Notes, cautions, and warnings

**NOTE:** A NOTE indicates important information that helps you make better use of your product.

**CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

**WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.
1 Introduction ........................................................................................................................................................................5
   High availability overview ..................................................................................................................................................5

2 High availability architecture .............................................................................................................................................6
   System requirements for high availability ............................................................................................................................6

3 High availability on Windows Server 2012 R2/2016/2019 ............................................................................................8
   Creating clustered roles ........................................................................................................................................................8

4 Achieve high availability on Windows Server 2012 R2/2016/2019 .............................................................................11
   Add failover cluster feature on Windows Server 2012 R2/2016/2019 ...........................................................................11
   Create file share witness ......................................................................................................................................................16
   Configure cluster quorum settings .......................................................................................................................................17
   Creating clustered roles ......................................................................................................................................................19

5 Achieve high availability for MySQL InnoDB ..................................................................................................................22
   High availability with MySQL InnoDB ..................................................................................................................................22
   Install MySQL InnoDB database ..........................................................................................................................................22
   Check MySQL InnoDB server instances ..............................................................................................................................40
   Create a cluster instance for MySQL InnoDB .....................................................................................................................41
   Add server instance to MySQL InnoDB cluster ..................................................................................................................42
   Configure MySQL Router ...................................................................................................................................................43
   Create database and users on MySQL InnoDB server ......................................................................................................56

6 Achieve high availability on MongoDB ............................................................................................................................57
   Install MongoDB ..................................................................................................................................................................57
   Create replica servers for MongoDB database ..................................................................................................................58
   Create stratus user ............................................................................................................................................................58
   Create database user .........................................................................................................................................................59
   Create DBadmin user for MongoDB ..................................................................................................................................59
   Edit mongod.cfg file ...........................................................................................................................................................59
   Initiate replication on the servers ........................................................................................................................................60

7 Achieve high availability for Teradici devices ...................................................................................................................64
   Install and configure HAProxy .............................................................................................................................................64

8 Install Wyse Management Suite on Windows Server 2012 R2/2016/2019 .................................................................66

9 Post installation checks .....................................................................................................................................................72

10 Upgrade Wyse Management Suite version 1.3 to 1.4 ......................................................................................................73

11 Upgrading from Wyse Management Suite version 1.4/1.4.1 to Wyse Management Suite version 2.0 .......81
Wyse Management Suite is the next generation management solution and enables you to configure, monitor, manage, and optimize your Dell Wyse thin clients. This helps you to deploy and manage thin clients on a high availability set-up with improved performance.

It offers advanced feature options such as cloud versus on-premises deployment, manage-from-anywhere by using a mobile application, and enhanced security such as BIOS configuration and port lockdown. Other features include device discovery and registration, asset and inventory management, configuration management, operating system and applications deployment, real-time commands, monitoring, alerts, reports, and troubleshooting of endpoints.

Wyse Management Suite version supports high availability and significantly minimizes the system downtime. The solution also protects the system from unplanned downtime and helps you to achieve the required availability to meet the business goals.

This guide describes the solution architecture and explains how to set up, configure, and maintain high availability clusters at the application and database level.

### High availability overview

**About this task**

The high availability solution for Wyse Management Suite version includes the following sections:

**Steps**

1. Review the high availability requirements—see System requirements to set up high availability.
3. Deploy high availability on MySQL InnoDB servers—see Deploy high availability on MySQL InnoDB.
4. Deploy high availability on MongoDB—see Deploy high availability on MongoDB.
5. Configure high availability proxy (for Teradici devices)—see Deploy high availability for Teradici servers.
7. Review the post installation checks—see Post installation checks.
8. Troubleshooting issues with workaround—see Troubleshooting.
High availability architecture

The Dell Wyse Management Suite architecture consists of Windows Server 2012 R2/2016/2019 with failover cluster enabled. The Windows cluster contains a main computer that supports other applications and ensures minimum downtime by harnessing the redundant. This is used for application failover for Tomcat, Memcache, MQTT services. MongoDB database cluster helps in the event of primary database failure the secondary database will take over. MySQL InnoDB database cluster has an inbuilt database clustering mechanism and secondary database will take over in case of primary read write database fail. Linux Server with HA Proxy is a load balancer and high availability server for EMSDK (Teradici) server. Local repository is created as part of the shared path that contains the applications, images, packages, and will not be part of the cluster set up.

NOTE: The high availability system requirements may change depending on the infrastructure at your work site.

System requirements for high availability

The table lists the minimum hardware and software requirement and supports up to 10,000 devices. Each instance of EMSDK can support a maximum of 5,000 devices. The deployment can be on individual servers or on a hypervisor environment, depending on the requirement.

The hardware and software requirements to set up high availability for Wyse Management Suite are:
<table>
<thead>
<tr>
<th>Product</th>
<th>Port</th>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows Server 2012 R2/2016/2019</td>
<td>• Network communication ports:</td>
<td>• Minimum disk space—40 GB</td>
<td>Server where Wyse Management Suite is hosted.</td>
</tr>
<tr>
<td></td>
<td>• UDP:3343</td>
<td>• Minimum number of systems—2</td>
<td>Supports English, French, Italian, German, and Spanish languages.</td>
</tr>
<tr>
<td></td>
<td>• TCP:3342</td>
<td>• Minimum memory (RAM)—8 GB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• UDP:137</td>
<td>• Minimum CPU requirements—4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MySQL Cluster</td>
<td>• Network communication port—TCP:3306</td>
<td>• Minimum disk space—40 GB</td>
<td>Server in the high availability setup.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum number of systems—3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum memory (RAM)—8 GB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum CPU requirements—4</td>
<td></td>
</tr>
<tr>
<td>MySQL Router</td>
<td>• Network communication ports:</td>
<td>• Minimum disk space—40 GB</td>
<td>Establishes communication in the high availability setup.</td>
</tr>
<tr>
<td></td>
<td>• 6446</td>
<td>• Minimum number of systems—2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 6447</td>
<td>• Minimum memory (RAM)—8 GB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum CPU requirements—4</td>
<td></td>
</tr>
<tr>
<td>MongoDB</td>
<td>• Network communication port—TCP:27017</td>
<td>• Minimum disk space—40 GB</td>
<td>Database</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum number of systems—3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum memory (RAM)—8 GB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum CPU requirements—4</td>
<td></td>
</tr>
<tr>
<td>EMSDK</td>
<td>• Network communication port—TCP:5172</td>
<td>• Minimum disk space—40 GB</td>
<td>Enterprise SDK server</td>
</tr>
<tr>
<td></td>
<td>• TCP 49159</td>
<td>• Minimum number of systems—2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum memory (RAM)—8 GB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum CPU requirements—4</td>
<td></td>
</tr>
<tr>
<td>HAProxy</td>
<td>• Network communication port—TCP:5172</td>
<td>• Minimum disk space—40 GB</td>
<td>Load balancer in the high availability setup.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum number of systems—1</td>
<td>Ubuntu version 12.04 and later.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum memory (RAM)—4 GB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum CPU requirements—2</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Ensure that you add the TCP ports 443, 8080 and 1883 to the firewall exception list during high availability setup.
High availability on Windows Server 2012 R2/2016/2019

A failover cluster is a group of independent systems that increases the availability and scalability of clustered roles. This feature supports multiple workloads running clusters on hardware or on virtual machines.

A failover cluster is a group of systems that are independent and increases the availability and scalability of clustered roles. The clustered servers are the nodes that are connected to one another as a network. If one or more of the cluster nodes fail, other nodes become active and prevent failover of the systems in the network. The clustered roles that are created during cluster setup monitor to verify that the systems are working in the clustered network. If any of the systems are not working, they are restarted or moved to another node.

The failover cluster network for high availability on Windows Server 2012 R2/2016/2019 contains two nodes, Node 1 and Node 2 that are configured on systems running Windows Server 2012 R2/2016/2019. In the failover cluster network, if Node 1 that is working as the primary node fails, Node 2 starts working automatically as the primary node. After Node 1 becomes active, it automatically becomes the secondary node. The systems have a shared storage space that is connected in a network.

NOTE: The IP address of the systems in the image is an example and varies for each system at your work place.

Creating clustered roles

Prerequisites

After you create the failover cluster, you can create clustered roles to host cluster workloads. Ensure that Wyse Management Suite is installed on the servers and point to the remote database before you create clustered roles.

Steps

1. In Windows Server 2012, right-click the Start menu and then select Server Manager to launch the Server Manager dashboard
2. Click Failover Cluster Manager to launch the cluster manager.
3. Right-click **Roles** and then select **Configure Role** to display the **High Availability Wizard** screen.

![High Availability Wizard](image)

**Figure 3. High availability wizard**

4. Select **Generic Service** and then click **Next** to view the **Select Service** screen.

![Select Service](image)

**Figure 4. Select service**

5. Select **Dell WMS: Tomcat Service** and then click **Next**.
NOTE: You can add the Wyse Management Suite related services to the cluster only after you install Wyse Management Suite.

The High Availability Wizard screen is displayed where you need to create the client access point and establish connectivity between the Windows server 2012 and Wyse Management Suite.

6. Type a network name in the Name field and then click Next. The Confirmation screen is displayed with the network name and IP address details of the server.

![Confirmation](image)

**Figure 5. Confirmation**

7. Click Next to complete the process.

8. To add other Wyse Management Suite services as part of the cluster, launch Failover Cluster Manager, and then go to ActionsRoles to display the network name that you have created.

9. Click on the network name, and go to Add ResourceGeneric Service.

10. Select the following services from the New Resource Wizard screen that needs to be added as part of the cluster:
   a) Dell WMS: MQTT Broker
   b) Dell WMS: memcached

11. Click Next to complete the task.

   The Wyse Management Suite services that have been added as part of the cluster are displayed with the status Running.
Achieve high availability on Windows Server 2012 R2/2016/2019

About this task

The following are the steps to achieve high availability on Windows Server 2012/2016/2019:

2. Create file share witness—see Create file share witness.
3. Configure cluster Quorum—see Configure cluster Quorum.
4. Create clustered roles—see Create cluster roles.

Add failover cluster feature on Windows Server 2012 R2/2016/2019

About this task

To add the failover clustering feature on the Windows server 2012/2016/2019, do the following:

Steps

1. In Microsoft Windows Server 2012 R2/2016/2019, click Start to open the Start screen and then click Server Manager to launch the Server Manager dashboard.

   NOTE: Server Manager is a management console in Windows Server 2012 R2/2016/2019 that enables you to add server roles/features, manage, and deploy servers.

2. Click Add roles and features and select an option to configure the server based on your requirement from the Add Roles and Feature Wizard screen.
3. Click Installation Type and select Role-based or Feature-based installation and then click Next to view the list of servers in the Select destination server screen.

4. Select the server where you want to enable the failover cluster feature and then click Next.

5. Select Failover Clustering on the Features screen, and then click Next. After you enable the failover cluster on the servers, open the Failover Cluster Manager on the server at Node 1.
6. Click Yes to confirm installation, and enable the failover cluster feature on the selected server.

7. In the Failover Cluster Manager screen, click Validate Configuration to view the Validate a Configuration Wizard and add the required servers or nodes to cluster.

8. Click Select servers or cluster and then click Browse to configure the servers.

9. Click Next and select Run all tests from the Testing Options screen.
10. Click **Next**. The **Confirmation** screen is displayed with the list of selected servers.
Figure 10. Confirmation

11. Click Next. The Summary screen is displayed with the failover cluster validation report.
12. Click **View Report** to check the report. If the status is **Passed**, you can proceed with the next step. If the status is **Failed**, you must fix the errors before you proceed with the next step.

**NOTE:** The **Create Cluster Wizard** screen is displayed if there are no validation errors.

13. Click **Next** and type a name for the cluster in the **Cluster Name** field and then select the IP address of the system.
14. Click **Next** and the **Confirmation** screen is displayed.
15. Click **Next** to create the cluster on all the selected clustered nodes and then click **View Report** to view the warning messages.
16. Click **Finish** to create the failover cluster.

---

**Create file share witness**

A file share witness is a basic file share that the cluster computer has read/write access. The file share must be on a separate Windows Server 2012 in the same domain where the cluster resides.

### About this task

To create a file share witness, do the following:

### Steps

1. In Microsoft Windows Server 2012, Right-click the **Start** Menu and then select **Server Manager** to launch the Server Manager dashboard.
2. Click the **Server Manager** icon to access the server manager.
3. Go to **Files and Storage ServicesShares** and then click **Tasks**.
4. Click **New Share**. The **New Share Wizard** is displayed.
5. Click **Select Profile** to create a file share and then click **Next**.
6. On the **Share location** screen, select the server and share location for the file share and then click **Next**.
7. On the **Share Name** screen, type a name in the **Share name** field and then click **Next** until the **Confirmation** screen is displayed.
8. Click **Create** to create the file share and the **View results** screen is displayed with the status as **Completed** which indicates that the file share witness is created without any errors.

9. Click **Close** to exit.

### Configure cluster quorum settings

The cluster configuration database, also called the quorum, contains details as to which server should be active at any given time in a cluster set-up.

**About this task**

To configure the cluster quorum settings, do the following:

**Steps**

1. In Microsoft Windows Server 2012, click **Start** to open the **Start** screen and then click **Server Manager** to launch the Server Manager dashboard.

2. Click the **Server Manager** icon to access the server manager and then click **Failover Cluster Manager** to launch the cluster manager.

3. Right-click the cluster node, and go to **More Actions** > **Configure Cluster Quorum Settings** to display the **Configure Cluster Quorum Wizard** screen.

4. Click **Next**. Select **Select the quorum witness** from the **Select Quorum Configuration Option** screen.

![Configure Cluster Quorum Wizard](image)

**Figure 12. Quorum cluster wizard**

5. Click **Next**. Select **All Nodes** from the **Select Voting Configuration** screen.
6. Click **Next**. Select **Configure a file share witness** from the **Select Quorum Witness** screen.

7. Click **Next** and then type the share path in the **File Share Path** field from the **Configure a file share witness** screen.

8. Click **Next**. The **Summary** screen is displayed with the configured quorum settings.
Figure 15. Summary of the quorum settings

9. Click Finish to complete the quorum settings.

Creating clustered roles

Prerequisites

After you create the failover cluster, you can create clustered roles to host cluster workloads. Ensure that Wyse Management Suite is installed on the servers and point to the remote database before you create clustered roles.

Steps

1. In Windows Server 2012, right-click the Start menu and then select Server Manager to launch the Server Manager dashboard.
2. Click Failover Cluster Manager to launch the cluster manager.
3. Right-click Roles and then select Configure Role to display the High Availability Wizard screen.
4. Select **Generic Service** and then click **Next** to view the **Select Service** screen.

5. Select **Dell WMS: Tomcat Service** and then click **Next**.

   **NOTE:** You can add the Wyse Management Suite related services to the cluster only after you install Wyse Management Suite.
The **High Availability Wizard** screen is displayed where you need to create the client access point and establish connectivity between the Windows server 2012 and Wyse Management Suite.

6. Type a network name in the **Name** field and then click **Next**. The **Confirmation** screen is displayed with the network name and IP address details of the server.

![Confirmation](image)

**Figure 18. Confirmation**

7. Click **Next** to complete the process.

8. To add other Wyse Management Suite services as part of the cluster, launch **Failover Cluster Manager**, and then go to **ActionsRoles** to display the network name that you have created.

9. Click on the network name, and go to **Add ResourceGeneric Service**.

10. Select the following services from the **New Resource Wizard** screen that needs to be added as part of the cluster:
   a) Dell WMS: MQTT Broker
   b) Dell WMS: memcached

11. Click **Next** to complete the task.

   The Wyse Management Suite services that have been added as part of the cluster are displayed with the status **Running**.
Achieve high availability for MySQL InnoDB

About this task
The following steps explain how to achieve high availability for MySQL InnoDB:

Steps
1. Check MySQL InnoDB server instance—see Create MySQL InnoDB cluster.
2. Add server or node to MySQL InnoDB—see Adding server or node to MySQL InnoDB cluster.
3. Create MySQL Router—see Creating MySQL Router

High availability with MySQL InnoDB
The MySQL InnoDB cluster provides a complete high availability solution for MySQL. The client application is connected to the primary node by using the MySQL router. If the primary node fails, a secondary node is automatically promoted to the role of primary node, and the MySQL router routes the requests to the new primary node.

The components of the MySQL InnoDB cluster are:
- MySQL server
- MySQL router

Install MySQL InnoDB database

About this task
To install MySQL InnoDB database, do the following:

Steps
1. Double-click the MySQL installer.
   - The MySQL Installer window is displayed.
2. On the License Agreement screen, read the license agreement, and click Next.
3. On the Choosing a Setup Type screen, click the Custom radio button, and click Next.
4. On the **Select Products and Features** screen, select the MySQL Server, workbench, and shell components, and click **Next**.
Figure 20. Products and features

5. On the **Check Requirements** screen, select the components, and click **Execute**.
6. Install the required components, and click **Next**.
Achieve high availability for MySQL InnoDB

Figure 22. Components installation

Check Requirements

The following products have failing requirements. MySQL Installer will attempt to resolve some of this automatically. Requirements marked as manual cannot be resolved automatically. Click on those items to try and resolve them manually.

<table>
<thead>
<tr>
<th>For Product</th>
<th>Requirement</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>MySQL Server 5.7.22</td>
<td>Microsoft Visual C++ 2013 Redistrib...</td>
<td>INSTL...</td>
</tr>
<tr>
<td>MySQL Shell 8.0.11</td>
<td>Microsoft Visual C++ 2015 Redistrib...</td>
<td></td>
</tr>
</tbody>
</table>

Microsoft Visual C++ 2013 Redistributable (x64) - 12.0.40660

Microsoft Software License Terms

Microsoft Visual C++ Redistributable for Visual Studio 2013

These license terms are an agreement between Microsoft Corporation (or its local subsidiary) and you. Please read them

I agree to the license terms and conditions

Install  Close

< Back  Execute  Next >  Cancel
Figure 23. Requirements

7. On the **Installation** screen, click **Execute**.
Figure 24. Installation

The MySQL server, workbench, and shell components are upgraded.

8. Click **Next**.
Figure 25. Installation

9. On the Product Configuration screen, the MySQL server component is displayed.
10. Click Next to configure the MySQL server component.

11. On the Group Replication screen, click the Standalone MySQL Server / Classic MySQL Replication radio button, and click Next.
12. On the Type and Networking screen, select the Dedicated Computer option from the Config Type drop-down list.
13. Select and configure the options in the Connectivity section, and click Next.
14. In the Accounts and Roles screen, enter the MySQL root password.
15. Click Add User.
Figure 29. Add user

The **MySQL User Details** window is displayed.

16. Enter the credentials and click **Ok**. The newly added user account is displayed in the **MySQL User Accounts** section.
Figure 30. Accounts and roles

17. Click Next.

18. On the Windows Service screen, enter the MySQL Windows service name, and click Next.
Figure 31. Windows service

19. On the **Plugins and Extensions** screen, click **Next**.
20. On the Apply Configuration screen, click Execute.
   The configurations are applied to the MySQL component.
Figure 33. Apply configurations

21. Click Finish.
Figure 34. Apply configurations

22. On the Product Configuration screen, click Next.
23. On the **Installation Complete** screen, click **Finish**.
Next steps
Follow the procedure to install and configure MySQL server in all the three servers of the MySQL cluster.

![Figure 36. Installation complete](image)

**NOTE:** To set up the environment as per the high availability setup, see [dev.mysql.com](http://dev.mysql.com).

**Check MySQL InnoDB server instances**

**About this task**
Before you add MySQL InnoDB to the cluster setup, verify that MySQL InnoDB is created as per the cluster requirements. You must login as root user to run the commands and restart the system each time you run a set of commands.

Run the following commands to verify that the MySQL InnoDB server instance meets the configured cluster requirements:

- **NOTE:** The IP Address is different for each system that is used at your work place and the following commands are used only as an example.

**Steps**
- To check that the MySQL InnoDB is created as per the requirements, run the following commands at the command prompt:
  - `mysql-js> dba.checkInstanceConfiguration('root@IP Address1')`
  - `mysql-js> dba.checkInstanceConfiguration('root@IP Address2')`
  - `mysql-js> dba.checkInstanceConfiguration('root@IP Address3')`
To check that the MySQL InnoDB is created on all the three cluster nodes, run the following commands at the command prompt:

- `mysql-js> dba.checkInstanceConfiguration('root@IPAddress1:3306')`
- `mysql-js> dba.checkInstanceConfiguration('root@IPAddress2:3306')`
- `mysql-js> dba.checkInstanceConfiguration('root@IPAddress3:3306')`

The instance "IPAddress:3306" is valid for InnoDB cluster usage; 'Status': 'ok' message is displayed.

## Create a cluster instance for MySQL InnoDB

### Prerequisites
After you have installed MySQL InnoDB instance on the servers, create a cluster instance.

### About this task
To create a cluster for MySQL InnoDB, do the following:

### Steps
1. Login as administrator user from the command prompt. This user account should have administrative privileges. For example, `DBadmin`. The following screen shows an example of logging in as root user.

   ![Login prompt](image)

2. Run the following command to create a cluster with a unique name. For example, `MySQLCluster`.
   
   ```javascript
   var cluster = dba.createCluster('MySQLCluster')
   ```

3. Run the following command to check the status of the cluster.
   
   ```javascript
   Cluster.status()
   ```

   The status of the created cluster is displayed as **ONLINE** which indicates that the cluster is created successfully.
Add server instance to MySQL InnoDB cluster

Prerequisites

- Before you add servers or nodes to the clusters, change the server id to either 2 or 3 in the my.conf file in the secondary MySQL servers at C:\ProgramData\MySQL\MySQL Server 5.7.
- Only the primary MySQL server must have server ID as 1. The server ID should be unique across the SQL cluster.

About this task

You must add server instance to the MySQL InnoDB cluster as primary or secondary.

Do the following to add a server instance to the MySQL InnoDB cluster:

1. Log in as DB Admin user from the command prompt on the primary server.
2. Run the following command to add a server instance to the MySQL InnoDB cluster:
   ```shell
   cluster.addInstance('root@IPAddress2:3306')
   cluster.addInstance('root@IPAddress3:3306')
   ```
   **NOTE:** The IP address and the port numbers are only examples and varies based on the system that you are using at your work place.
3. Run the following command to check the status of the server instance:
   ```shell
   cluster.status()
   ```
   **NOTE:**
   - If the server IDs are same in all the nodes, and if you try to add instances in the Cluster, the error message Server_ID is already in used by the peer node, Result<Runtime Error> is displayed.
   - All the nodes should display the status as ONLINE which indicates that the nodes have been added successfully to the MySQL InnoDB cluster setup.
Configure MySQL Router

Prerequisites
MySQL Router establishes communication network between Wyse Management Suite and MySQL InnoDB.

About this task
To install MySQL Router, do the following:

Steps
1. Log in to the Windows Server 2012/2016 to install MySQL Router. For more information, see MySQL Router Installation
2. Select MySQL Router from the Select Products and Features screen and then click Next.
3. On the **Check Requirements** screen, click **Execute**.
Figure 42. Check requirements

4. Install the required components, and click Next.
Achieve high availability for MySQL InnoDB
5. On the **Installation** screen, click **Execute**.
Figure 45. Installation

MySQL router component is upgraded.

6. Click Next.
Figure 46. Installation

7. On the **Product Configuration** screen, the MySQL router component is displayed.
Click Next to configure the MySQL router component.

On the MySQL Router Configuration screen, enter the hostname, port number, management user, and password.
Figure 48. MySQL Router Configuration

10. On the **Apply Configuration** screen, click **Execute**.
Figure 49. Apply configuration

11. Click **Finish**.
Figure 50. Apply configurations

12. On the **Product Configuration** screen, click **Next**.
The **Installation Complete** message is displayed.
Figure 52. Installation complete

13. Click Finish.

14. Browse to \ProgramData\MySQL\MySQL Router directory, and open the file mysqlrouter.conf to check that the bootstrap property with all the configured MySQL servers are part of cluster setup.
Create database and users on MySQL InnoDB server

You must create the database and user accounts with administrator privileges on MySQL InnoDB server.

About this task

To create database on MySQL InnoDB server, run the following SQL commands:

```
Create Database stratus DEFAULT CHARACTER SET utf8 DEFAULT COLLATE utf8_unicode_ci;
CREATE USER 'STRATUS'@'LOCALHOST';
CREATE USER 'STRATUS'@'IP ADDRESS';
SET PASSWORD FOR 'STRATUS'@'LOCALHOST' = PASSWORD <db_password>;
SET PASSWORD FOR 'STRATUS'@<IP_Address> = PASSWORD <db_password>;
GRANT ALL PRIVILEGES ON *.* TO 'STRATUS'@<IP_Address> IDENTIFIED BY <db_password> WITH GRANT OPTION;
GRANT ALL PRIVILEGES ON *.* TO 'STRATUS'@'LOCALHOST' IDENTIFIED BY <db_password> WITH GRANT OPTION;
```

**NOTE:** Instead of IP Address, you can type the Wildcard for Network /Subnet or Multiple Single host entry where Wyse Management Suite application server will be installed.
Achieve high availability on MongoDB

About this task
The following steps explain how to achieve high availability on MongoDB:

Steps
1. Install MongoDB—see Installing MongoDB.
2. Create replica servers—see Creating Replica servers.
3. Create Stratus users—see Creating Stratus user account.
4. Create root user—see Creating root user for MongoDB.
5. Edit MongoDB configuration file—see Editing MongoDB configuration file.

Install MongoDB

About this task
To install MongoDB on all the three nodes, do the following:

Steps
1. Copy the MongoDB installation files on a system.
2. Create two folders Data\log and data\db on a secondary drive other than Drive C.
3. Go to the folder where you have copied the MongoDB installation files, and create a file mongod.cfg from the command prompt.
4. Open the `mongod.cfg` file in a text editor, and add:

```javascript
systemLog:
    destination: file
    path: c:\data\log\mongod.log
storage:
    dbPath: c:\data\db
```

5. Save the file.

6. Open command prompt.

7. Run the following command to start the MongoDB service:
   a) `C:\MongoDB\bin>\.mongod.exe --config c:\Mongodb\mongod.cfg --install`
   b) `C:\MongoDB\bin>net start mongodb`
   The message `MongoDB service is starting` is displayed.

8. Change the working directory to `\MongoDB\bin`.

9. Run `Mongo.exe` at the command prompt to complete the MongoDB installation.

### Create replica servers for MongoDB database

You must create replica servers to avoid any system failures. The replica servers should have the capacity to store multiple distributed read operations.

For more information to create replica servers, see Deploy a Replica Server Set at docs.mongodb.com/manual.

### Create stratus user

Create an user, for example, StratusUser using the Wyse Management Suite to access MongoDB.

**NOTE:** The stratus user and password are examples and can be created using a different name and password at your work place.

Run the following command to create the StratusUser:

```javascript
db.createUser({
    user: "stratus",
    pwd: <db_password>,
    roles: [
        { role: "userAdminAnyDatabase", db: "admin" },
        { role: "dbAdminAnyDatabase", db: "admin" },
        { role: "readWriteAnyDatabase", db: "admin" },
        { role: "dbOwner", db: "DBUser" }
    ]}
```

---

**Figure 55. mongod.cfg file**

4. Open the `mongod.cfg` file in a text editor, and add:

```javascript
systemLog:
    destination: file
    path: c:\data\log\mongod.log
storage:
    dbPath: c:\data\db
```
Create database user

Create an user, for example, DBUser using the Wyse Management Suite to access MongoDB.

NOTE: The database user and password are examples and can be created using a different name and password at your work place.

Run the following command to create the DBUser:

```javascript
db.createUser({
  user: "DBUser",
  pwd: <db_password>,
  roles: [
    { role: "dbOwner", db: "DBUser" }
  ]
})
```

Create DBadmin user for MongoDB

Login to the MongoDB using the user account created in the previous section. The DBadmin user is created with the administrative privileges.

Run the following command to create the DBadmin user:

```bash
mongo -uDBUser -pPassword admin
use admin
db.createUser({
  user: "DBadmin",
  pwd: <DBadmin user password>,
  roles: [
    { role: "DBadmin", db: "admin" },
  ]
})
```

Edit mongod.cfg file

You must edit the `mongod.cfg` file to enable the security for the MongoDB database.

1. Login to MongoDB as root user that you have already created and run the following command:

   ```bash
   mongo -uroot -p<root password> admin
   ```

2. Go to `\data\bin\mongod.cfg` directory, and open `mongod.cfg` file in a text editor.

3. Edit `mongod.cfg` file as shown in the following command:

   ```bash
   systemLog:
   destination: file
   path: c:\data\log\mongod.log
   storage:
   dbPath: c:\data\db
   port: 27017
   security:
   authorization: enabled
   ```
Initiate replication on the servers

Ensure that you disable firewall on Windows and stop Tomcat servers if they are running.

1. Login to MongoDB as root user that you have already created and run the following command:

```
mongo -u root -p <root password> admin
```

2. Go to `\data\bin\mongod.cfg` directory, and open `mongod.cfg` file in a text editor.

3. Add the following three lines in the `mongod.cfg` file:

```
"systemLog": {
  "destination": "file",
  "path": "c:\data\log\mongod.log"
},
"storage": {
  "dbPath": "c:\data\db\Mongo"
},
"net": {
  "bindIp": "X.X.X.X, 0.0.0.0",
  "port": 27017
},
"security": {
  "authorization": "enabled",
  "keyFile": "c:\data\log\mongod.key.txt"
},
"replication": {
  "replSetName": "wms"
}
```

4. Create `mongod.key.txt` file and copy on all the three servers.

**NOTE:** Ensure that the `mongod.key.txt` file content or key is the same in all the three servers.
Figure 58. Copy the mongod key file

5. After you copy the file, stop the mongod service by running the following command:
   ```
   net stop mongodb
   ```

6. Start the mongod service by running the following command:
   ```
   net start mongodb
   ```

7. Repeat the steps from 1 to 6 in all the three nodes of MongoDB servers.

8. Initiate replication on the primary node of the MongoDB cluster logging in using DBadmin user and then run the following command:
   ```
   rs.initiate();
   ```

C:\Mongo\bin>mongo.exe -u root -p x` admin
MongoDB shell version v4.2.1
connecting to: mongodb://127.0.0.1:27017/admin?
compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("952f322c-1eb4-46c4-9b5e-bd536e2c1e7e") }
MongoDB server version: 4.2.1
MongoDB Enterprise > use admin
switched to db admin
MongoDB Enterprise >
MongoDB Enterprise >
MongoDB Enterprise > rs.initiate();
{
"info2" : "no configuration specified. Using a default configuration for the set",
"me" : "10.150.132.37:27017",
"ok" : 1
}

9. Check the replication status by running the following command:
   ```
   rs.status();
   ```
Start mongod service and add the secondary nodes to the second and third nodes in the MongoDB cluster:

```javascript
rs.add("IPAddress2:27017")
r.add("IPAddress3:27017")
```

```
NOTE: The port numbers will differ based on the systems at your network and systems.
```

11. After you add the nodes in the MongoDB cluster, check the replication status by running the following commands for the primary and secondary nodes:

```javascript
rs.status();
```
Figure 60. Status in primary server

Figure 61. Secondary server status

Achieve high availability on MongoDB
Achieve high availability for Teradici devices

Wyse Management Suite uses the HAProxy hosted on the Ubuntu server 16.04.1 LTS to perform load balancing between the EMSDK servers. HAProxy is a load balancer proxy that can also provide high availability based on how it is configured. It is a popular open source software for TCP/HTTP Load Balancer, and proxy solution which runs on Linux operating system. The most common use is to improve the performance and reliability of a server environment by distributing the workload across multiple servers.

About this task
The following points explains how to achieve high availability for Teradici devices using HAProxy on Linux operating system:

- There will be only one instance of Teradici server as part of high availability with Wyse Management Suite.
- Teradici device support requires installation of EMSDK. EMSDK is a software component provided by Teradici that is integrated into Wyse Management Suite. Wyse Management Suite Installer installs EMSDK can be installed on Wyse Management Suite server or on a separate server. You need minimum of two instances of EMSDK to support more than 5000 devices, and all EMSDK servers should be on remote servers.
- Only one instance of EMSDK can be installer per server.
- Teradici Device support requires a PRO license.
- High availability of Teradici will be provided through HAProxy.
- If Teradici server goes down, device will reconnect automatically to the next available EMSDK server.

Install and configure HAProxy

About this task
HAProxy which is the load balancer for ThreadX 5x devices is configured on Ubuntu Linux version 16.04.1 with HAProxy version 1.6.

Do the following to install and configure HAProxy on Ubuntu Linux system:

1. Log in to Ubuntu system using the user credentials used during the installation of Ubuntu operating system.
2. Run the following commands to install HAProxy
   ```
sudo apt-get install software-properties-common
sudo add-apt-repository ppa:vbernat/haproxy-1.6
sudo apt-get update
sudo apt-get install haproxy
   ```
3. Run the following command to take backup of the original configuration:
   ```
sudo cp /etc/haproxy/haproxy.cfg /etc/haproxy/ haproxy.cfg.original
   ```
4. Edit the HAPProxy configuration file in a suitable text editor by running the following commands:
   ```
sudo nano /etc/haproxy/haproxy.cfg
   ```
   Add the following entries in the configuration file:
   ```
Global section: Maxconn <maximum number of connections>
Frontend tcp-in: bind :5172
Back end servers: server :5172
maxconn <maximum number of connections per Teradici device proxy server>
```

**NOTE:** Administrator must add additional back end servers beyond the total number of client’s capacity to have seamless failover.

5. Save the changes to the haproxy.cfg file by typing CTRL+O.
The following text is a sample HAProxy configuration file:

```
global
    log /dev/log   local0
    log /dev/log   local1 notice
    chroot /var/lib/haproxy
defaults
    log global mode tcp
timeout connect 5000ms
    timeout client 50000ms
    timeout server 50000ms
    errorfile 400 /etc/haproxy/errors/400.http
    errorfile 403 /etc/haproxy/errors/403.http
    errorfile 408 /etc/haproxy/errors/408.http
    errorfile 500 /etc/haproxy/errors/500.http
    errorfile 502 /etc/haproxy/errors/502.http
    errorfile 503 /etc/haproxy/errors/503.http
    errorfile 504 /etc/haproxy/errors/504.http
frontend fe_teradici_5172
    bind :5172
    mode tcp
    backlog 4096
    maxconn 70000
    default_backend be_teradici_5172
backend be_teradici_5172
    mode tcp
    option log-health-checks
    option tcplog
    balance leastconn
    server emsdk1 :5172 check server emsdk2 5172 check : timeout queue 5s timeout server 86400s
    option srvtcpka
#frontend fe_teradici_5172
#replace IP with IP of your Linux proxy machine bind Eg: 10.150.105.119:5172
#default_backend servers
#backend servers
#Add your multiple back end windows machine ip with 5172 as port
# maxconn represents number of connection- replace 10 with limit #(below 20000)
# "server1" "server2" are just names and not keywords
#server server1 10.150.105.121:5172 maxconn 20000 check
#server server2 10.150.105.124:5172 maxconn 20000 check
```

6. Validate the HAProxy configuration by running the following command:
   ```
sudo haproxy -f /etc/haproxy/haproxy.cfg -c
   ```
   If the configuration is valid, the message **Configuration is Valid** is displayed.

7. Restart HAProxy service by running the following command:
   ```
   sudo service haproxy restart
   ```

8. Stop HAProxy by running the following command:
   ```
   serviceSudo service haproxy stop
   ```

Achieve high availability for Teradici devices
Prerequisites

Ensure that the following servers are configured before installation of Wyse Management Suite application:

- Windows Fail over Cluster on Two Nodes
- MongoDB Server Running with replica set
- MySQL Server InnoDB Cluster up running
- MySQL Router installed on the two Nodes

About this task

Installation of Wyse Management Suite 1.3 or higher on both the Nodes in Windows Cluster

Steps

1. Launch the Wyse Management Suite installer.

2. Select Custom type installation.

3. Select the External Remote Mongo database option (MongoDB Cluster with Replica set created). Ensure to provide the remote primary Mongo DB server information and port number; and Mongo DB username and password.
4. Select the External MariaDB option for MySQL. Provide MySQL router address (Local Host if it is installed on Wyse Management Suite server node) in the External MariaDB Server fields with the port number (Default 6446). You must type the MySQL database user account information that was created initially.

**NOTE:** Ensure that the "Stratus" Database is created and "DB User" account (stratus) with appropriate Privileges is created on MySQL server.

The following commands are to be started in the Primary Node or R/W MySQL DB Server:

a. Open command prompt with Admin mode, go to “C:\Program Files\MariaDB 10.0\bin>” and start command, “C:\Program Files \MariaDB 10.0\bin>mysql.exe -u root –p”

b. Provide the root password which was created during MySQL server installation to log in into DB server.

c. Execute the command, CREATE DATABASE stratus DEFAULT CHARACTER SET utf8 DEFAULT COLLATE utf8_unicode_ci to create DB.
Figure 66. Database command
d. Execute following commands to create and Stratus User account and privileges:
   • Create user ‘stratus’@’localhost’
   • Create user ‘stratus’@’10.150.132.21’
   • Set password for ‘stratus’@’localhost’ = password (‘PASSWORD’)
   • Set password for ‘stratus’@’IP ADDRESS’ = password (‘PASSWORD’)
   • Grant all privileges on *.* to ‘stratus’@’IP ADDRESS’ identified by ‘PASSWORD’ with grant option.
   • Grant all privileges on *.* to ‘stratus’@’localhost’ identified by ‘PASSWORD’ with grant option.

e. Provide MySQL router information in the External Maria DB Server fields with port number and MySQL DB user account information.

NOTE: The above commands can be started through the MySQL workbench for creating users and privileges with wildcards.

Figure 67. MySQL workbench

Figure 68. MySQL workbench

5. Provide ports information for Wyse Management Suite related Services in “Port Selection” window.
6. Provide administrator credentials and email address information.

7. Provide Teradici EM SDK Port information and CIFS User Account information.
8. Provide ‘Destination Installation folder path’ and ‘Shared UNC path’ for Local repository.

9. Recheck the Installation Summary information before we proceed with the Wyse Management Suite installation.

10. Complete the Installation on both the nodes.

Type the Destination Installation folder path and Shared UNC path for the local repository and then click Next. The message The installation was successful is displayed.

**NOTE:** The shared UNC path should be kept out of both the Windows Server where Wyse Management Suite application is installed. Before you install Wyse Management Suite application on Node 2, ensure to delete the 'Data' folder present in the Wyse Management Suite Local Repository; which was created during installation on Node 1.
After 'Data' folder is deleted from the shared UNC WMS Local Repository path, you can install Wyse Management Suite Application in the Node 2 of the Windows Cluster.

![Installation successful](image.png)

**Figure 73. Installation successful**
About this task

Do the following to check the high availability for Wyse Management Suite:

- Launch the Wyse Management Suite administrator portal and check whether you can log in using the web interface.
- Edit the bootstrap.properties file in the Tomcat server under the \Dell\WMS\Tomcat-9\webapps\ccm-web\WEB-INF \classes folder for MongoDB as follows:

  ```
  mongodb.seedList = MongoDBServer1_IP:27017, MongoDBServer2_IP:27017,
  MongoDBServer3_IP:27017
  ```

Do the following to make changes in the MongoDB and MySQL DB tables:

1. Log in to MongoDB using Robo 3T and update **Windows Cluster Virtual IP/Hostname of Access Point** values in the bootstrapProperties table with the following attributes:
   - Stratusapp.server.url
   - Stratus.external.mqtt.url
   - Memcached.Servers
   - Mqtt.server.url

2. Update the MySQL tables and restart the Tomcat on both the nodes. Manually update mysql database table to retain the ServerIp in the ServersInCluster table to be active by running the following command:

   ```
   Update serversInCluster set ServerIp = '<VIP address of Windows Cluster>';
   ```

   **NOTE:** Ensure that there is only one record in serversInCluster table and if there are more than one record, delete the excess records.

   ```
   Update queuelock set IpInLock = '<VIP address of Windows Cluster>';
   ```

3. Connect the FQDN address of the access point to the Memcached registry on both nodes of the high availability setup using the following paths:
   - Registry path—HKLM\SYSTEM\CurrentControlSet\Services\Memcached\n   - Image path—C:\Program Files\DELL\WMS\memcached\memcached.exe -d runservice -p 11211 -i <FQDN of Access Point> -u 0
Upgrade Wyse Management Suite version 1.3 to 1.4

Prerequisites

- Ensure that the `mongodb.seedList` value in the `bootstrap.properties` file includes backslash character (\) in the list of MongoDB database servers. The `bootstrap.properties` file is at `Tomcat-9\webapps\ccm-web\WEB-INF\classes`, `mongodb.seedList = MongoDBServer1_IP:27017,MongoDBServer2_IP:27017, MongoDBServer3_IP:27017`.

Figure 74. Prerequisite

- Ensure that the primary (active) Mongo database server with read and write access is the first entry in the `mongodb.seedList`. This is because the installer uses only the first entry as the primary server in the MongoDB cluster.

About this task

To upgrade Wyse Management Suite from version 1.4 to 2.0, do the following:

Steps

1. Double-click the Wyse Management Suite 1.4 installer package.
2. On the Welcome screen, read the license agreement and click Next.
On the Upgrade page, click **Next** to upgrade Wyse Management Suite.
Upgrade Wyse Management Suite version 1.3 to 1.4

Figure 76. Upgrade

Dell Wyse Management Suite 1.3 will be upgraded to 1.4.

Please make sure WMS console is closed for ensuring a smooth upgrade.
Figure 77. Upgrade

4. Click **Launch** to open the Wyse Management Suite web console.
Next steps

- Ensure that Tomcat-8 folder and subfolders are deleted, and Tomcat-9 folder and subfolders are created. Also, do the following:
  - Ensure that Tomcat-9\webapps\ccm-web\WEB-INF\classes folders and subfolders are created.
  - Ensure that Tomcat-9 service is added, and Tomcat-9 service is running.
  - Ensure that the bootstrap.properties file is copied from Tomcat-8\webapps\ccm-web\WEB-INF\classes folder to Tomcat-9\webapps\ccm-web\WEB-INF\classes folder.
  - Ensure that the mongodb.seedList value in the bootstrap.properties file includes backslash character (\) in the list of MongoDB database servers. The bootstrap.properties file is at Tomcat-8\webapps\ccm-web\WEB-INF\classes, mongodb.seedList = MongoDBServer1_IP\:27017,MongoDBServer2_IP\:27017, MongoDBServer3_IP \:27017.
  - Ensure that the primary and secondary MongoDB servers entries are present in the mongodb.seedList.
- In the Windows Fail-over Cluster, if the status of the access point is down due to the unavailability of the Tomcat 8 service, do the following:
  2. Check the status of the Wyse management Suite related services, roles, and access point.
3. Check the version of the Tomcat service. If the version of the Tomcat service is 8, you must manually remove Tomcat-8 and add Tomcat-9 service into the Access Point. This is because, when you upgrade Wyse Management Suite 1.4 to WMS 2.0, Tomcat-8 service is replaced with Tomcat-9.

4. Right-click the Tomcat-8 service, and then click Remove.

5. Add the Tomcat-9 service to the access point.
6. Bind the FQDN address of the access point of High Availability to the Memcached registry on both nodes of the High Availability setup using the command

```
Registry Path: HKLM\SYSTEM\CurrentControlSet\Services\Memcached\ "ImagePath" = "C:\Program Files\DELL\WMS\memcached\memcached.exe" -d runservice -p -I 11211 WMS1314AP.ADI32.COM -U 0"
```
Upgrade Wyse Management Suite version 1.3 to 1.4
Upgrading from Wyse Management Suite version 1.4/1.4.1 to Wyse Management Suite version 2.0

Prerequisites

Ensure to perform the following tasks before upgrading to Wyse Management Suite version 2.0.

- Set the policy of the resources (tomcat, memcache, mqtt) in the access point to "if resource fails, Do not restart" though default policy "if resource fails, attempt restart on current node " is recommended, for failover scenario it does not allow the product to upgrade.

Figure 84. Tomcat Service Properties

- Upgrade the MongoDB Replica Set from 3.4.1 to 4.2.1; path of MongoDB Upgrade is 3.4.1 >> 3.6 >> 4.0 >> 4.2.1. This is because from WMS 2.0 version onwards we are supporting MongoDB version 4.2.1 due to scheme changes made to support RAPTOR 9.0 devices.
  1. Upgrading Replica Set from 3.4.1 to 3.6 — see https://docs.mongodb.com/manual/release-notes/3.6-upgrade-replica-set/.
  2. Upgrading Replica Set from 3.6 to 4.0.13 — see https://docs.mongodb.com/manual/release-notes/4.0-upgrade-replica-set/.
  3. Upgrading Replica Set from 4.0 to 4.2.1 — see https://docs.mongodb.com/manual/release-notes/4.0-upgrade-replica-set/.

- The primary MongoDB server must be the first entry in the 'mongodb.seedList' value in 'bootstrap.properties' file under
  "Tomcat-9\webapps\ccm-web\WEB-INF\classes ".

- The MS Services Control Panel "services.msc" and any Wyse Management Suite related Files and Folder must be closed.

Steps

1. Double-click the Wyse Management Suite 2.x installer package.
2. On the Welcome screen, read the license agreement and click Next.
3. Select the **Bind Memcached to 127.0.0.1 check box** to bind the memcache to local server—127.0.0.1. If this check box is not selected, the memcache is binded to FQDN.

4. Click **Next**.
5. In the Dell Wyse Management Suite - InstallShield Wizard window, click Yes.

Wait for the installation to complete.

Figure 87. Upgrade

Figure 88. Upgrade

Figure 89. Upgrade
Post upgrade from Wyse Management Suite version 1.4/1.4.1 to Wyse Management Suite version 2.0

Ensure to change back the Access Point’s service policy setting of the resources to default “if resource fails, attempt restart on current node” configuration.
Upgrading from Wyse Management Suite version 1.4/1.4.1 to Wyse Management Suite version 2.0
Troubleshooting

About this task

This section provides troubleshooting information for Wyse Management Suite version 1.x for the cluster set up.

- Problem: Where is the Wyse Management Suite log file located to check server installation issues.
  Workaround: The log file is in the %temp% WMSInstall.log folder.

- Problem: Where is the Tomcat service related log file located to check the application related issues.
  Workaround: If any of the node/server in the cluster does not work and fails to be part of the MySQL cluster do the following:
  1. Reboot the cluster node and run the command `var cluster = dba.rebootClusterFromCompleteOutage();` in the shell prompt.
  2. Reconfigure the local instance using the command `dba.configureLocalInstance('root@Server_IPAddress:3306');`.
  3. Add the instance back to the cluster using the command `cluster.addInstance('root@Server_IPAddress:3306');`.

- Problem: If any of the server or node in the cluster stops working and is not part of the MySQL InnoDB cluster.
  Workaround: Perform the following steps at the command prompt:

```
var cluster = dba.rebootClusterFromCompleteOutage(); #Reboot the cluster instance
dba.configureLocalInstance('root@Server_IPAddress:3306'); #Reconfigure the local instance
cluster.addInstance('root@Server_IPAddress:3306'); #Add the cluster instance back to the network
MySQL JS> cluster.rejoinInstance("root@Server_IPAddress")
```

- Problem: If the server IDs are same in all the nodes, and if we try adding instances in the Cluster, an error message `ERROR: Error joining instance to cluster` is displayed.
**Figure 94. Error message**

Workaround: Change the server ID entries in the `my.conf` file located in the `\ProgramData\MySQL\MySQL Server 5.7` directory.

<table>
<thead>
<tr>
<th>Option Name</th>
<th>Required Value</th>
<th>Current Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>server_id</td>
<td>Unique ID = 1</td>
<td></td>
<td>PH11 &lt;RuntimeError&gt;</td>
</tr>
</tbody>
</table>

![MySQL screenshot](image)

**Figure 95. change server ID**

```
[mysqld]
general_log_file="23MySQL01.log"
slow_query_log=1
slow_query_log_file="23MySQL01-slow.log"
long_query_time=10

# Binary Logging.
# log-bin

# Error Logging.
log-error="23MySQL01.err"

# Server Id.
server-id=1
```