tiebreaker 軟體"

安裝及設定斷路器軟體之前、請先確認您的系統符合特定需求。

2

"確保安裝安全"

對於執行MetroCluster 還原器1.5及更新版本的組態、您可以保護並強化主機作業系統和資料庫。

3

"安裝 tiebreaker 軟體套件"

執行新安裝或升級的 tiebreaker 軟體。您遵循的安裝程序取決於您要安裝的 tiebreaker 版本。

準備安裝 tiebreaker 軟體

在安裝和設定斷路器軟體之前、您應該先確認系統符合特定需求。

軟體需求

您必須符合下列軟體需求、視所安裝的斷路器版本而定。

ONTAP tiebreaker 版本	支援 ONTAP 的支援 版本	支援的Linux版本	Java/MariaDB 需求
1.6.	更新版本ONTAP	請參閱 "作業系統支援對照表" 以取得詳細資料。	無。相依性與安裝相關。
1.5	ONTAP 9.8 至 ONTAP 9.14.1	<ul style="list-style-type: none">Red Hat Enterprise Linux 8.1至8.7	<p>搭配 Red Hat Enterprise Linux 8.1 至 8.7：</p> <ul style="list-style-type: none">MariaDB 10.x（使用使用「yum install MariaDB-server.x86_64」安裝的預設版本）OpenJDK 17 、 18 或 19

1.4.	ONTAP 9.1 至 ONTAP 9.9.1	<ul style="list-style-type: none"> • Red Hat Enterprise Linux 8.1至8.7 • Red Hat Enterprise Linux 7 至 7.9 • CentOS 7 至 7.9 64 位元 	使用 CentOS ： <ul style="list-style-type: none"> • MariaDB 5.5.52 x / MySQL Server 5.6x • 4 GB RAM • 開啟JRE 8 搭配 Red Hat Enterprise Linux 8.1 至 8.7 ： <ul style="list-style-type: none"> • MariaDB 10.x（使用使用「yum install MariaDB-server.x86_64」安裝的預設版本） • JRE 8.
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其他需求

您必須瞭解下列額外需求：

- Tiebreaker軟體安裝在第三個站台、可讓軟體區分交換器間連結（ISL）故障（站台間連結中斷時）與站台故障。您的主機系統必須符合特定需求、才能安裝或升級 tiebreaker 軟體以監控 MetroCluster 組態。
- 您必須擁有「root」權限、才能安裝MetroCluster ESITiebreaker軟體和相依套件。
- 每個版本僅能使用一個MetroCluster ESIT斷路 器監控器來避免MetroCluster 與多個斷路器監控器發生衝突。
- 為 tiebreaker 軟體選取網路時間傳輸協定（NTP）來源時、您必須使用本機 NTP 來源。tiebreaker 軟體不應使用與 tiebreaker 軟體所監控的 MetroCluster 站台相同的來源。
- 磁碟容量：8 GB
- 防火牆：
 - 直接存取以設定AutoSupport 資訊訊息
 - SSH（連接埠22/TCP）、HTTPS（連接埠443/TCP）及ping（ICMP）

保護 tiebreaker 主機和資料庫的安裝安全

對於執行MetroCluster 還原器1.5及更新版本的組態、您可以保護並強化主機作業系統和資料庫。

保護主機安全

下列準則說明如何保護安裝了Tiebreaker軟體的主機。

使用者管理建議

- 限制「root」使用者的存取權。
 - 您可以使用能夠提升為root存取權限的使用者來安裝及管理tiebreaker軟體。

- 您可以使用無法提升為root存取權限的使用者來管理tiebreaker軟體。
- 安裝期間、您必須建立名為「mcctbgrp」的群組。安裝期間建立的主機根使用者和使用者都必須是成員。只有此群組的成員才能完整管理Tiebreaker軟體。



非此群組成員的使用者無法存取Tiebreaker軟體或CLI。您可以在主機上建立其他使用者、並讓他們成為群組的成員。這些額外成員無法完全管理 tiebreaker 軟體。他們擁有ReadOnly 存取權、無法新增、變更或刪除監視器。

- 請勿以root使用者身分執行tiebreaker。使用專屬的無權限服務帳戶來執行Tiebreaker。
- 變更「/etc/SNMP /snmpd.conf」檔案中的預設社群字串。
- 允許最低寫入權限。無權限的tiebreaker服務帳戶不應擁有覆寫其執行檔二進位檔或任何組態檔的存取權。只有本地斷路器儲存設備（例如、用於整合式後端儲存設備）或稽核記錄的目錄和檔案、才應由斷路器使用者寫入。
- 不允許匿名使用者。
 - 將「允許TcpForwarding」設為「否」、或使用MATCH指令來限制匿名使用者。

相關資訊

- ["Red Hat Enterprise Linux 8 產品文件"](#)
- ["Red Hat Enterprise Linux 9 產品文件"](#)

基礎主機安全建議

- 使用磁碟加密
 - 您可以啟用磁碟加密。這可以是FullDiskEncryption（硬體）、或由主機（軟體）或SVM主機提供的加密。
- 停用允許傳入連線的未使用服務。您可以停用任何未使用的服務。Tiebreaker軟體不需要傳入連線的服務、因為來自Tiebreaker安裝的所有連線都是傳出的。預設啟用且可停用的服務包括：
 - HTTP / HTTPS伺服器
 - FTP伺服器
 - Telnet、RSH, rlogin
 - NFS、CIFS及其他傳輸協定存取
 - RDP（RemoteDesktopProtocol）、X11伺服器、vnc或其他遠端「桌面」服務供應商。



您必須保留序列主控台存取權（若有支援）或至少啟用一個傳輸協定、才能遠端管理主機。如果停用所有傳輸協定、則需要實體存取主機以進行管理。

- 使用FIPS保護主機安全
 - 您可以在FIPS相容模式下安裝主機作業系統、然後安裝斷路器。



OpenJDK 19會在開機時檢查主機是否以FIPS模式安裝。不需要手動變更。

- 如果您保護主機安全、則必須確保主機能夠在不需要使用者介入的情況下開機。如果需要使用者介入、如果主機意外重新開機、則斷路器功能可能無法使用。如果發生這種情況、只有在手動介入和主機完全

開機之後、才能使用斷路器功能。

- 停用Shell命令歷程記錄。
- 經常升級。Tiebreaker是積極開發的產品、更新頻繁對於將安全性修正程式與任何變更納入預設設定（例如金鑰長度或密碼套件）而言、非常重要。
- 訂閱HashiCorp公告郵寄清單、即可接收新版本的公告、並造訪Tiebreaker Changelog、以瞭解最新版本的最新更新詳細資料。
- 使用正確的檔案權限。在啟動Tiebreaker軟體之前、請務必確保適當的權限已套用至檔案、尤其是含有敏感資訊的檔案。
- 多因素驗證（MFA）可要求系統管理員使用多個使用者名稱和密碼來識別自己、藉此強化組織的安全性。雖然使用者名稱和密碼很重要、但容易遭受暴力攻擊、而且可能遭第三方竊取。
 - Red Hat Enterprise Linux 8 提供 MFA、要求使用者提供多項資訊、以便成功驗證帳戶或 Linux 主機。其他資訊可能是一次性密碼、透過SMS傳送到您的手機、或是從Google驗證程式、TWilio驗證或FreeFP等應用程式傳送認證。

相關資訊

- ["Red Hat Enterprise Linux 8 產品文件"](#)
- ["Red Hat Enterprise Linux 9 產品文件"](#)

保護資料庫安裝

下列準則說明如何保護及強化MariaDB 10.x資料庫安裝。

- 限制「root」使用者的存取權。
 - Tiebreaker使用專屬帳戶。用於儲存（組態）資料的帳戶和表格是在安裝tiebreaker期間建立的。唯一需要提高資料庫存取權限的時間、是在安裝期間。
- 安裝期間需要下列存取權限：
 - 建立資料庫和資料表的能力
 - 能夠建立全域選項
 - 能夠建立資料庫使用者並設定密碼
 - 可將資料庫使用者與資料庫和資料表建立關聯、並指派存取權限



您在Tiebreaker安裝期間指定的使用者帳戶必須擁有所有這些權限。不支援將多個使用者帳戶用於不同的工作。

- 使用資料庫加密
 - 支援靜態資料加密。 ["深入瞭解閒置資料加密"](#)
 - 傳輸中的資料未加密。飛行中的資料使用本機的「SOCKS」檔案連線。
 - FIPS符合MariaDB規範：您不需要在資料庫上啟用FIPS相容性。以FIPS相容模式安裝主機已足夠。

["瞭解 MySQL Enterprise Transparent Data Encryption （ TDE ） "](#)



在安裝斷路器軟體之前、必須先啟用加密設定。

相關資訊

- 資料庫使用者管理

["存取控制與帳戶管理"](#)

- 保護資料庫安全

["保護MySQL免受攻擊者攻擊"](#)

["保護MariaDB安全"](#)

- 確保Vault安裝安全

["正式作業強化"](#)

安裝 tiebreaker 軟體套件

選擇您的安裝程序

您遵循的 tiebreaker 安裝程序取決於您要安裝的 tiebreaker 版本。

Tiebreaker 版本	前往...
斷路器 1.6.	"安裝斷路器 1.6"
斷路器 1.5	"安裝斷路器 1.5"
斷路器 1.4	"安裝斷路器 1.4"

安裝斷路器 1.6

在主機 Linux 作業系統上執行新的安裝或升級至 tiebreaker 1.6 、以監控 MetroCluster 組態。

關於這項工作

- 您的儲存系統必須執行 ONTAP 9.12.1 或更新版本。
- 您可以將 MetroCluster tiebreaker 安裝為非 root 使用者、並擁有足夠的管理權限來執行 tiebreaker 安裝、建立表格和使用者、以及設定使用者密碼。

步驟

1. 下載 MetroCluster Tiebreaker 1.6 軟體。

["MetroCluster Tiebreaker （下載） - NetApp 支援網站"](#)

2. 以root使用者身分登入主機。
3. 如果您正在執行升級、請確認您正在執行的 tiebreaker 版本：

以下範例顯示 tiebreaker 1.5 。

```
[root@mcctb ~] # netapp-metrocluster-tiebreaker-software-cli
NetApp MetroCluster Tiebreaker :> version show
NetApp MetroCluster Tiebreaker 1.5: Sun Mar 13 09:59:02 IST 2022
NetApp MetroCluster Tiebreaker :> exit
```

4. 安裝或升級 tiebreaker 軟體。

安裝斷路器 1.6

請依照下列步驟安裝斷路器 1.6 。

步驟

- a. 在執行下列命令 [root@mcctb ~] # 開始安裝的提示：

```
sh MetroClusterTiebreakerInstall-1.6
```

系統會顯示下列輸出、以利成功安裝：

```
Extracting the MetroCluster Tiebreaker installation/upgrade
archive
Install digest hash is Ok
Performing the MetroCluster Tiebreaker code signature check
Install code signature is Ok
Enter unix user account to use for the installation:
mcctbadminuser
Unix user account "mcctbadminuser" doesn't exist. Do you wish to
create "mcctbadminuser" user account? [Y/N]: y
useradd: warning: the home directory already exists.
Not copying any file from skel directory into it.
Creating mailbox file: File exists
Unix account "mcctbadminuser" created.
Changing password for user mcctbadminuser.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
MetroCluster Tiebreaker requires unix user account
"mcctbadminuser" to be added to the group "mcctbgrp" for admin
access.
Do you wish to add ? [Y/N]: y
Unix user account "mcctbadminuser" added to "mcctbgrp".
Do you wish to generate your own public-private key pair for
encrypting audit log? [Y/N]: y
Generating public-private key pair...
Configuring Vault...
Starting vault server...
==> Vault server configuration:

      Api Address: <api_address>
      Cgo: disabled
      Cluster Address: <cluster_address>
      Environment Variables: BASH_FUNC_which%%,
      DBUS_SESSION_BUS_ADDRESS, GODEBUG, HISTCONTROL, HISTSIZE, HOME,
```

```

HOSTNAME, HOST_ACCOUNT, LANG, LESSOPEN, LOGNAME, LS_COLORS, MAIL,
PATH, PWD, SHELL, SHLVL, SSH_CLIENT, SSH_CONNECTION, SSH_TTY,
STAF_TEMP_DIR, TERM, USER, VAULT_ADDR, VAULT_TOKEN,
XDG_RUNTIME_DIR, XDG_SESSION_ID, _, vault_Addr, which_declare
    Go Version: go1.20.5
    Listener 1: tcp (addr: "0.0.0.0:8200", cluster
address: "0.0.0.0:8201", max_request_duration: "1m30s",
max_request_size: "33554432", tls: "enabled")
    Log Level:
        Mlock: supported: true, enabled: true
    Recovery Mode: false
    Storage: file
    Version: Vault v1.14.0, built 2023-06-
19T11:40:23Z
    Version Sha:
13a649f860186dffe3f3a4459814d87191efc321

```

==> Vault server started! Log data will stream in below:

```

2023-11-23T15:14:28.532+0530 [INFO] proxy environment:
http_proxy="" https_proxy="" no_proxy=""
2023-11-23T15:14:28.577+0530 [INFO] core: Initializing version
history cache for core
2023-11-23T15:14:38.552+0530 [INFO] core: security barrier not
initialized
2023-11-23T15:14:38.552+0530 [INFO] core: seal configuration
missing, not initialized
2023-11-23T15:14:38.554+0530 [INFO] core: security barrier not
initialized
2023-11-23T15:14:38.555+0530 [INFO] core: security barrier
initialized: stored=1 shares=5 threshold=3
2023-11-23T15:14:38.556+0530 [INFO] core: post-unseal setup
starting
2023-11-23T15:14:38.577+0530 [INFO] core: loaded wrapping token
key
2023-11-23T15:14:38.577+0530 [INFO] core: successfully setup
plugin catalog: plugin-directory=""
2023-11-23T15:14:38.577+0530 [INFO] core: no mounts; adding
default mount table
2023-11-23T15:14:38.578+0530 [INFO] core: successfully mounted:
type=cubbyhole version="v1.14.0+builtin.vault" path=cubbyhole/
namespace="ID: root. Path: "
2023-11-23T15:14:38.578+0530 [INFO] core: successfully mounted:
type=system version="v1.14.0+builtin.vault" path=sys/
namespace="ID: root. Path: "
2023-11-23T15:14:38.578+0530 [INFO] core: successfully mounted:

```

```

type=identity version="v1.14.0+builtin.vault" path=identity/
namespace="ID: root. Path: "
2023-11-23T15:14:38.581+0530 [INFO] core: successfully mounted:
type=token version="v1.14.0+builtin.vault" path=token/
namespace="ID: root. Path: "
2023-11-23T15:14:38.581+0530 [INFO] rollback: starting rollback
manager
2023-11-23T15:14:38.581+0530 [INFO] core: restoring leases
2023-11-23T15:14:38.582+0530 [INFO] expiration: lease restore
complete
2023-11-23T15:14:38.582+0530 [INFO] identity: entities restored
2023-11-23T15:14:38.582+0530 [INFO] identity: groups restored
2023-11-23T15:14:38.583+0530 [INFO] core: Recorded vault
version: vault version=1.14.0 upgrade time="2023-11-23
09:44:38.582881162 +0000 UTC" build date=2023-06-19T11:40:23Z
2023-11-23T15:14:38.583+0530 [INFO] core: usage gauge collection
is disabled
2023-11-23T15:14:38.998+0530 [INFO] core: post-unseal setup
complete
2023-11-23T15:14:38.999+0530 [INFO] core: root token generated
2023-11-23T15:14:38.999+0530 [INFO] core: pre-seal teardown
starting
2023-11-23T15:14:38.999+0530 [INFO] rollback: stopping rollback
manager
2023-11-23T15:14:38.999+0530 [INFO] core: pre-seal teardown
complete
2023-11-23T15:14:39.311+0530 [INFO] core.cluster-listener.tcp:
starting listener: listener_address=0.0.0.0:8201
2023-11-23T15:14:39.311+0530 [INFO] core.cluster-listener:
serving cluster requests: cluster_listen_address=[:]:8201
2023-11-23T15:14:39.312+0530 [INFO] core: post-unseal setup
starting
2023-11-23T15:14:39.312+0530 [INFO] core: loaded wrapping token
key
2023-11-23T15:14:39.312+0530 [INFO] core: successfully setup
plugin catalog: plugin-directory=""
2023-11-23T15:14:39.313+0530 [INFO] core: successfully mounted:
type=system version="v1.14.0+builtin.vault" path=sys/
namespace="ID: root. Path: "
2023-11-23T15:14:39.313+0530 [INFO] core: successfully mounted:
type=identity version="v1.14.0+builtin.vault" path=identity/
namespace="ID: root. Path: "
2023-11-23T15:14:39.313+0530 [INFO] core: successfully mounted:
type=cubbyhole version="v1.14.0+builtin.vault" path=cubbyhole/
namespace="ID: root. Path: "
2023-11-23T15:14:39.314+0530 [INFO] core: successfully mounted:

```

```

type=token version="v1.14.0+builtin.vault" path=token/
namespace="ID: root. Path: "
2023-11-23T15:14:39.314+0530 [INFO] rollback: starting rollback
manager
2023-11-23T15:14:39.314+0530 [INFO] core: restoring leases
2023-11-23T15:14:39.314+0530 [INFO] identity: entities restored
2023-11-23T15:14:39.314+0530 [INFO] expiration: lease restore
complete
2023-11-23T15:14:39.314+0530 [INFO] identity: groups restored
2023-11-23T15:14:39.315+0530 [INFO] core: usage gauge collection
is disabled
2023-11-23T15:14:39.316+0530 [INFO] core: post-unseal setup
complete
2023-11-23T15:14:39.316+0530 [INFO] core: vault is unsealed
Success! Uploaded policy: mcctb-policy
2023-11-23T15:14:39.795+0530 [INFO] core: enabled credential
backend: path=appprole/ type=appprole version=""
Success! Enabled approle auth method at: approle/
2023-11-23T15:14:39.885+0530 [INFO] core: successful mount:
namespace="" path=mcctb/ type=kv version=""
Success! Enabled the kv secrets engine at: mcctb/
Success! Data written to: auth/appprole/role/mcctb-app
Installing the NetApp-MetroCluster-Tiebreaker-Software-1.6-
1.x86_64.rpm
Preparing... #
##### # [100%]

Updating / installing...

1:NetApp-MetroCluster-Tiebreaker-So#
##### # [100%]
Performing file integrity check
etc/cron.weekly/metrocluster-tiebreaker-support is Ok
etc/cron.weekly/metrocluster-tiebreaker-support-cov is Ok
etc/init.d/netapp-metrocluster-tiebreaker-software is Ok
etc/init.d/netapp-metrocluster-tiebreaker-software-cov is Ok
etc/logrotate.d/mcctb is Ok
opt/netapp/mcctb/lib/common/activation-1.1.1.jar is Ok
opt/netapp/mcctb/lib/common/aopalliance.jar is Ok
opt/netapp/mcctb/lib/common/args4j.jar is Ok
opt/netapp/mcctb/lib/common/aspectjrt.jar is Ok
opt/netapp/mcctb/lib/common/aspectjweaver.jar is Ok
opt/netapp/mcctb/lib/common/asup.jar is Ok
opt/netapp/mcctb/lib/common/bcpkix-jdk15on.jar is Ok
opt/netapp/mcctb/lib/common/bcprov-jdk15on.jar is Ok
opt/netapp/mcctb/lib/common/bcprov-jdk18on.jar is Ok

```

opt/netapp/mcctb/lib/common/bctls-fips-1.0.13.jar is Ok
opt/netapp/mcctb/lib/common/bctls-jdk18on.jar is Ok
opt/netapp/mcctb/lib/common/bcutil-jdk18on.jar is Ok
opt/netapp/mcctb/lib/common/cglib.jar is Ok
opt/netapp/mcctb/lib/common/commons-codec.jar is Ok
opt/netapp/mcctb/lib/common/commons-collections4.jar is Ok
opt/netapp/mcctb/lib/common/commons-compress.jar is Ok
opt/netapp/mcctb/lib/common/commons-daemon.jar is Ok
opt/netapp/mcctb/lib/common/commons-daemon.src.jar is Ok
opt/netapp/mcctb/lib/common/commons-dbcp2.jar is Ok
opt/netapp/mcctb/lib/common/commons-io.jar is Ok
opt/netapp/mcctb/lib/common/commons-lang3.jar is Ok
opt/netapp/mcctb/lib/common/commons-logging.jar is Ok
opt/netapp/mcctb/lib/common/commons-pool2.jar is Ok
opt/netapp/mcctb/lib/common/guava.jar is Ok
opt/netapp/mcctb/lib/common/httpclient.jar is Ok
opt/netapp/mcctb/lib/common/httpcore.jar is Ok
opt/netapp/mcctb/lib/common/jakarta.activation.jar is Ok
opt/netapp/mcctb/lib/common/jakarta.xml.bind-api.jar is Ok
opt/netapp/mcctb/lib/common/java-xmlbuilder.jar is Ok
opt/netapp/mcctb/lib/common/javax.inject.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-api-2.3.1.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-core.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-impl.jar is Ok
opt/netapp/mcctb/lib/common/jline.jar is Ok
opt/netapp/mcctb/lib/common/jna.jar is Ok
opt/netapp/mcctb/lib/common/joda-time.jar is Ok
opt/netapp/mcctb/lib/common/jsch.jar is Ok
opt/netapp/mcctb/lib/common/json.jar is Ok
opt/netapp/mcctb/lib/common/jsvc.zip is Ok
opt/netapp/mcctb/lib/common/junixsocket-common.jar is Ok
opt/netapp/mcctb/lib/common/junixsocket-native-common.jar is Ok
opt/netapp/mcctb/lib/common/logback-classic.jar is Ok
opt/netapp/mcctb/lib/common/logback-core.jar is Ok
opt/netapp/mcctb/lib/common/mail-1.6.2.jar is Ok
opt/netapp/mcctb/lib/common/mariadb-java-client.jar is Ok
opt/netapp/mcctb/lib/common/mcctb-mib.jar is Ok
opt/netapp/mcctb/lib/common/mcctb.jar is Ok
opt/netapp/mcctb/lib/common/mockito-core.jar is Ok
opt/netapp/mcctb/lib/common/slf4j-api.jar is Ok
opt/netapp/mcctb/lib/common/snmp4j.jar is Ok
opt/netapp/mcctb/lib/common/spring-aop.jar is Ok
opt/netapp/mcctb/lib/common/spring-beans.jar is Ok
opt/netapp/mcctb/lib/common/spring-context-support.jar is Ok
opt/netapp/mcctb/lib/common/spring-context.jar is Ok
opt/netapp/mcctb/lib/common/spring-core.jar is Ok

```
opt/netapp/mcctb/lib/common/spring-expression.jar is Ok
opt/netapp/mcctb/lib/common/spring-web.jar is Ok
opt/netapp/mcctb/lib/common/vault-java-driver.jar is Ok
opt/netapp/mcctb/lib/common/xz.jar is Ok
opt/netapp/mcctb/lib/org.jacoco.agent-0.8.8-runtime.jar is Ok
opt/netapp/mcctb/bin/mcctb-asup-invoke is Ok
opt/netapp/mcctb/bin/mcctb_postrotate is Ok
opt/netapp/mcctb/bin/netapp-metrocluster-tiebreaker-software-cli
is Ok
/
```

```
Synchronizing state of netapp-metrocluster-tiebreaker-
software.service with SysV service script with
/usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable netapp-
metrocluster-tiebreaker-software
Created symlink /etc/systemd/system/multi-
user.target.wants/netapp-metrocluster-tiebreaker-software.service
→ /etc/systemd/system/netapp-metrocluster-tiebreaker-
software.service.
```

```
Attempting to start NetApp MetroCluster Tiebreaker software
services
Started NetApp MetroCluster Tiebreaker software services
Successfully installed NetApp MetroCluster Tiebreaker software
version 1.6.
```

從 **tiebreaker 1.5** 升級至 **1.6**

請依照下列步驟、將 tiebreaker 1.5 軟體版本升級至 tiebreaker 1.6 。

步驟

- a. 在執行下列命令 [root@mcctb ~] # 提示升級軟體：

```
sh MetroClusterTiebreakerInstall-1.6
```

系統會顯示下列輸出以成功升級：

```
Extracting the MetroCluster Tiebreaker installation/upgrade
archive
Install digest hash is Ok
Performing the MetroCluster Tiebreaker code signature check
Install code signature is Ok

Enter database user name : root
```

Please enter database password for root

Enter password:

Password updated successfully in the database.

Do you wish to generate your own public-private key pair for encrypting audit log? [Y/N]: y

Generating public-private key pair...

Configuring Vault...

=> Vault shutdown triggered

2023-07-21T00:30:22.335+0530 [INFO] core: marked as sealed

2023-07-21T00:30:22.335+0530 [INFO] core: pre-seal teardown starting

2023-07-21T00:30:22.335+0530 [INFO] rollback: stopping rollback manager

2023-07-21T00:30:22.335+0530 [INFO] core: pre-seal teardown complete

2023-07-21T00:30:22.335+0530 [INFO] core: stopping cluster listeners

2023-07-21T00:30:22.335+0530 [INFO] core.cluster-listener: forwarding rpc listeners stopped

2023-07-21T00:30:22.375+0530 [INFO] core.cluster-listener: rpc listeners successfully shut down

2023-07-21T00:30:22.375+0530 [INFO] core: cluster listeners successfully shut down

2023-07-21T00:30:22.376+0530 [INFO] core: vault is sealed

Starting vault server...

=> Vault server configuration:

Api Address: <api_address>

Cgo: disabled

Cluster Address: <cluster_address>

Environment Variables: BASH_FUNC_which%%,
DBUS_SESSION_BUS_ADDRESS, GODEBUG, HISTCONTROL, HISTSIZE, HOME,
HOSTNAME, HOST_ACCOUNT, LANG, LESSOPEN, LOGNAME, LS_COLORS, MAIL,
PATH, PWD, SHELL, SHLVL, SSH_CLIENT, SSH_CONNECTION, SSH_TTY,
STAF_TEMP_DIR, TERM, USER, VAULT_ADDR, VAULT_TOKEN,
XDG_RUNTIME_DIR, XDG_SESSION_ID, _, vault_Addr, which_declare

Go Version: go1.20.5

Listener 1: tcp (addr: "0.0.0.0:8200", cluster
address: "0.0.0.0:8201", max_request_duration: "1m30s",
max_request_size: "33554432", tls: "enabled")

Log Level:

Mlock: supported: true, enabled: true

Recovery Mode: false

```

Storage: file
Version: Vault v1.14.0, built 2023-06-
19T11:40:23Z
Version Sha:
13a649f860186dffe3f3a4459814d87191efc321

==> Vault server started! Log data will stream in below:

2023-07-21T00:30:33.065+0530 [INFO] proxy environment:
http_proxy="" https_proxy="" no_proxy=""
2023-07-21T00:30:33.098+0530 [INFO] core: Initializing version
history cache for core
2023-07-21T00:30:43.092+0530 [INFO] core: security barrier not
initialized
2023-07-21T00:30:43.092+0530 [INFO] core: seal configuration
missing, not initialized
2023-07-21T00:30:43.094+0530 [INFO] core: security barrier not
initialized
2023-07-21T00:30:43.096+0530 [INFO] core: security barrier
initialized: stored=1 shares=5 threshold=3
2023-07-21T00:30:43.098+0530 [INFO] core: post-unseal setup
starting
2023-07-21T00:30:43.124+0530 [INFO] core: loaded wrapping token
key
2023-07-21T00:30:43.124+0530 [INFO] core: successfully setup
plugin catalog: plugin-directory=""
2023-07-21T00:30:43.124+0530 [INFO] core: no mounts; adding
default mount table
2023-07-21T00:30:43.125+0530 [INFO] core: successfully mounted:
type=cubbyhole version="v1.14.0+builtin.vault" path=cubbyhole/
namespace="ID: root. Path: "
2023-07-21T00:30:43.126+0530 [INFO] core: successfully mounted:
type=system version="v1.14.0+builtin.vault" path=sys/
namespace="ID: root. Path: "
2023-07-21T00:30:43.126+0530 [INFO] core: successfully mounted:
type=identity version="v1.14.0+builtin.vault" path=identity/
namespace="ID: root. Path: "
2023-07-21T00:30:43.129+0530 [INFO] core: successfully mounted:
type=token version="v1.14.0+builtin.vault" path=token/
namespace="ID: root. Path: "
2023-07-21T00:30:43.130+0530 [INFO] rollback: starting rollback
manager
2023-07-21T00:30:43.130+0530 [INFO] core: restoring leases
2023-07-21T00:30:43.130+0530 [INFO] identity: entities restored
2023-07-21T00:30:43.130+0530 [INFO] identity: groups restored
2023-07-21T00:30:43.131+0530 [INFO] core: usage gauge collection

```



```

is disabled
2023-07-21T00:30:43.131+0530 [INFO]   expiration: lease restore
complete
2023-07-21T00:30:43.131+0530 [INFO]   core: Recorded vault
version: vault version=1.14.0 upgrade time="2023-07-20
19:00:43.131158543 +0000 UTC" build date=2023-06-19T11:40:23Z
2023-07-21T00:30:43.371+0530 [INFO]   core: post-unseal setup
complete
2023-07-21T00:30:43.371+0530 [INFO]   core: root token generated
2023-07-21T00:30:43.371+0530 [INFO]   core: pre-seal teardown
starting
2023-07-21T00:30:43.371+0530 [INFO]   rollback: stopping rollback
manager
2023-07-21T00:30:43.372+0530 [INFO]   core: pre-seal teardown
complete
2023-07-21T00:30:43.694+0530 [INFO]   core.cluster-listener.tcp:
starting listener: listener_address=0.0.0.0:8201
2023-07-21T00:30:43.695+0530 [INFO]   core.cluster-listener:
serving cluster requests: cluster_listen_address=[::]:8201
2023-07-21T00:30:43.695+0530 [INFO]   core: post-unseal setup
starting
2023-07-21T00:30:43.696+0530 [INFO]   core: loaded wrapping token
key
2023-07-21T00:30:43.696+0530 [INFO]   core: successfully setup
plugin catalog: plugin-directory=""
2023-07-21T00:30:43.697+0530 [INFO]   core: successfully mounted:
type=system version="v1.14.0+builtin.vault" path=sys/
namespace="ID: root. Path: "
2023-07-21T00:30:43.698+0530 [INFO]   core: successfully mounted:
type=identity version="v1.14.0+builtin.vault" path=identity/
namespace="ID: root. Path: "
2023-07-21T00:30:43.698+0530 [INFO]   core: successfully mounted:
type=cubbyhole version="v1.14.0+builtin.vault" path=cubbyhole/
namespace="ID: root. Path: "
2023-07-21T00:30:43.701+0530 [INFO]   core: successfully mounted:
type=token version="v1.14.0+builtin.vault" path=token/
namespace="ID: root. Path: "
2023-07-21T00:30:43.701+0530 [INFO]   rollback: starting rollback
manager
2023-07-21T00:30:43.702+0530 [INFO]   core: restoring leases
2023-07-21T00:30:43.702+0530 [INFO]   identity: entities restored
2023-07-21T00:30:43.702+0530 [INFO]   expiration: lease restore
complete
2023-07-21T00:30:43.702+0530 [INFO]   identity: groups restored
2023-07-21T00:30:43.702+0530 [INFO]   core: usage gauge collection
is disabled

```

```

2023-07-21T00:30:43.703+0530 [INFO] core: post-unseal setup
complete
2023-07-21T00:30:43.703+0530 [INFO] core: vault is unsealed
Success! Uploaded policy: mcctb-policy
2023-07-21T00:30:44.226+0530 [INFO] core: enabled credential
backend: path=approle/ type=approle version=""
Success! Enabled approle auth method at: approle/
2023-07-21T00:30:44.315+0530 [INFO] core: successful mount:
namespace="" path=mcctb/ type=kv version=""
Success! Enabled the kv secrets engine at: mcctb/
Success! Data written to: auth/approle/role/mcctb-app
Upgrading to NetApp-MetroCluster-Tiebreaker-Software-1.6-
1.x86_64.rpm
Preparing...
##### [100%]
Updating / installing...
  1:NetApp-MetroCluster-Tiebreaker-
So##### [ 50%]
Performing file integrity check
etc/cron.weekly/metrocluster-tiebreaker-support is Ok
etc/cron.weekly/metrocluster-tiebreaker-support-cov is Ok
etc/init.d/netapp-metrocluster-tiebreaker-software is Ok
etc/init.d/netapp-metrocluster-tiebreaker-software-cov is Ok
etc/logrotate.d/mcctb is Ok
opt/netapp/mcctb/lib/common/activation-1.1.1.jar is Ok
opt/netapp/mcctb/lib/common/aopalliance.jar is Ok
opt/netapp/mcctb/lib/common/args4j.jar is Ok
opt/netapp/mcctb/lib/common/aspectjrt.jar is Ok
opt/netapp/mcctb/lib/common/aspectjweaver.jar is Ok
opt/netapp/mcctb/lib/common/asup.jar is Ok
opt/netapp/mcctb/lib/common/bcpkix-jdk15on.jar is Ok
opt/netapp/mcctb/lib/common/bcprov-jdk15on.jar is Ok
opt/netapp/mcctb/lib/common/bcprov-jdk18on.jar is Ok
opt/netapp/mcctb/lib/common/bctls-fips-1.0.13.jar is Ok
opt/netapp/mcctb/lib/common/bctls-jdk18on.jar is Ok
opt/netapp/mcctb/lib/common/bcutil-jdk18on.jar is Ok
opt/netapp/mcctb/lib/common/cglib.jar is Ok
opt/netapp/mcctb/lib/common/commons-codec.jar is Ok
opt/netapp/mcctb/lib/common/commons-collections4.jar is Ok
opt/netapp/mcctb/lib/common/commons-compress.jar is Ok
opt/netapp/mcctb/lib/common/commons-daemon.jar is Ok
opt/netapp/mcctb/lib/common/commons-daemon.src.jar is Ok
opt/netapp/mcctb/lib/common/commons-dbcp2.jar is Ok
opt/netapp/mcctb/lib/common/commons-io.jar is Ok
opt/netapp/mcctb/lib/common/commons-lang3.jar is Ok
opt/netapp/mcctb/lib/common/commons-logging.jar is Ok

```

```
opt/netapp/mcctb/lib/common/commons-pool2.jar is Ok
opt/netapp/mcctb/lib/common/guava.jar is Ok
opt/netapp/mcctb/lib/common/httpclient.jar is Ok
opt/netapp/mcctb/lib/common/httpcore.jar is Ok
opt/netapp/mcctb/lib/common/jakarta.activation.jar is Ok
opt/netapp/mcctb/lib/common/jakarta.xml.bind-api.jar is Ok
opt/netapp/mcctb/lib/common/java-xmlbuilder.jar is Ok
opt/netapp/mcctb/lib/common/javax.inject.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-api-2.3.1.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-core.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-impl.jar is Ok
opt/netapp/mcctb/lib/common/jline.jar is Ok
opt/netapp/mcctb/lib/common/jna.jar is Ok
opt/netapp/mcctb/lib/common/joda-time.jar is Ok
opt/netapp/mcctb/lib/common/jsch.jar is Ok
opt/netapp/mcctb/lib/common/json.jar is Ok
opt/netapp/mcctb/lib/common/jsvc.zip is Ok
opt/netapp/mcctb/lib/common/junixsocket-common.jar is Ok
opt/netapp/mcctb/lib/common/junixsocket-native-common.jar is Ok
opt/netapp/mcctb/lib/common/logback-classic.jar is Ok
opt/netapp/mcctb/lib/common/logback-core.jar is Ok
opt/netapp/mcctb/lib/common/mail-1.6.2.jar is Ok
opt/netapp/mcctb/lib/common/mariadb-java-client.jar is Ok
opt/netapp/mcctb/lib/common/mcctb-mib.jar is Ok
opt/netapp/mcctb/lib/common/mcctb.jar is Ok
opt/netapp/mcctb/lib/common/mockito-core.jar is Ok
opt/netapp/mcctb/lib/common/slf4j-api.jar is Ok
opt/netapp/mcctb/lib/common/snmp4j.jar is Ok
opt/netapp/mcctb/lib/common/spring-aop.jar is Ok
opt/netapp/mcctb/lib/common/spring-beans.jar is Ok
opt/netapp/mcctb/lib/common/spring-context-support.jar is Ok
opt/netapp/mcctb/lib/common/spring-context.jar is Ok
opt/netapp/mcctb/lib/common/spring-core.jar is Ok
opt/netapp/mcctb/lib/common/spring-expression.jar is Ok
opt/netapp/mcctb/lib/common/spring-web.jar is Ok
opt/netapp/mcctb/lib/common/vault-java-driver.jar is Ok
opt/netapp/mcctb/lib/common/xz.jar is Ok
opt/netapp/mcctb/bin/mcctb_postrotate is Ok
opt/netapp/mcctb/bin/netapp-metrocluster-tiebreaker-software-cli
is Ok
/
```

Synchronizing state of netapp-metrocluster-tiebreaker-
software.service with SysV service script with
/usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable netapp-

```
metrocluster-tiebreaker-software
```

```
Attempting to start NetApp MetroCluster Tiebreaker software  
services
```

```
Started NetApp MetroCluster Tiebreaker software services
```

```
Successfully upgraded NetApp MetroCluster Tiebreaker software to  
version 1.6.
```

```
Cleaning up / removing...
```

```
2:NetApp-MetroCluster-Tiebreaker-
```

```
So##### [100%]
```

從 Tiebreaker 1.4 升級至 1.6

請依照下列步驟、將 Tiebreaker 1.4 軟體版本升級至 Tiebreaker 1.6 。

步驟

- a. 在執行下列命令 [root@mcctb ~] # 提示升級軟體：

```
sh MetroClusterTiebreakerInstall-1.6
```

系統會顯示下列輸出以成功升級：

```
Extracting the MetroCluster Tiebreaker installation/upgrade  
archive  
Install digest hash is Ok  
Performing the MetroCluster Tiebreaker code signature check  
Install code signature is Ok  
Enter unix user account to use for the installation:  
mcctbuseradmin1  
Unix user account "mcctbuseradmin1" doesn't exist. Do you wish to  
create "mcctbuseradmin1" user account? [Y/N]: y  
Unix account "mcctbuseradmin1" created.  
Changing password for user mcctbuseradmin1.  
New password:  
Retype new password:  
passwd: all authentication tokens updated successfully.  
  
Enter database user name : root  
  
Please enter database password for root  
Enter password:  
  
Password updated successfully in the database.  
  
MetroCluster Tiebreaker requires unix user account
```

"mcctbuseradmin1" to be added to the group "mcctbgrp" for admin access.

Do you wish to add ? [Y/N]: y

Unix user account "mcctbuseradmin1" added to "mcctbgrp".

Do you wish to generate your own public-private key pair for encrypting audit log? [Y/N]: y

Generating public-private key pair...

Configuring Vault...

Starting vault server...

==> Vault server configuration:

Api Address: <api_address>

Cgo: disabled

Cluster Address: <cluster_address>

Environment Variables: BASH_FUNC_which%%,
DBUS_SESSION_BUS_ADDRESS, GODEBUG, HISTCONTROL, HISTSIZE, HOME,
HOSTNAME, HOST_ACCOUNT, LANG, LESSOPEN, LOGNAME, LS_COLORS, MAIL,
PATH, PWD, SHELL, SHLVL, SSH_CLIENT, SSH_CONNECTION, SSH_TTY,
STAF_TEMP_DIR, TERM, USER, VAULT_ADDR, VAULT_TOKEN,
XDG_RUNTIME_DIR, XDG_SESSION_ID, _, vault_Addr, which_declare

Go Version: go1.20.5

Listener 1: tcp (addr: "0.0.0.0:8200", cluster
address: "0.0.0.0:8201", max_request_duration: "1m30s",
max_request_size: "33554432", tls: "enabled")

Log Level:

Mlock: supported: true, enabled: true

Recovery Mode: false

Storage: file

Version: Vault v1.14.0, built 2023-06-

19T11:40:23Z

Version Sha:

13a649f860186dffe3f3a4459814d87191efc321

==> Vault server started! Log data will stream in below:

2023-11-23T15:58:10.400+0530 [INFO] proxy environment:
http_proxy="" https_proxy="" no_proxy=""

2023-11-23T15:58:10.432+0530 [INFO] core: Initializing version
history cache for core

2023-11-23T15:58:20.422+0530 [INFO] core: security barrier not
initialized

2023-11-23T15:58:20.422+0530 [INFO] core: seal configuration
missing, not initialized

2023-11-23T15:58:20.424+0530 [INFO] core: security barrier not
initialized

2023-11-23T15:58:20.425+0530 [INFO] core: security barrier

```

initialized: stored=1 shares=5 threshold=3
2023-11-23T15:58:20.427+0530 [INFO]   core: post-unseal setup
starting
2023-11-23T15:58:20.448+0530 [INFO]   core: loaded wrapping token
key
2023-11-23T15:58:20.448+0530 [INFO]   core: successfully setup
plugin catalog: plugin-directory=""
2023-11-23T15:58:20.448+0530 [INFO]   core: no mounts; adding
default mount table
2023-11-23T15:58:20.449+0530 [INFO]   core: successfully mounted:
type=cubbyhole version="v1.14.0+builtin.vault" path=cubbyhole/
namespace="ID: root. Path: "
2023-11-23T15:58:20.449+0530 [INFO]   core: successfully mounted:
type=system version="v1.14.0+builtin.vault" path=sys/
namespace="ID: root. Path: "
2023-11-23T15:58:20.449+0530 [INFO]   core: successfully mounted:
type=identity version="v1.14.0+builtin.vault" path=identity/
namespace="ID: root. Path: "
2023-11-23T15:58:20.451+0530 [INFO]   core: successfully mounted:
type=token version="v1.14.0+builtin.vault" path=token/
namespace="ID: root. Path: "
2023-11-23T15:58:20.452+0530 [INFO]   rollback: starting rollback
manager
2023-11-23T15:58:20.452+0530 [INFO]   core: restoring leases
2023-11-23T15:58:20.453+0530 [INFO]   identity: entities restored
2023-11-23T15:58:20.453+0530 [INFO]   identity: groups restored
2023-11-23T15:58:20.453+0530 [INFO]   expiration: lease restore
complete
2023-11-23T15:58:20.453+0530 [INFO]   core: usage gauge collection
is disabled
2023-11-23T15:58:20.453+0530 [INFO]   core: Recorded vault
version: vault version=1.14.0 upgrade time="2023-11-23
10:28:20.453481904 +0000 UTC" build date=2023-06-19T11:40:23Z
2023-11-23T15:58:20.818+0530 [INFO]   core: post-unseal setup
complete
2023-11-23T15:58:20.819+0530 [INFO]   core: root token generated
2023-11-23T15:58:20.819+0530 [INFO]   core: pre-seal teardown
starting
2023-11-23T15:58:20.819+0530 [INFO]   rollback: stopping rollback
manager
2023-11-23T15:58:20.819+0530 [INFO]   core: pre-seal teardown
complete
2023-11-23T15:58:21.116+0530 [INFO]   core.cluster-listener.tcp:
starting listener: listener_address=0.0.0.0:8201
2023-11-23T15:58:21.116+0530 [INFO]   core.cluster-listener:
serving cluster requests: cluster_listen_address=[::]:8201

```

```

2023-11-23T15:58:21.117+0530 [INFO]   core: post-unseal setup
starting
2023-11-23T15:58:21.117+0530 [INFO]   core: loaded wrapping token
key
2023-11-23T15:58:21.117+0530 [INFO]   core: successfully setup
plugin catalog: plugin-directory=""
2023-11-23T15:58:21.119+0530 [INFO]   core: successfully mounted:
type=system version="v1.14.0+builtin.vault" path=sys/
namespace="ID: root. Path: "
2023-11-23T15:58:21.120+0530 [INFO]   core: successfully mounted:
type=identity version="v1.14.0+builtin.vault" path=identity/
namespace="ID: root. Path: "
2023-11-23T15:58:21.120+0530 [INFO]   core: successfully mounted:
type=cubbyhole version="v1.14.0+builtin.vault" path=cubbyhole/
namespace="ID: root. Path: "
2023-11-23T15:58:21.123+0530 [INFO]   core: successfully mounted:
type=token version="v1.14.0+builtin.vault" path=token/
namespace="ID: root. Path: "
2023-11-23T15:58:21.123+0530 [INFO]   rollback: starting rollback
manager
2023-11-23T15:58:21.124+0530 [INFO]   core: restoring leases
2023-11-23T15:58:21.124+0530 [INFO]   identity: entities restored
2023-11-23T15:58:21.124+0530 [INFO]   identity: groups restored
2023-11-23T15:58:21.124+0530 [INFO]   expiration: lease restore
complete
2023-11-23T15:58:21.125+0530 [INFO]   core: usage gauge collection
is disabled
2023-11-23T15:58:21.125+0530 [INFO]   core: post-unseal setup
complete
2023-11-23T15:58:21.125+0530 [INFO]   core: vault is unsealed
Success! Uploaded policy: mcctb-policy
2023-11-23T15:58:21.600+0530 [INFO]   core: enabled credential
backend: path=appprole/ type=appprole version=""
Success! Enabled approle auth method at: approle/
2023-11-23T15:58:21.690+0530 [INFO]   core: successful mount:
namespace="" path=mcctb/ type=kv version=""
Success! Enabled the kv secrets engine at: mcctb/
Success! Data written to: auth/appprole/role/mcctb-app
Upgrading to NetApp-MetroCluster-Tiebreaker-Software-1.6-
1.x86_64.rpm
Preparing...
##### [100%]
Updating / installing...
 1:NetApp-MetroCluster-Tiebreaker-
So##### [ 50%]
Performing file integrity check

```

etc/cron.weekly/metrocluster-tiebreaker-support is Ok
etc/cron.weekly/metrocluster-tiebreaker-support-cov is Ok
etc/init.d/netapp-metrocluster-tiebreaker-software is Ok
etc/init.d/netapp-metrocluster-tiebreaker-software-cov is Ok
etc/logrotate.d/mcctb is Ok
opt/netapp/mcctb/lib/common/activation-1.1.1.jar is Ok
opt/netapp/mcctb/lib/common/aopalliance.jar is Ok
opt/netapp/mcctb/lib/common/args4j.jar is Ok
opt/netapp/mcctb/lib/common/aspectjrt.jar is Ok
opt/netapp/mcctb/lib/common/aspectjweaver.jar is Ok
opt/netapp/mcctb/lib/common/asup.jar is Ok
opt/netapp/mcctb/lib/common/bcpkix-jdk15on.jar is Ok
opt/netapp/mcctb/lib/common/bcprov-jdk15on.jar is Ok
opt/netapp/mcctb/lib/common/bcprov-jdk18on.jar is Ok
opt/netapp/mcctb/lib/common/bctls-fips-1.0.13.jar is Ok
opt/netapp/mcctb/lib/common/bctls-jdk18on.jar is Ok
opt/netapp/mcctb/lib/common/bcutil-jdk18on.jar is Ok
opt/netapp/mcctb/lib/common/cglib.jar is Ok
opt/netapp/mcctb/lib/common/commons-codec.jar is Ok
opt/netapp/mcctb/lib/common/commons-collections4.jar is Ok
opt/netapp/mcctb/lib/common/commons-compress.jar is Ok
opt/netapp/mcctb/lib/common/commons-daemon.jar is Ok
opt/netapp/mcctb/lib/common/commons-daemon.src.jar is Ok
opt/netapp/mcctb/lib/common/commons-dbcp2.jar is Ok
opt/netapp/mcctb/lib/common/commons-io.jar is Ok
opt/netapp/mcctb/lib/common/commons-lang3.jar is Ok
opt/netapp/mcctb/lib/common/commons-logging.jar is Ok
opt/netapp/mcctb/lib/common/commons-pool2.jar is Ok
opt/netapp/mcctb/lib/common/guava.jar is Ok
opt/netapp/mcctb/lib/common/httpclient.jar is Ok
opt/netapp/mcctb/lib/common/httpcore.jar is Ok
opt/netapp/mcctb/lib/common/jakarta.activation.jar is Ok
opt/netapp/mcctb/lib/common/jakarta.xml.bind-api.jar is Ok
opt/netapp/mcctb/lib/common/java-xmlbuilder.jar is Ok
opt/netapp/mcctb/lib/common/javax.inject.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-api-2.3.1.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-core.jar is Ok
opt/netapp/mcctb/lib/common/jaxb-impl.jar is Ok
opt/netapp/mcctb/lib/common/jline.jar is Ok
opt/netapp/mcctb/lib/common/jna.jar is Ok
opt/netapp/mcctb/lib/common/joda-time.jar is Ok
opt/netapp/mcctb/lib/common/jsch.jar is Ok
opt/netapp/mcctb/lib/common/json.jar is Ok
opt/netapp/mcctb/lib/common/jsvc.zip is Ok
opt/netapp/mcctb/lib/common/junixsocket-common.jar is Ok
opt/netapp/mcctb/lib/common/junixsocket-native-common.jar is Ok


```

opt/netapp/mcctb/lib/common/logback-classic.jar is Ok
opt/netapp/mcctb/lib/common/logback-core.jar is Ok
opt/netapp/mcctb/lib/common/mail-1.6.2.jar is Ok
opt/netapp/mcctb/lib/common/mariadb-java-client.jar is Ok
opt/netapp/mcctb/lib/common/mcctb-mib.jar is Ok
opt/netapp/mcctb/lib/common/mcctb.jar is Ok
opt/netapp/mcctb/lib/common/mockito-core.jar is Ok
opt/netapp/mcctb/lib/common/slf4j-api.jar is Ok
opt/netapp/mcctb/lib/common/snmp4j.jar is Ok
opt/netapp/mcctb/lib/common/spring-aop.jar is Ok
opt/netapp/mcctb/lib/common/spring-beans.jar is Ok
opt/netapp/mcctb/lib/common/spring-context-support.jar is Ok
opt/netapp/mcctb/lib/common/spring-context.jar is Ok
opt/netapp/mcctb/lib/common/spring-core.jar is Ok
opt/netapp/mcctb/lib/common/spring-expression.jar is Ok
opt/netapp/mcctb/lib/common/spring-web.jar is Ok
opt/netapp/mcctb/lib/common/vault-java-driver.jar is Ok
opt/netapp/mcctb/lib/common/xz.jar is Ok
opt/netapp/mcctb/lib/org.jacoco.agent-0.8.8-runtime.jar is Ok
opt/netapp/mcctb/bin/mcctb-asup-invoke is Ok
opt/netapp/mcctb/bin/mcctb_postrotate is Ok
opt/netapp/mcctb/bin/netapp-metrocluster-tiebreaker-software-cli
is Ok
/

```

```

Synchronizing state of netapp-metrocluster-tiebreaker-
software.service with SysV service script with
/usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable netapp-
metrocluster-tiebreaker-software

```

```

Attempting to start NetApp MetroCluster Tiebreaker software
services
Started NetApp MetroCluster Tiebreaker software services
Successfully upgraded NetApp MetroCluster Tiebreaker software to
version 1.6.
Cleaning up / removing...
  2:NetApp-MetroCluster-Tiebreaker-
So##### [100%]

```

安裝斷路器 1.5

設定管理員對ONTAP SURE API和SSH的存取權限

您可以設定管理員存取ONTAP 功能以存取SURE API和SSH。

步驟

1. 建立可ONTAP 存取API的管理員使用者：`security login create -user-or-group-name mcctb -application ontapi -authentication-method password`
2. 建立具有SSH存取權限的管理使用者：`security login create -user-or-group-name mcctb -application ssh -authentication-method password`
3. 確認已建立新的管理使用者：`security login show`
4. 在合作夥伴叢集上重複這些步驟。



"系統管理員驗證與RBAC" 已實作。

安裝 MetroCluster tiebreaker 1.5 相依性

視主機 Linux 作業系統而定、您必須先安裝 MySQL 或 MariaDB 伺服器、才能安裝或升級 tiebreaker 軟體。

步驟

1. [安裝 JDK](#)
2. [安裝及設定Vault](#)
3. 安裝MySQL或MariaDB伺服器：

如果Linux主機是	然後...
Red Hat Enterprise Linux 7/CentOS 7.	在 Red Hat Enterprise Linux 7 或 CentOS 7 上安裝 MySQL Server 5.5.30 或更新版本和 5.6.x 版本
Red Hat Enterprise Linux 8	在 Red Hat Enterprise Linux 8 上安裝 MariaDB 伺服器

安裝 JDK

在安裝或升級 tiebreaker 軟體之前、您必須在主機系統上安裝 JDK。Tiebreaker 1.5 及更新版本支援 OpenJDK 17、18 或 19。

步驟

1. 以「root」使用者或可變更為進階權限模式的Sudo使用者身分登入。

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

2. 檢查可用的 JDK 版本：

```
yum search openjdk
```

3. 安裝 JDK 17 、 18 或 19 。

下列命令會安裝 JDK 17：

```
yum install java-17-openjdk
```

4. 驗證安裝：

```
java -version
```

成功安裝時會顯示下列輸出：

```
openjdk version "17.0.2" 2022-01-18 LTS
OpenJDK Runtime Environment 21.9 (build 17.0.2+8-LTS)
OpenJDK 64-Bit Server VM 21.9 (build 17.0.2+8-LTS, mixed mode, sharing)
```

安裝及設定Vault

如果您沒有或想要使用本機Vault伺服器、則必須安裝Vault。您可以參閱本標準程序來安裝Vault、或參閱《橋式安裝說明》以取得替代準則。



如果您的網路中有Vault伺服器、您可以設定MetroCluster 使用該Vault安裝的還原斷路器主機。如果您這麼做、就不需要在主機上安裝 Vault。

步驟

1. 瀏覽至 /bin 目錄：

```
[root@mcctb] cd /bin
```

2. 下載Vault壓縮檔。

```
[root@mcctb /bin]# curl -sO
https://releases.hashicorp.com/vault/1.12.2/vault_1.12.2_linux_amd64.zip
```

3. 解壓縮Vault檔案。

```
[root@mcctb /bin]# unzip vault_1.12.2_linux_amd64.zip
Archive:  vault_1.12.2_linux_amd64.zip
  inflating: vault
```

4. 驗證安裝。

```
[root@mcctb /bin]# vault -version
Vault v1.12.2 (415e1fe3118eebd5df6cb60d13defdc01aa17b03), built 2022-11-23T12:53:46Z
```

5. 瀏覽至 /root 目錄：

```
[root@mcctb /bin] cd /root
```

6. 在下建立 Vault 組態檔案 /root 目錄。

的 [root@mcctb ~] 提示、複製並執行下列命令以建立 config.hcl 檔案：

```
# cat > config.hcl << EOF
storage "file" {
  address = "127.0.0.1:8500"
  path    = "/mcctb_vdata/data"
}
listener "tcp" {
  address      = "127.0.0.1:8200"
  tls_disable = 1
}
EOF
```

7. 啟動Vault伺服器：

```
[root@mcctb ~] vault server -config config.hcl &
```

8. 匯出Vault位址。

```
[root@mcctb ~]# export VAULT_ADDR="http://127.0.0.1:8200"
```

9. 初始化Vault。

```
[root@mcctb ~]# vault operator init
2022-12-15T14:57:22.113+0530 [INFO] core: security barrier not
initialized
2022-12-15T14:57:22.113+0530 [INFO] core: seal configuration missing,
not initialized
2022-12-15T14:57:22.114+0530 [INFO] core: security barrier not
```

```

initialized
2022-12-15T14:57:22.116+0530 [INFO]   core: security barrier initialized:
stored=1 shares=5 threshold=3
2022-12-15T14:57:22.118+0530 [INFO]   core: post-unseal setup starting
2022-12-15T14:57:22.137+0530 [INFO]   core: loaded wrapping token key
2022-12-15T14:57:22.137+0530 [INFO]   core: Recorded vault version: vault
version=1.12.2 upgrade time="2022-12-15 09:27:22.137200412 +0000 UTC"
build date=2022-11-23T12:53:46Z
2022-12-15T14:57:22.137+0530 [INFO]   core: successfully setup plugin
catalog: plugin-directory=""
2022-12-15T14:57:22.137+0530 [INFO]   core: no mounts; adding default
mount table
2022-12-15T14:57:22.143+0530 [INFO]   core: successfully mounted backend:
type=cubbyhole version="" path=cubbyhole/
2022-12-15T14:57:22.144+0530 [INFO]   core: successfully mounted backend:
type=system version="" path=sys/
2022-12-15T14:57:22.144+0530 [INFO]   core: successfully mounted backend:
type=identity version="" path=identity/
2022-12-15T14:57:22.148+0530 [INFO]   core: successfully enabled
credential backend: type=token version="" path=token/ namespace="ID:
root. Path: "
2022-12-15T14:57:22.149+0530 [INFO]   rollback: starting rollback manager
2022-12-15T14:57:22.149+0530 [INFO]   core: restoring leases
2022-12-15T14:57:22.150+0530 [INFO]   expiration: lease restore complete
2022-12-15T14:57:22.150+0530 [INFO]   identity: entities restored
2022-12-15T14:57:22.150+0530 [INFO]   identity: groups restored
2022-12-15T14:57:22.151+0530 [INFO]   core: usage gauge collection is
disabled
2022-12-15T14:57:23.385+0530 [INFO]   core: post-unseal setup complete
2022-12-15T14:57:23.387+0530 [INFO]   core: root token generated
2022-12-15T14:57:23.387+0530 [INFO]   core: pre-seal teardown starting
2022-12-15T14:57:23.387+0530 [INFO]   rollback: stopping rollback manager
2022-12-15T14:57:23.387+0530 [INFO]   core: pre-seal teardown complete
Unseal Key 1: <unseal_key_1_id>
Unseal Key 2: <unseal_key_2_id>
Unseal Key 3: <unseal_key_3_id>
Unseal Key 4: <unseal_key_4_id>
Unseal Key 5: <unseal_key_5_id>

Initial Root Token: <initial_root_token_id>

```

Vault initialized with 5 key shares and a key threshold of 3. Please securely distribute the key shares printed above. When the Vault is re-sealed, restarted, or stopped, you must supply at least 3 of these keys to

```
unseal it
before it can start servicing requests.
```

Vault does not store the generated root key. Without at least 3 keys to reconstruct the root key, Vault will remain permanently sealed!

It is possible to generate new unseal keys, provided you have a quorum of existing unseal keys shares. See "vault operator rekey" for more information.



您必須將金鑰 ID 和初始根權杖記錄並儲存在安全位置、以便稍後在程序中使用。

10. 匯出Vault根憑證。

```
[root@mcctb ~]# export VAULT_TOKEN="<initial_root_token_id>"
```

11. 使用建立的五個金鑰中的任何三個來解除保存 Vault 的密封。

您必須執行 vault operator unseal 三個按鍵的命令：

a. 使用第一個金鑰來解除保存資料保險箱的密封：

```
[root@mcctb ~]# vault operator unseal
Unseal Key (will be hidden):
Key                               Value
---                               -
Seal Type                         shamir
Initialized                       true
Sealed                           true
Total Shares                     5
Threshold                        3
Unseal Progress                  1/3
Unseal Nonce                     <unseal_key_1_id>
Version                          1.12.2
Build Date                      2022-11-23T12:53:46Z
Storage Type                     file
HA Enabled                       false
```

b. 使用第二個金鑰來解除保存資料保險箱的密封：

```
[root@mcctb ~]# vault operator unseal
Unseal Key (will be hidden):
Key                               Value
---                               -
Seal Type                         shamir
Initialized                       true
Sealed                           true
Total Shares                     5
Threshold                        3
Unseal Progress                  2/3
Unseal Nonce                     <unseal_key_2_id>
Version                          1.12.2
Build Date                       2022-11-23T12:53:46Z
Storage Type                     file
HA Enabled                       false
```

c. 使用第三個金鑰來解除保存資料保險箱的密封：

```

[root@mcctb ~]# vault operator unseal
Unseal Key (will be hidden):
2022-12-15T15:15:00.980+0530 [INFO] core.cluster-listener.tcp:
starting listener: listener_address=127.0.0.1:8201
2022-12-15T15:15:00.980+0530 [INFO] core.cluster-listener: serving
cluster requests: cluster_listen_address=127.0.0.1:8201
2022-12-15T15:15:00.981+0530 [INFO] core: post-unseal setup starting
2022-12-15T15:15:00.981+0530 [INFO] core: loaded wrapping token key
2022-12-15T15:15:00.982+0530 [INFO] core: successfully setup plugin
catalog: plugin-directory=""
2022-12-15T15:15:00.983+0530 [INFO] core: successfully mounted
backend: type=system version="" path=sys/
2022-12-15T15:15:00.984+0530 [INFO] core: successfully mounted
backend: type=identity version="" path=identity/
2022-12-15T15:15:00.984+0530 [INFO] core: successfully mounted
backend: type=cubbyhole version="" path=cubbyhole/
2022-12-15T15:15:00.986+0530 [INFO] core: successfully enabled
credential backend: type=token version="" path=token/ namespace="ID:
root. Path: "
2022-12-15T15:15:00.986+0530 [INFO] rollback: starting rollback
manager
2022-12-15T15:15:00.987+0530 [INFO] core: restoring leases
2022-12-15T15:15:00.987+0530 [INFO] expiration: lease restore
complete
2022-12-15T15:15:00.987+0530 [INFO] identity: entities restored
2022-12-15T15:15:00.987+0530 [INFO] identity: groups restored
2022-12-15T15:15:00.988+0530 [INFO] core: usage gauge collection is
disabled
2022-12-15T15:15:00.989+0530 [INFO] core: post-unseal setup complete
2022-12-15T15:15:00.989+0530 [INFO] core: vault is unsealed
Key          Value
---          -
Seal Type    shamir
Initialized  true
Sealed       false
Total Shares 5
Threshold    3
Version      1.12.2
Build Date   2022-11-23T12:53:46Z
Storage Type  file
Cluster Name  vault-cluster
Cluster ID    <cluster_id>
HA Enabled    false

```

12. 確認Vault密封狀態為假。


```
[root@mcctb ~]# vault status
Key          Value
---          -
Seal Type    shamir
Initialized  true
Sealed       false
Total Shares 5
Threshold    3
Version      1.12.2
Build Date   2022-11-23T12:53:46Z
Storage Type  file
Cluster Name vault-cluster
Cluster ID    <cluster_id>
HA Enabled    false
```

13. 將 Vault 服務設定為開機時啟動。

- a. 執行下列命令：cd /etc/systemd/system

```
[root@mcctb ~]# cd /etc/systemd/system
```

- b. 的 [root@mcctb system] 提示、複製並執行下列命令以建立 Vault 服務檔案。

```
# cat > vault.service << EOF
[Unit]
Description=Vault Service
After=mariadb.service

[Service]
Type=forking
ExecStart=/usr/bin/vault server -config /root/config.hcl &
Restart=on-failure

[Install]
WantedBy=multi-user.target
EOF
```

- c. 執行下列命令：systemctl daemon-reload

```
[root@mcctb system]# systemctl daemon-reload
```

- d. 執行下列命令：systemctl enable vault.service

```
[root@mcctb system]# systemctl enable vault.service
Created symlink /etc/systemd/system/multi-
user.target.wants/vault.service → /etc/systemd/system/vault.service.
```



安裝MetroCluster 完ESITiebreaker時、系統會提示您使用此功能。如果您想要變更解封Vault的方法、則需要解除安裝並重新安裝MetroCluster 還原器軟體。

在 **Red Hat Enterprise Linux 7** 或 **CentOS 7** 上安裝 **MySQL Server 5.5.30** 或更新版本和 **5.6.x** 版本

安裝或升級Tiebreaker軟體之前、您必須先在主機系統上安裝MySQL Server 5.5.30或更新版本及5.6.x版本。對於 Red Hat Enterprise Linux 8 、[安裝 MariaDB 伺服器](#)。

步驟

1. 以root使用者或可變更為進階權限模式的Sudo使用者身分登入。

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

2. 將MySQL儲存庫新增至主機系統：

```
[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. 停用MySQL 57儲存庫：

```
[root@mcctb ~]# yum-config-manager -disablemysql57-community
```

4. 啟用MySQL 56儲存庫：

```
[root@mcctb ~]# yum-config-manager --enable mysql56-community
```

5. 啟用儲存庫：

```
[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. 安裝MySQL社群伺服器：

```
[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
<key_id> 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. 啟動MySQL伺服器：

```
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

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

8. 確認MySQL伺服器正在執行：

[root@mcctb ~]#服務mysqLD狀態

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

9. 設定安全性和密碼設定：

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MySQL

SERVICES 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 authorization.

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. 驗證MySQL登入是否正常運作：

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

mysql>

如果MySQL登入正常運作、輸出將在「mysql>」提示字元結束。

啟用 **MySQL** 自動啟動設定

您應該確認MySQL精靈的自動啟動功能已開啟。開啟MySQL精靈會在MetroCluster 系統重新開機時、自動重新啟動MySQL。如果MySQL精靈未執行、則tiebreaker軟體會繼續執行、但無法重新啟動、也無法進行組態變更。

步驟

1. 驗證MySQL在開機時是否已啟用自動啟動：

```
[root@mcctb ~]# systemctl list-unit-files mysqld.service`
```

UNIT	FILE	State
-----	-----	
mysqld.service		enabled

如果MySQL在開機時未啟用自動啟動、請參閱MySQL文件、以啟用安裝的自動啟動功能。

在 **Red Hat Enterprise Linux 8** 上安裝 **MariaDB** 伺服器

您必須先在主機系統上安裝MariaDB伺服器、才能安裝或升級tiebreaker軟體。對於 Red Hat Enterprise Linux 7 或 CentOS 7 、[安裝 MySQL Server](#)。

開始之前

您的主機系統必須在Red Hat Enterprise Linux (RHEL) 8上執行。

步驟

1. 以登入 root 使用者或可Sudo進階權限模式的使用者。

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

2. 安裝 MariaDB 伺服器：

```
[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. 啟動MariaDB伺服器：

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

4. 確認MariaDB伺服器已啟動：

```
[root@mcctb ~]# systemctl 狀態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 mcctb systemd[1]: Started MariaDB database server.
```

5. 設定安全性和密碼設定：



當系統提示您輸入 root 密碼時、請將其保留空白、然後按 Enter 鍵繼續設定安全性和密碼設定。

```
root@localhost systemd]# mysql_secure_installation
```

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

In order to log into MariaDB to secure it, we'll need the current password for the root user. If you've just installed MariaDB, 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):
OK, successfully used password, moving on...
```

Setting the root password ensures that nobody can log into the MariaDB 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 MariaDB installation has an anonymous user, allowing anyone to log into MariaDB 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, MariaDB 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...

... Success!

- 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]

... 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!

啟用 MariaDB 伺服器的自動啟動設定

您應該確認 MariaDB 伺服器的自動啟動功能已開啟。如果您未啟用自動啟動功能、MetroCluster 且駐留的系統必須重新開機、則tiebreaker軟體會繼續執行、但無法重新啟動MariaDB服務、也無法進行組態變更。

步驟

1. 啟用自動啟動服務：

```
[root@mcctb ~]# systemctl enable mariadb.service`
```

2. 確認已啟用MariaDB、以便在開機時自動啟動：

```
[root@mcctb ~]# systemctl list-unit-filesmariadb.service`
```

UNIT FILE	State
-----	-----
mariadb.service	enabled

安裝或升級至 tiebreaker 1.5

在主機 Linux 作業系統上執行新的安裝或升級至 tiebreaker 1.5 、以監控 MetroCluster 組態。

關於這項工作

- 您的儲存系統必須執行支援的 ONTAP 版本。請參閱 ["軟體需求"](#) 詳細資料請見下表。
- 您必須使用安裝 OpenJDK `yum install java-x.x.x-openjdk` 命令。Tiebreaker 1.5 及更新版本支援 OpenJDK 17 、 18 或 19 。
- 您可以將 MetroCluster tiebreaker 安裝為非 root 使用者、並擁有足夠的管理權限來執行 tiebreaker 安裝、建立表格和使用者、以及設定使用者密碼。

步驟

1. 下載 MetroCluster tiebreaker 軟體和 MetroCluster 的 tiebreaker 、 RPM_GPG 金鑰。



MetroCluster_tiebreer_RPM_GPG 金鑰可從您在 NetApp 支援網站 下載 tiebreaker 1.5 軟體套件的同一頁下載。

["MetroCluster Tiebreaker （下載） - NetApp 支援網站"](#)

2. 以root使用者身分登入主機。
3. 建立非 root 使用者和 mcctbgrp 群組：
 - a. 建立非 root 使用者並設定密碼。

下列命令範例可建立名為的非 root 使用者 mcctbuser1：

```
[root@mcctb ~]# useradd mcctbuser1
[root@mcctb ~]# passwd mcctbuser1
Changing password for user mcctbuser1.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
```

- b. 建立名為的群組 mcctbgrp：

```
[root@mcctb ~]# groupadd mcctbgrp
```

- c. 將您建立的非 root 使用者新增至 mcctbgrp 群組：

下列命令會新增 mcctbuser1 至 mcctbgrp 群組：

```
[root@mcctb ~]# usermod -a -G mcctbgrp mcctbuser1
```

4. 驗證RPM檔案。

從包含 RPM 金鑰的目錄執行下列子步驟。

a. 下載並匯入RPM金鑰檔：

```
[root@mcctb ~]# rpm --import MetroCluster_Tiebreaker_RPM_GPG.key
```

b. 檢查指紋、確認已匯入正確的金鑰。

下列範例顯示正確的金鑰指紋：

```
root@mcctb:~/signing/mcctb-rpms# gpg --show-keys --with-fingerprint
MetroCluster_Tiebreaker_RPM_GPG.key
pub   rsa3072 2022-11-17 [SCEA] [expires: 2025-11-16]
       65AC 1562 E28A 1497 7BBD  7251 2855 EB02 3E77 FAE5
uid           MCCTB-RPM (mcctb RPM production signing)
<mcctb-rpm@netapp.com>
```

a. 驗證簽名：rpm --checksig NetApp-MetroCluster-Tiebreaker-Software-1.5-1.x86_64.rpm

```
NetApp-MetroCluster-Tiebreaker-Software-1.5-1.x86_64.rpm: digests OK
```



您必須在成功驗證簽名之後、才能繼續安裝。

5. [[install-tiebreaker)]安裝或升級Tiebreaker軟體：



從Tiebreaker 1.4版升級時、您只能升級至Tiebreaker 1.5版。不支援從舊版升級至Tiebreaker 1.5。

根據您是執行新安裝還是升級現有安裝、選擇正確的程序。

執行新安裝

- a. 擷取並記錄 Java 的絕對路徑：

```
[root@mcctb ~]# readlink -f /usr/bin/java  
/usr/lib/jvm/java-19-openjdk-19.0.0.0.36-  
2.rolling.el8.x86_64/bin/java
```

- b. 執行下列命令：rpm -ivh NetApp-MetroCluster-Tiebreaker-Software-1.5-1.x86_64.rpm

系統會顯示下列輸出、以利成功安裝：



在安裝期間出現提示時、請提供您先前建立並指派給的非 root 使用者 mcctbgrp 群組：


```

Verifying...
##### [100%]
Preparing...
##### [100%]
Updating / installing...
  1:NetApp-MetroCluster-Tiebreaker-
So##### [100%]
Enter the absolute path for Java : /usr/lib/jvm/java-19-openjdk-
19.0.0.0.36-2.rolling.el8.x86_64/bin/java
Verifying if Java exists...
Found Java. Proceeding with the installation.
Enter host user account to use for the installation:
mcctbuser1
User account mcctbuser1 found. Proceeding with the installation
Enter database user name:
root
Please enter database password for root
Enter password:
Sealed          false
Do you wish to auto unseal vault(y/n)?y
Enter the key1:
Enter the key2:
Enter the key3:
Success! Uploaded policy: mcctb-policy
Error enabling approle auth: Error making API request.
URL: POST http://127.0.0.1:8200/v1/sys/auth/approle
Code: 400. Errors:
* path is already in use at approle/
Success! Enabled the kv secrets engine at: mcctb/
Success! Data written to: auth/approle/role/mcctb-app
Password updated successfully in the vault.
Synchronizing state of netapp-metrocluster-tiebreaker-
software.service with SysV service script with
/usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable netapp-
metrocluster-tiebreaker-software
Created symlink /etc/systemd/system/multi-
user.target.wants/netapp-metrocluster-tiebreaker-software.service
→ /etc/systemd/system/netapp-metrocluster-tiebreaker-
software.service.
Attempting to start NetApp MetroCluster Tiebreaker software
services
Started NetApp MetroCluster Tiebreaker software services
Successfully installed NetApp MetroCluster Tiebreaker software
version 1.5.

```

升級現有的安裝

- a. 確認已安裝受支援版本的OpenJDK、而且是主機上目前的Java版本。



若要升級至Tiebreaker 1.5、您必須安裝OpenJDK 17、18或19版。

```
[root@mcctb ~]# readlink -f /usr/bin/java
/usr/lib/jvm/java-19-openjdk-19.0.0.0.36-
2.rolling.el8.x86_64/bin/java
```

- b. 確認Vault服務未密封且正在執行：`vault status`

```
[root@mcctb ~]# vault status
Key          Value
---          -
Seal Type    shamir
Initialized  true
Sealed       false
Total Shares 5
Threshold    3
Version      1.12.2
Build Date   2022-11-23T12:53:46Z
Storage Type  file
Cluster Name  vault
Cluster ID    <cluster_id>
HA Enabled    false
```

- c. 升級Tiebreaker軟體。

```
[root@mcctb ~]# rpm -Uvh NetApp-MetroCluster-Tiebreaker-Software-
1.5-1.x86_64.rpm
```

系統會顯示下列輸出以成功升級：

```

Verifying...
##### [100%]
Preparing...
##### [100%]
Updating / installing...
  1:NetApp-MetroCluster-Tiebreaker-
So##### [ 50%]

Enter the absolute path for Java : /usr/lib/jvm/java-19-openjdk-
19.0.0.0.36-2.rolling.el8.x86_64/bin/java
Verifying if Java exists...
Found Java. Proceeding with the installation.
Enter host user account to use for the installation:
mcctbuser1
User account mcctbuser1 found. Proceeding with the installation
Sealed          false
Do you wish to auto unseal vault(y/n)?y
Enter the key1:
Enter the key2:
Enter the key3:
Success! Uploaded policy: mcctb-policy
Error enabling approle auth: Error making API request.
URL: POST http://127.0.0.1:8200/v1/sys/auth/approle
Code: 400. Errors:
* path is already in use at approle/
Success! Enabled the kv secrets engine at: mcctb/
Success! Data written to: auth/approle/role/mcctb-app
Enter database user name : root
Please enter database password for root
Enter password:
Password updated successfully in the database.
Password updated successfully in the vault.
Synchronizing state of netapp-metrocluster-tiebreaker-
software.service with SysV service script with
/usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable netapp-
metrocluster-tiebreaker-software
Attempting to start NetApp MetroCluster Tiebreaker software
services
Started NetApp MetroCluster Tiebreaker software services
Successfully upgraded NetApp MetroCluster Tiebreaker software to
version 1.5.
Cleaning up / removing...
  2:NetApp-MetroCluster-Tiebreaker-
So##### [100%]

```



如果您輸入錯誤的MySQL根密碼、則Tiebreaker軟體會指出已成功安裝、但會顯示「拒絕存取」訊息。若要解決此問題、您必須使用「rpm -e」命令解除安裝Tiebreaker軟體、然後使用正確的MySQL root密碼重新安裝軟體。

6. 開啟從斷路器主機到每個節點管理生命期和叢集管理生命期的SSH連線、以檢查斷路器與MetroCluster 該軟件的連線。

相關資訊

["NetApp支援"](#)

安裝斷路器 1.4

安裝 **MetroCluster Tiebreaker 1.4** 相依性

安裝或升級 tiebreaker 軟體之前、請先安裝 MySQL 或 MariaDB 伺服器、視您的主機 Linux 作業系統而定。

步驟

1. 安裝 [JDK](#)。
2. 安裝MySQL或MariaDB伺服器：

如果Linux主機是	然後...
Red Hat Enterprise Linux 7/CentOS 7.	在 Red Hat Enterprise Linux 7 或 CentOS 7 上安裝 MySQL Server 5.5.30 或更新版本和 5.6.x 版本
Red Hat Enterprise Linux 8	在 Red Hat Enterprise Linux 8 上安裝 MariaDB 伺服器

安裝 **JDK**

在安裝或升級 tiebreaker 軟體之前、您必須在主機系統上安裝 JDK 。Tiebreaker 1.4 及更早版本支援 JDK 1.8.0 。 (JRE 8) 。

步驟

1. 以「root」使用者身分登入。

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

2. 安裝 JDK 1.8.0 ：

```
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!
```

在 **Red Hat Enterprise Linux 7** 或 **CentOS 7** 上安裝 **MySQL Server 5.5.30** 或更新版本和 **5.6.x** 版本

安裝或升級Tiebreaker軟體之前、您必須先在主機系統上安裝MySQL Server 5.5.30或更新版本及5.6.x版本。對於 Red Hat Enterprise Linux 8 、[安裝 MariaDB 伺服器](#)。

步驟

1. 以root使用者身分登入。

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

2. 將MySQL儲存庫新增至主機系統：

```
[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. 停用MySQL 57儲存庫：

```
[root@mcctb ~]# yum-config-manager -disablemysql57-community
```

4. 啟用MySQL 56儲存庫：

```
[root@mcctb ~]# yum-config-manager --enable mysql56-community
```

5. 啟用儲存庫：

```
[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. 安裝MySQL社群伺服器：

```
[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
<key_id> 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. 啟動MySQL伺服器：

```

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

```

Starting mysqld: [ OK ]

```

8. 確認MySQL伺服器正在執行：

[root@mcctb ~]#服務mysqLD狀態

```

mysqld (pid 2739) is running...

```

9. 設定安全性和密碼設定：

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 authorization.

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. 驗證MySQL登入是否正常運作：

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

mysql>

當 MySQL 登入如預期般運作時、輸出會在結束 mysql> 提示。

啟用 MySQL 自動啟動設定

您應該確認MySQL精靈的自動啟動功能已開啟。開啟MySQL精靈會在MetroCluster 系統重新開機時、自動重新啟動MySQL。如果MySQL精靈未執行、則tiebreaker軟體會繼續執行、但無法重新啟動、也無法進行組態變更。

步驟

1. 驗證MySQL在開機時是否已啟用自動啟動：

```
[root@mcctb ~]# systemctl list-unit-files mysqld.service`
```

UNIT	FILE	State
-----	-----	
mysqld.service		enabled

如果MySQL在開機時未啟用自動啟動、請參閱MySQL文件、以啟用安裝的自動啟動功能。

在 **Red Hat Enterprise Linux 8** 上安裝 **MariaDB** 伺服器

您必須先在主機系統上安裝MariaDB伺服器、才能安裝或升級tiebreaker軟體。對於 Red Hat Enterprise Linux 7 或 CentOS 7 、[安裝 MySQL Server](#) 。

開始之前

您的主機系統必須在Red Hat Enterprise Linux (RHEL) 8上執行。

步驟

1. 以登入 root 使用者：

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

2. 安裝 MariaDB 伺服器：

```
[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. 啟動MariaDB伺服器：

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

4. 確認MariaDB伺服器已啟動：

```
[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 mcctb systemd[1]: Started MariaDB database server.
```

5. 設定安全性和密碼設定：



當系統提示您輸入 root 密碼時、請將其保留空白、然後按 Enter 鍵繼續設定安全性和密碼設定。

```
root@localhost systemd]# mysql_secure_installation
```

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

In order to log into MariaDB to secure it, we'll need the current password for the root user. If you've just installed MariaDB, 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):
OK, successfully used password, moving on...
```

Setting the root password ensures that nobody can log into the MariaDB 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 MariaDB installation has an anonymous user, allowing anyone to log into MariaDB 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, MariaDB 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...

... Success!

- 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]

... 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!

啟用 MariaDB 伺服器的自動啟動設定

您應該確認 MariaDB 伺服器的自動啟動功能已開啟。如果您未啟用自動啟動功能、MetroCluster 且駐留的系統必須重新開機、則tiebreaker軟體會繼續執行、但無法重新啟動MariaDB服務、也無法進行組態變更。

步驟

1. 啟用自動啟動服務：

```
[root@mcctb ~]# systemctl enable mariadb.service`
```

2. 確認已啟用MariaDB、以便在開機時自動啟動：

```
[root@mcctb ~]# systemctl list-unit-filesmariadb.service`
```


UNIT FILE	State
-----	-----
mariadb.service	enabled

安裝或升級至 tiebreaker 1.4

在主機 Linux 作業系統上執行新的安裝或升級至 tiebreaker 1.4 、以監控 MetroCluster 組態。

關於這項工作

- 您的儲存系統必須執行支援的 ONTAP 版本。請參閱 ["軟體需求"](#) 詳細資料請見下表。
- 您必須使用安裝 OpenJDK `yum install java-x.x.x-openjdk` 命令。Tiebreaker 1.4 及更早版本支援 JDK 1.8.0 (JRE 8) 。

步驟

1. 下載 MetroCluster Tiebreaker 軟體。

["MetroCluster Tiebreaker \(下載\) - NetApp 支援網站"](#)

2. 以root使用者身分登入主機。
3. `[[install-tiebreaker]` 安裝或升級Tiebreaker軟體：

根據您是執行新安裝還是升級現有安裝、選擇正確的程序。

執行新安裝

- a. 執行以下項目來安裝 tiebreaker 軟體：

```
rpm -ivh NetApp-MetroCluster-Tiebreaker-Software-1.4-1.x86_64.rpm
```

系統會顯示下列輸出、以利成功安裝：

```
Verifying...
##### [100%]
Preparing...
##### [100%]
Updating / installing...
   1:NetApp-MetroCluster-Tiebreaker-
So##### [100%]
Post installation start Fri Apr  5 02:28:09 EDT 2024
Enter MetroCluster Tiebreaker user password:

Please enter mysql root password when prompted
Enter password:
Synchronizing state of netapp-metrocluster-tiebreaker-
software.service with SysV service script with
/usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable netapp-
metrocluster-tiebreaker-software
Created symlink /etc/systemd/system/multi-
user.target.wants/netapp-metrocluster-tiebreaker-software.service
→ /etc/systemd/system/netapp-metrocluster-tiebreaker-
software.service.
Attempting to start NetApp MetroCluster Tiebreaker software
services
Started NetApp MetroCluster Tiebreaker software services
Enabled autostart of NetApp MetroCluster Tiebreaker software
daemon during boot
Created symbolic link for NetApp MetroCluster Tiebreaker software
CLI
Post installation end Fri Apr  5 02:28:22 EDT 2024
Successfully installed NetApp MetroCluster Tiebreaker software
version 1.4.
```

升級現有安裝

- a. 升級Tiebreaker軟體。

```
[root@mcctb ~]# rpm -Uvh NetApp-MetroCluster-Tiebreaker-Software-1.4-1.x86_64.rpm
```

系統會顯示下列輸出以成功升級：

```
Verifying...
##### [100%]
Preparing...
##### [100%]
Upgrading NetApp MetroCluster Tiebreaker software....
Stopping NetApp MetroCluster Tiebreaker software services before
upgrade.
Updating / installing...
  1:NetApp-MetroCluster-Tiebreaker-
So##### [ 50%]
Post installation start Mon Apr  8 06:29:51 EDT 2024
Synchronizing state of netapp-metrocluster-tiebreaker-
software.service with SysV service script with
/usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable netapp-
metrocluster-tiebreaker-software
Attempting to start NetApp MetroCluster Tiebreaker software
services
Started NetApp MetroCluster Tiebreaker software services
Enabled autostart of NetApp MetroCluster Tiebreaker software
daemon during boot
Created symbolic link for NetApp MetroCluster Tiebreaker software
CLI
Post upgrade end Mon Apr  8 06:29:51 EDT 2024
Successfully upgraded NetApp MetroCluster Tiebreaker software to
version 1.4.
Cleaning up / removing...
  2:NetApp-MetroCluster-Tiebreaker-
So##### [100%]
```



如果您輸入錯誤的MySQL根密碼、則Tiebreaker軟體會指出已成功安裝、但會顯示「拒絕存取」訊息。若要解決此問題、您必須使用「rpm -e」命令解除安裝Tiebreaker軟體、然後使用正確的MySQL root密碼重新安裝軟體。

4. 開啟從斷路器主機到每個節點管理生命期和叢集管理生命期的SSH連線、以檢查斷路器與MetroCluster 該軟件的連線。

相關資訊

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