Dell Wyse Management Suite

Version 1.1 Deployment Guide

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.

2017 - 12

Rev. A00

Contents

1

Introduction

Wyse Management Suite v1.1 is the next generation management solution that lets you centrally configure, monitor, manage, and optimize your Dell Wyse thin clients. The new Suite makes it easier to deploy and manage thin clients with high functionality and performance, and ease of use. It also offers advanced feature options such as cloud versus on-premises deployment, manage-from-anywhere using a mobile application, 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, reporting, and troubleshooting of endpoints.

This document provides a deployment strategy of Wyse Management Suite in a single virtual machine or server in private cloud to support management of up to 120,000 devices.

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Hardware requirements

The following table lists the prerequisites to deploy Wyse Management Suite on a single server or virtual server on private cloud:

Table 1. Hardware requirements

Description	10000 devices or less	50,000 devices or less	120,000 devices or less	Software repository
Operating system	Microsoft Windows Server 2012 R2 or Microsoft Windows Server 2016 Supported language pack—English, French, Italian, German, and Spanish.			
Minimum disk space	40 GB	40 GB	200 GB	120 GB
Minimum memory (RAM)	8 GB	16 GB	32 GB	16 GB
Minimum CPU Requirements	4	4	16	4
Network Interfaces (assigned IP addresses)	1	1	4	1
Network Communication Ports	The Wyse Management Suite installer adds TCP ports 443, 8080 and 1883 to the firewall exception list. The ports are added to access the Wyse Management Suite console, and to send the push notifications to the thin clients. • TCP 443—HTTPS communication • TCP 8080—HTTP communication(optional) • TCP 1883—MQTT communication • TCP 3306—MariaDB (optional if remote) • TCP 27017—MongoDB (optional if remote) The default ports used by the installer, may be changed to an alternative port during installation			The Wyse Management Suite repository installer adds TCP ports 443, and 8080 to the firewall exception list. The ports are added to access the operating system images and application images managed by Wyse Management Suite. The port 8080 should be blocked to ensure that the communication with Wyse Management Suite Server can be achieved using HTTPS only.
Supported Browsers	Internet Explorer version 11 Chrome version 58.0 and later Edge browser on Windows—English only Firefox version 52.0 and later			

NOTE:

Software can be installed on a physical or a virtual machine.

The software repository and the Wyse Management Suite server can have the same operating system.

3

Wyse Management Suite architecture

This chapter contains the installer components of the Wyse Management Suite.

The following are the Wyse Management Suite installer components:

- WMS Web Application—Application Server that hosts Wyse Management Suite.
- Memcached—Used to Cache data for performance and scalability.
- MQTT—Used for push notifications to devices.
- MongoDB—Database used for devices, configurations.
- MariaDB—SQL Database for performance and scalability.

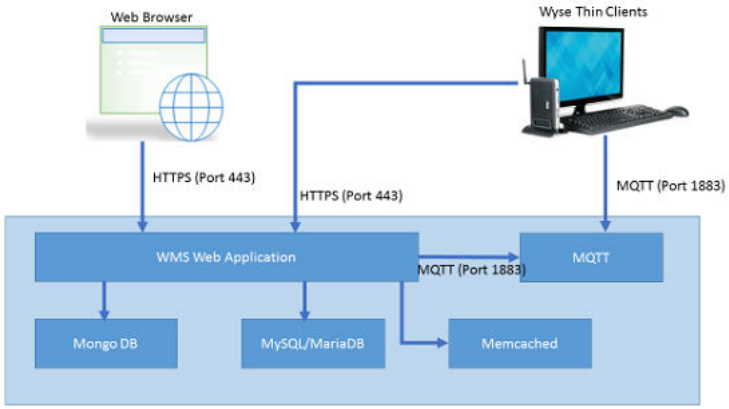


Figure 1. Wyse Management Suite architecture

4

Deployment architecture

This chapter contains the deployment architecture details for Wyse Management Suite v1.1.

The Wyse Management Suite v1.1 supports up to 1,20,000 connected devices.

The single server deployment solution is easy to maintain, and you have an option to deploy Wyse Management Suite, using multiple servers depending on your deployment scenario.

You can also deploy customize your deployment for 50,000 devices or more number of devices depending on the deployment setup.

Deployment on a single server to support 50,000 devices and above

This section explains Wyse Server Management Suite deployment on a single server to support 50,000 devices and above.

The minimum hardware requirement on a single server for 50,000 devices is:

Table 2. Hardware specification

Application detail	Hardware specification
Wyse Management Suite 1.1	4 CPUs, 16 GB RAM, 40 GB HDD

The following diagram explains deployment of Wyse Management Suite v1.1 on a single server.

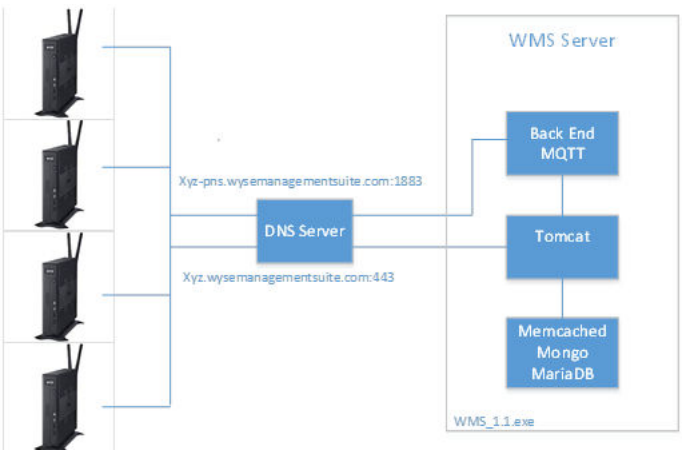


Figure 2. Single server deployment — 50000 devices

Deployment on a single server to support 1,20,000 devices

This section explains Wyse Server Management Suite deployment on a single server to support 1,20,000 devices.

The minimum hardware requirement on a single server for 1,20,000 devices is:

Table 3. Hardware specification

Application detail	Hardware specification
Wyse Management Suite 1.1	16 CPUs, 32 GB RAM, 200 GB HDD

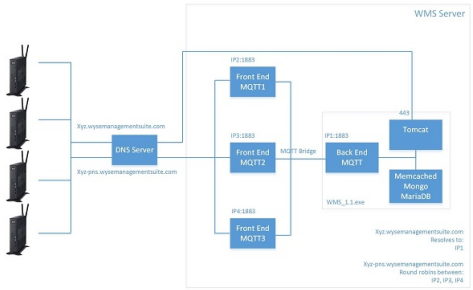


Figure 3. Single server deployment — 1,20,000 devices

FE MQTT Servers separated from the Wyse Management Server

This section explains about the architecture of FE MQTT Servers separated from the Wyse Management Suite server. This approach reduces the overhead on the Wyse Management Suite server in handling the number of TCP connections that needs to be supported. Each of the FE MQTT servers may be deployed on a separate server or on a single server.

The minimum hardware requirements are:

Table 4. Hardware requirements

Application detail	Hardware specification
Wyse Management Suite 1.1	8 CPUs, 16 GB RAM, 200 GB HDD, 1 network interface
Each FE MQTT server deployed on separate servers.	4 CPUs, 8 GB RAM, 40 GB HDD, 1 network interface
FE MQTT Server deployed on a single server.	8 CPUs, 16 GB RAM, 80 GB HDD, 1 network interface

The following diagram depicts the architecture of FE MQTT Servers separated from the Wyse Management Suite server.

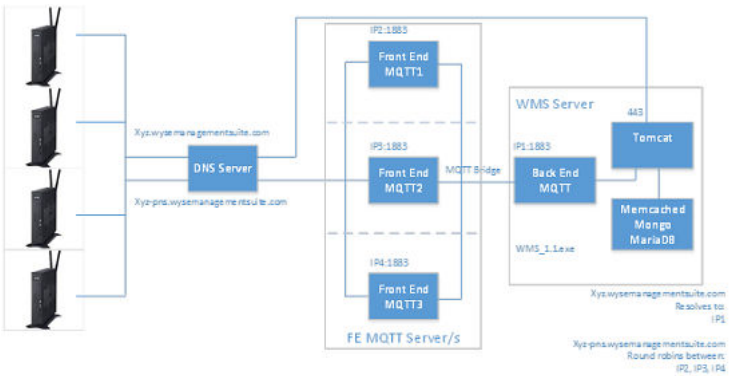


Figure 4. FE MQTT Servers separated from the Wyse Management Suite server

Deployment architecture with a separated database server

This section explains about the deployment architecture of Wyse Management Suite with a separated database server. MongoDB and MariaDB may be on the same server or on its own individual servers.

The following diagram depicts the deployment architecture of Wyse Management Suite with a separated database server.

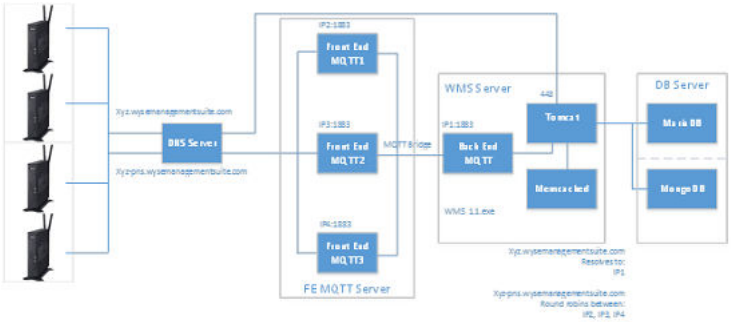


Figure 5. Wyse Management Suite with a separated database server

5

Deploying and configuring Wyse Management Suite

This chapter describes the deployment and configuration of Wyse Management Suite v1.1 on a single server to support up to 1,20,000 devices.

The tasks involved in deploying Wyse Management Suite v1.1 on a single server are:

- Preparing the server
- Configuring DNS
- Installing Wyse Management Suite v1.1

You need to perform the following steps to deploy Wyse Management Suite v1.1 on a single server to support 1,20,000 devices:

1 Login to your system using valid credentials. To check that the server has four network connections available, and get four IP addresses that you can use to work with the server.

The following window is displayed.

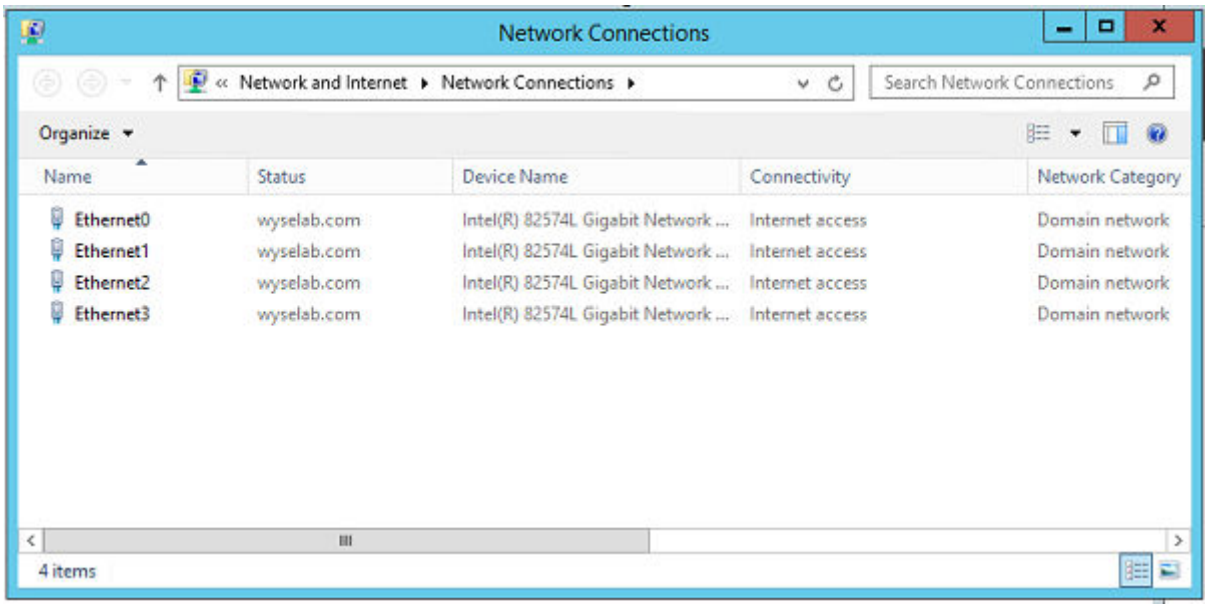


Figure 6. IP address details

2 Configure each network connection with an IP address such that **Ethernet0** has the primary IP address **IP0** that is used by the Wyse Management Suite v1.1.

3 Assign **Ethernet1**, **Ethernet2** and **Ethernet3** with the remaining three IP addresses – **IP1**, **IP2** and **IP3** that will be used by front end MQTT.

4 You must configure DNS and the server requires two DNS records. For example,

Xyz.wysemanagementsuite.com

Assigned with the primary IP address assigned to **Ethernet0**.

This domain is used by devices to communicate with Tomcat over HTTPS.

Xyz-pns.wysemanagementsuite.com

Round robin between three other IP addresses assigned to **Ethernet1**, **Ethernet2** and **Ethernet3**.

This domain is used by devices to hold a persistent connection with front end MQTT servers.

5 Download and install the latest Wyse Management Suite v1.1 for private cloud. The following components are installed as services:

a Tomcat
b Memcached
c Mosquitto
d MongoDB
e MariaDB

Mosquitto that is installed by the installer must be configured as the back end MQTT; front end MQTT can be installed manually. Installer installs all the components at the following default directory.

Default installation directory is, **Drive C:\Program Files\DELL\WMS**.

Topics:

Deploying front end Mosquitto

Wyse Management Suite v1.1 can handle up to 50,000 devices with a single instance of Mosquitto installed by the installer which serves both as front end as-well as back end Mosquitto. To support 1,20,000 devices, you need separate Mosquitto instances to handle the device connections. Since each Mosquitto instance can handle most of 50,000 device connections, you need at least three front end instances to handle 1,20,000 devices. Each of the three front end Mosquitto instances interacts through port 1883, and each instance will be bound to a particular IP address. In order to install three new instances of Mosquitto, you need three new copies of Mosquitto deployment as explained in the following steps.

1 Create three new directories inside Mosquitto folder as shown in the following entries.

C:\Program Files\DELL\mq1

C:\Program Files\DELL\mq2

C:\Program Files\DELL\mq3

2 Copy the contents in the directory **C:\Program Files\DELL\WMS\Mosquitto** to the folders created in the step 1.

3 Open the file in the directory **C:\Program Files\DELL\mq1\mosquito.conf** in a text editor.

4 Uncomment the property **bind_address**, in the **mosquito.conf** folder, and update the entry as, **bind_address <IP1>**.

5 Start **mq1** to confirm that it is running on IP1 with port 1883. Do the following to check that **mq1** is running on IP1:

a Open a command prompt window.
b Go to **C:\Program Files\DELL\mq1** directory.
c Run the command, **Mosquitto.exe –c mosquitto.conf** at the command prompt.
d Open the Powershell window, and run the command, **PS> get-nettcpconnection -LocalPort 1883** at the command prompt.

6 Confirm that the service is running with following values:

LocalAddress=IP1

LocalPort=1883

State=Listen

7 Repeat steps 3, 4, 5 and 6 for **mq2** and **mq3** with IP2 and IP3 respectively to complete the process.

Deploying front end Mosquitto as a service

This section describes how to deploy front end Mosquitto as a service.

1 Open a Windows PowerShell window with administrator privileges, and run the following commands to create a service entry in the registry and service database:

PS> sc.exe “Dell WMS: FE-MQTT1” binPath= “C:\Program Files\DELL\mq1\mosquito.exe run”

PS> sc.exe “Dell WMS: FE-MQTT2” binPath= “C:\Program Files\DELL\mq2\mosquito.exe run”

PS> sc.exe “Dell WMS: FE-MQTT3” binPath= “C:\Program Files\DELL\mq3\mosquito.exe run”

2 Open Windows Local Services from **Control Panel**, and confirm the services are created as shown in the following screen shot.

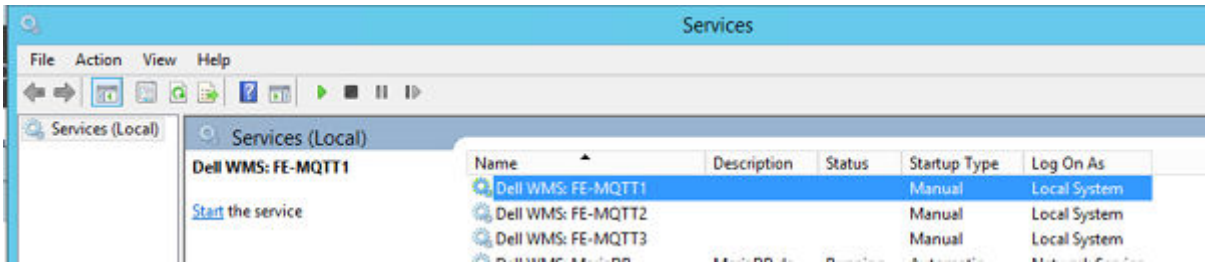


Figure 7. Services

NOTE: The Startup Type is Manual , and the Mosquitto Services are started by running a script. None of the Mosquitto Services (including ‘Dell WMS: Mosquitto’) should be started or restarted manually from this window.

Configuring back end Mosquitto to connect with front end Mosquitto

This section explains how to configure back end Mosquitto to connect with front end Mosquitto.

1 Open the file in the directory **C:\Program Files\DELL\WMS\Mosquitto\mosquito.conf** in a text editor.

2 Uncomment the property **bind_address**, in the **mosquito.conf** folder, and update the entry as, **bind_address <IP1>**.

3 Go to the **Bridges** section of the document, and add the following entries in the section.

connection <name>

#address <host>[:<port>] [<host>[:<port>]]

#topic <topic> [[[out | in | both] qos-level] local-prefix remote-prefix]

connection pns01

address <IP1>:1883

topic # out

connection pns02

address <IP2>:1883

topic # out

connection pns03

address <IP3>:1883

topic # out

4 Go to **Windows Local Services** and change the entry **Dell WMS: Mosquitto** service to start manually as shown in the following window.

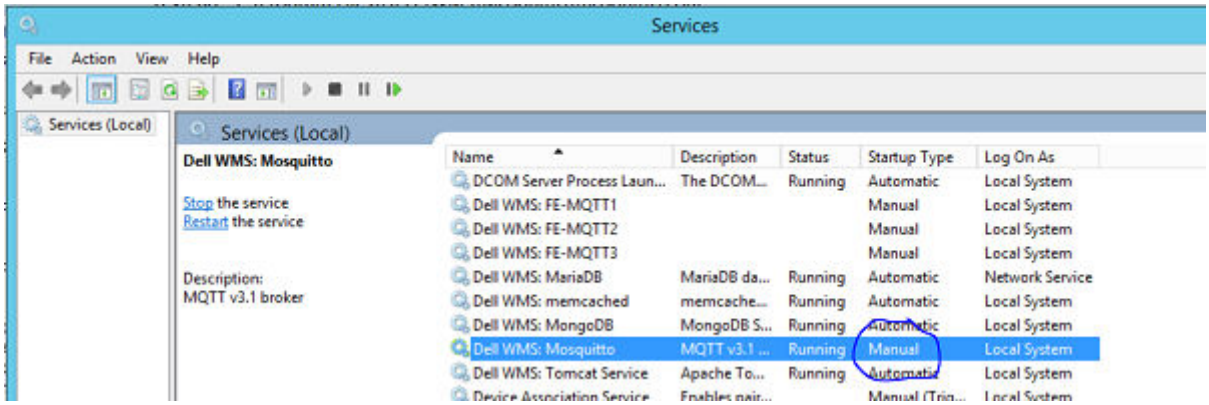


Figure 8. Start services manually

Configuring Mosquitto services startup script

This section explains how to configure Mosquitto services startup script.

1 Go to the directory **C:\Program Files\DELL**, and create a file **mqttsvc.bat**.

2 Open the file **mqttsvc.bat** in text editor, and type the following entries into the file.

```
@ECHO OFF

SETX -m MOSQUITTO_DIR "C:\Program Files\DELL\WMS\Mosquitto\mq1"

sc.exe start "Dell WMS: FE-MQTT1"

SLEEP 5

TIMEOUT /5

SETX -m MOSQUITTO_DIR "C:\Program Files\DELL\WMS\Mosquitto\mq2"

sc.exe start "Dell WMS: FE-MQTT2"

SLEEP 5

TIMEOUT /5

SETX -m MOSQUITTO_DIR "C:\Program Files\DELL\WMS\Mosquitto\mq3"

sc.exe start "Dell WMS: FE-MQTT3"

SLEEP 5

TIMEOUT /5

SETX -m MOSQUITTO_DIR "C:\Program Files\DELL\WMS\Mosquitto"

sc.exe start "mosquitto"
```

3 Save the **mqttsvc.bat** file.

4 Create a shortcut to the **mqttsvc.bat** file. This script is used to start all Mosquitto services when the server starts.

5 To configure Mosquitto Services Startup Script, go to Windows startup folder, and in the windows search window, type **Shell:startup** as shown in the following screen shot.

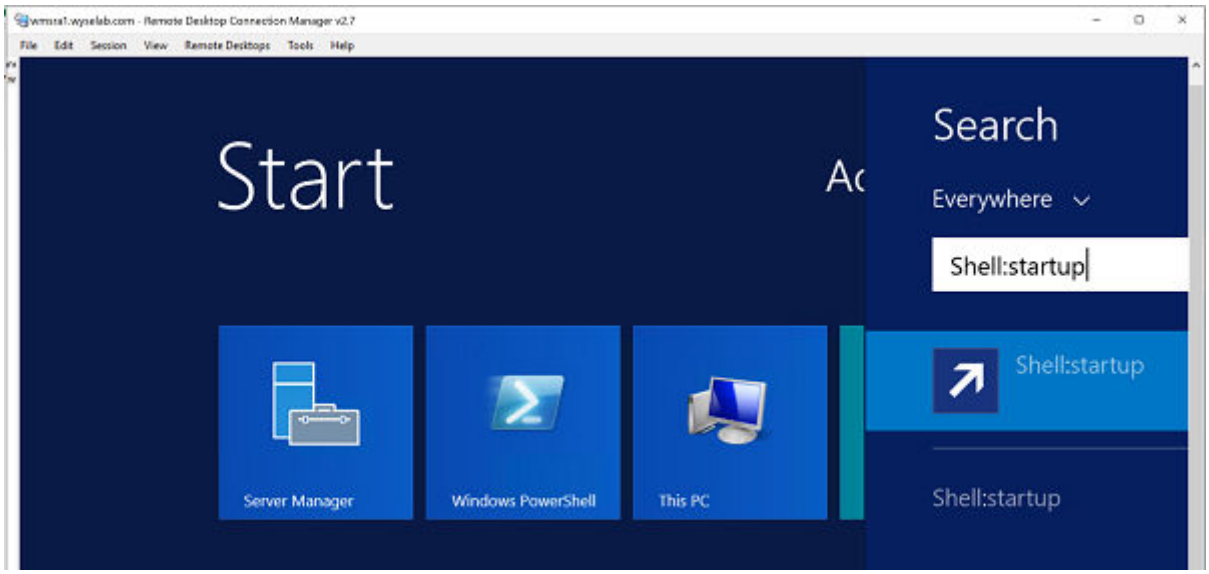


Figure 9. Windows startup

The **C:\Users\Administrator\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup** directory is displayed.

6 Copy the shortcut of **mqttsvc.bat** file into the folder.

7 Restart the server to confirm and test to confirm that four instances of Mosquitto are running on each of IP0, IP1, IP2 and IP3 on port 1883 as shown in the following steps.

a Open the Powershell window, and run the following command.

PS> get-nettcpconnection -LocalPort 1883

b Confirm that there are at least four services are running with the following values.

LocalAddress=IP0, IP1, IP2, IP3

LocalPort=1883

State=Listen

Configuring front end Mosquitto in MongoDB

MongoDB has **bootstrapProperties** collection that has among various parameters to configure URLs for Tomcat to connect to back end Mosquitto, and for devices to connect to front end Mosquitto. Installer by default would configure both parameters with back end Mosquitto as most users would be running with a single instance of Mosquitto.

1 Open a command prompt and navigate to **C:\Program Files\DELL\WMS\MongoDB\bin** directory.

2 Run following command at the command prompt.

>mongo stratus -u stratus -p <mongodbPassword> -eval "db.bootstrapProperties.update({'name': 'stratus.external.mqtt.url'}, {'name': 'stratus.external.mqtt.url' , 'value' : 'tcp://xyz-pns.wysemanagementsuite.com:1883' }, {upsert:true})"

3 Restart Tomcat Service identified in **Local Services** as **Dell WMS: Tomcat Service**.

Remote repository

Wyse Management Suite allows you to have local as well as remote repositories for applications, operating system images and so on. If the user accounts are distributed across geographies, it will be efficient to have local repository for each of the distributed user account so the devices can download images from its local repository. This flexibility is provided with **WMS_Repo.exe** software. The **WMS_Repo.exe** is a Wyse Management Suite file repository software that helps to create distributed remote repositories which can be registered with Wyse

Management Suite. When you need remote repository to download Remote Repository software from Dell Digital Locker or from Wyse Management Suite Portal from a public cloud, and install on the server/s where repository is required. The **WMS_Repo.exe** is available only for **Pro** license subscribers only.
The server requirements to install Wyse Management Suite repository software are:

- Windows 2012 R2 or Windows 2016 Server
- 4 CPU
- 8 GB RAM
- 40 GB storage space

Do the following to install **WMS-Repo** software:

1 Download **WMS_Repo.exe** file from Dell Digital Locker.
2 Log in as **Administrator**, and install **WMS_Repo.exe** on the repository server.
3 Click **Next** based on the following screens displayed to complete the installation.

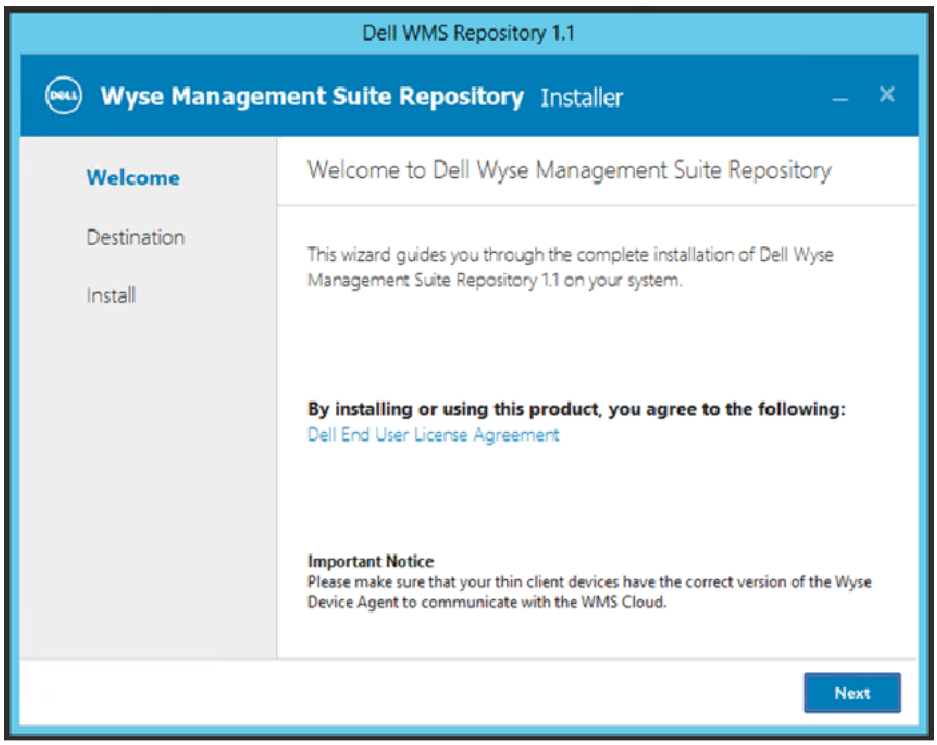


Figure 10. Welcome message

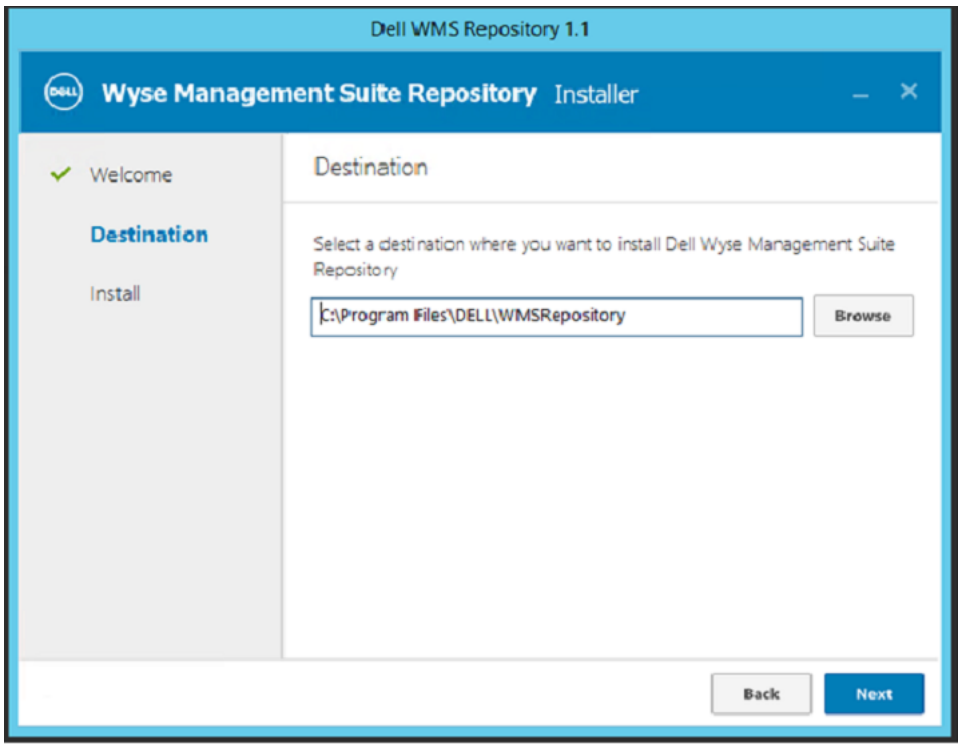


Figure 11. Destination folder detail

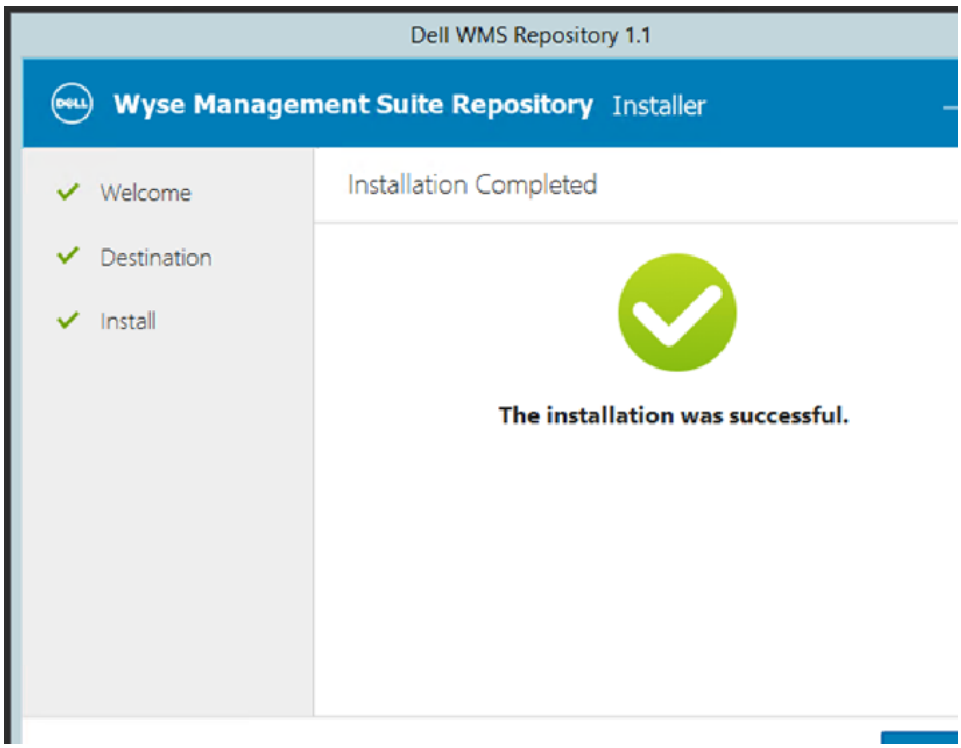


Figure 12. Installation complete

4 Click **Launch** to launch the **WMS Repository registration** screen on the web browser. This may take a few minutes for the web server start before you start the browser.

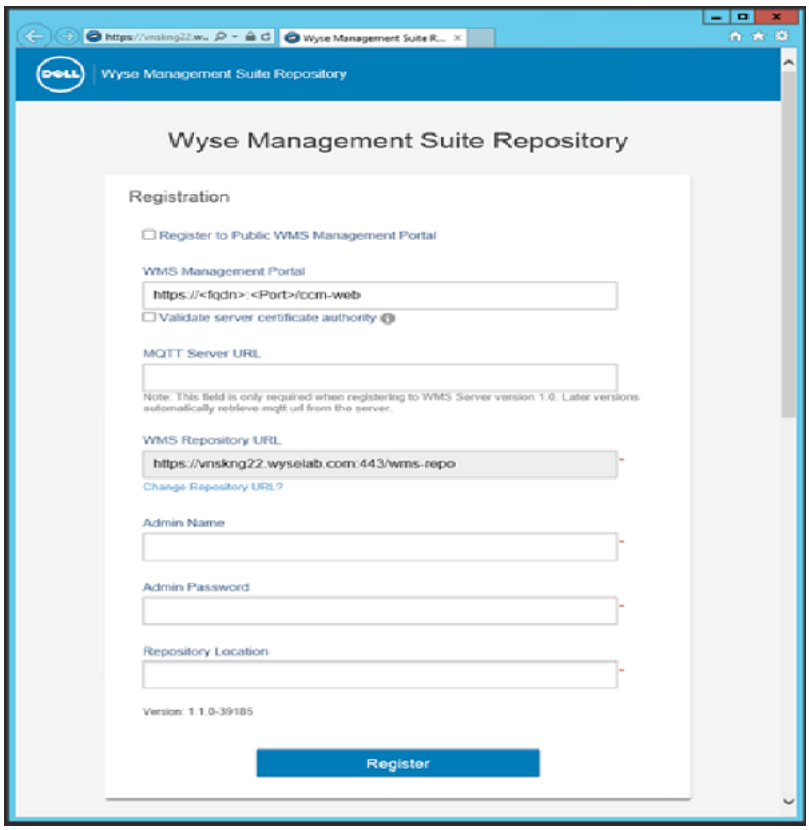


Figure 13. Repository detail

5 Click **Register** to start the registration. Select the **Register to public WMS Management Portal** if you are registering on the public cloud.

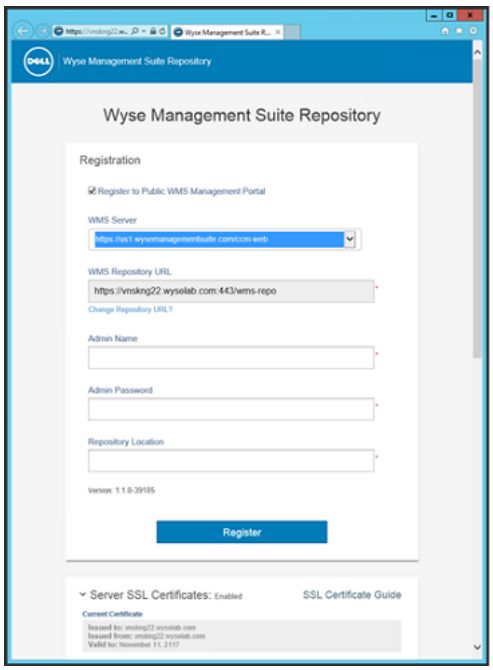


Figure 14. Register on a public cloud

6 Enter the following details, and press **Register**.

a Wyse Management Suite server URL
b MQTT Server URL is optional unless you register with Wyse Management Suite v1.0
c WMS Repository URL (update the URL with the domain name)
d Wyse Management Suite administrator login username information
e yse Management Suite administrator login password information
f Repository path information

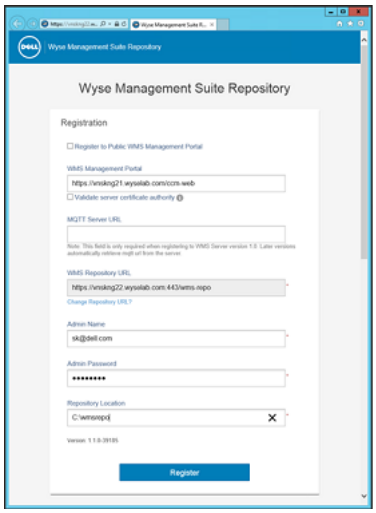


Figure 15. Registration details

7 If the registration is successful, the following window is displayed.

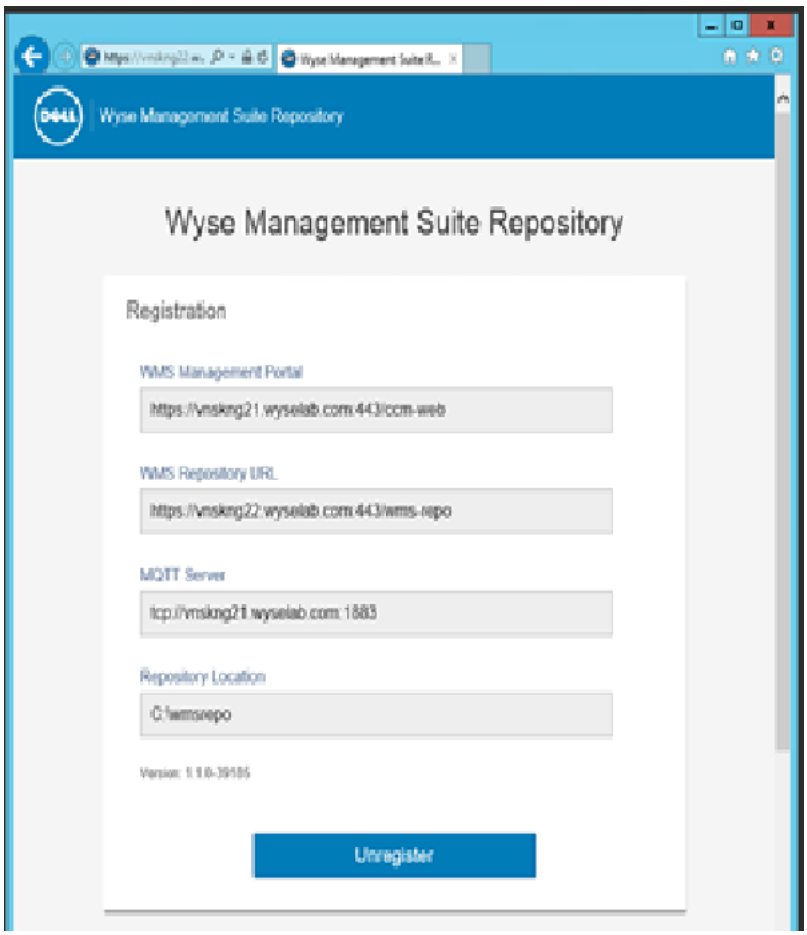


Figure 16. Successful registration

8 The following screen on the Wyse Management Suite portal confirms the successful registration of the remote repository.

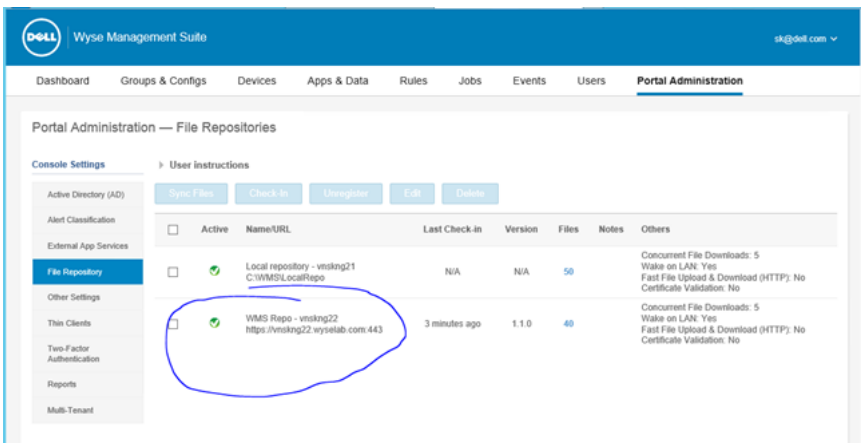


Figure 17. Successful registration on WyseManagement Suite portal

9 HTTPS is by default enabled with **WMS_Repo.exe**, and gets installed with the self-signed certificate. To install your own domain specific certificate, scroll down the registration page to upload the SSL certificates, as displayed in the following window.

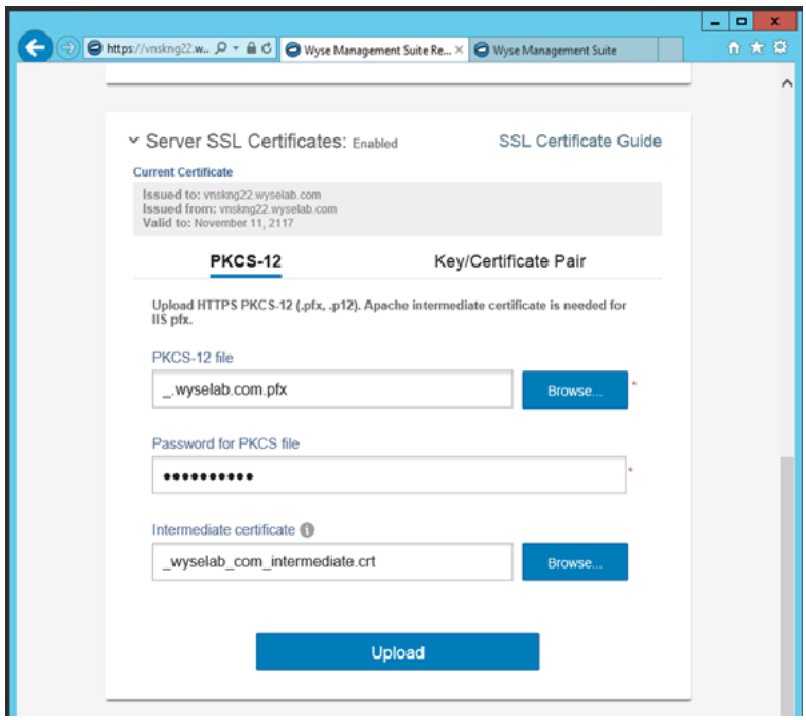


Figure 18. Uploading the certificate

10 The server restarts and the uploaded certificate is displayed as shown in the following window.

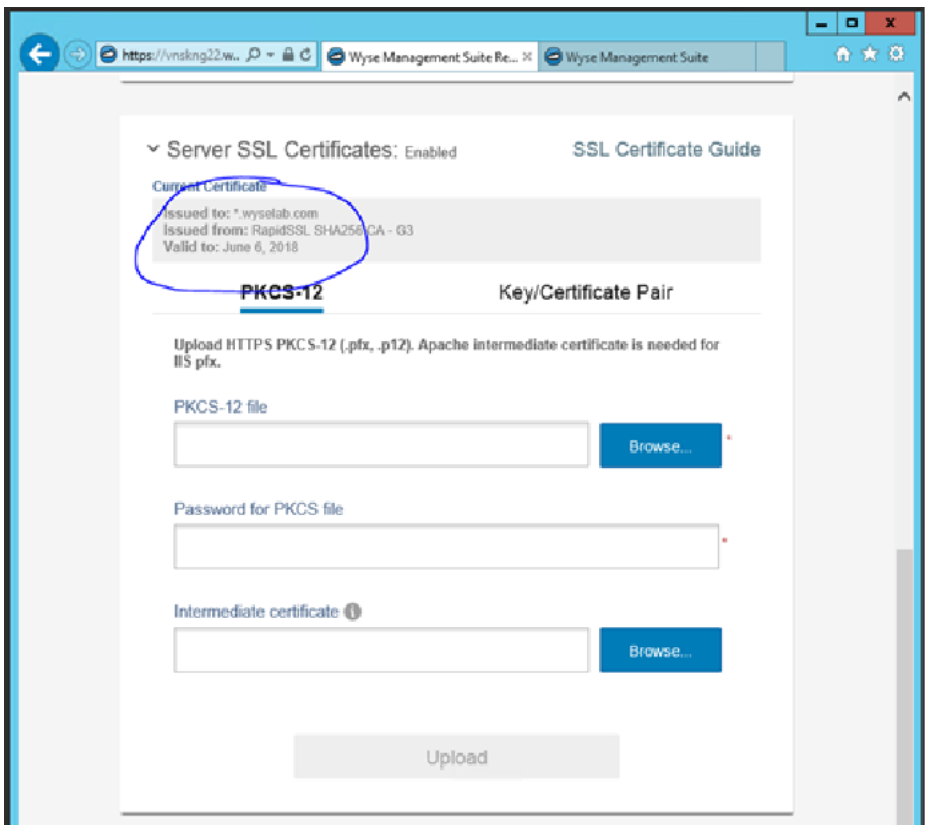


Figure 19. SSL Certificate enabled

11 If the Wyse Management Suite is enabled with self-signed or a private domain certificate, you can upload the certificate on the Wyse Management Suite repository server to validate the Wyse Management Suite CA credentials, as displayed in the following window.

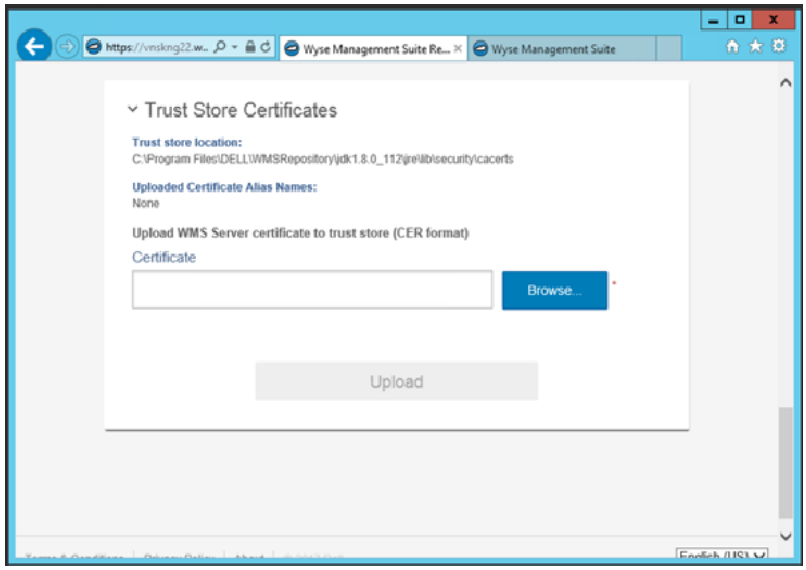


Figure 20. Trust store certificate

12 Navigate to the **C:\wmsrepo** location that you entered during registration, and you can see that the Wyse Management Suite repository server has created several folders where all the repository files will be saved and managed.

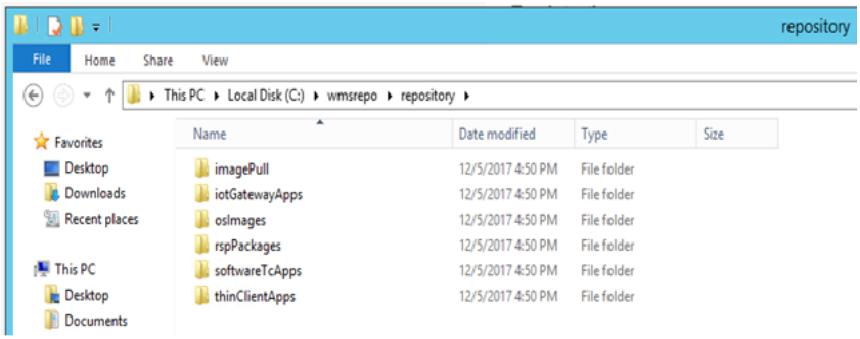
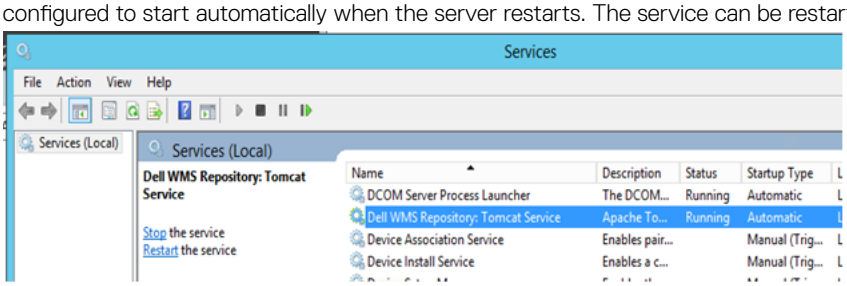


Figure 21. Repository folder

Managing Wyse Management Suite repository service

Wyse Management Suite repository is displayed as **Dell WMS Repository: Tomcat Service** in Windows Local Services window and is configured to start automatically when the server restarts. The service can be restarted as shown in the following window.



6

Custom port configurations

Wyse Management Suite v1.1 uses the following port as the default port for the applications that is installed.

- Apache Tomcat: 443
- MariaDB database: 3306
- Mongo database: 27017
- MQTT Broker: 1883
- Memcached: 11211

1 To use a non-default port for one or more of the above services, use **Custom** install option during Wyse Management Suite installation, the option listed in the following screen allows you to use the local database for MongoDB and MariaDB or use the remotely installed database.

2 The following set of screens allows you to change the default ports used by the installer during installation.

Topics:

Changing the port after Wyse Management Suite installation

This section explains how to change the port after installing Wyse Management Suite. Changing the ports after installation would be to uninstall Wyse Management Suite and reinstall using Custom installation mode to change ports. If re-installation is not an option, the following sections explains the procedure to change the ports manually.
To change the Tomcat service port, do the following:

1 Stop Tomcat service. The entry is identified by **Dell WMS: Tomcat Service**.

2 Edit the file **C:\Program Files\Dell\WMS\Tomcat-8\conf\server.xml** in a text editor.

3 Find and replace all occurrences of port entry 443 with the port number you need to use. It is optional to change the references to port 8443.

4 Save the **server.xml** file and exit.

5 Start the Tomcat service.

6 You must enter the port number in the URL (default port 443 can be omitted from the URL), For example, **https://xyz.wysemanagementsuite.com:553/ccm-web**. The port specified in the URL should be used for both portal access and for device registration.

Changing Memcached port

The Memcached port can be changed during Wyse Management Suite v1.1 installation. You must uninstall and reinstall to create a new Memcached service. Dell recommends not to change the Memcached port detail after installation.

Changing MQTT port

1 Stop the Tomcat and MQTT services.

2 Configure Mosquitto to change the port based on the following steps.

   a Edit the file **C:\Program Files\Dell\WMS\Mosquitto\mosquitto.conf** in a text editor.

   b Note the following entries:

   # Port to use for the default listener

   #port 1883

   c Uncomment the **port 1883** entry and change the port number to your preferred port. For example, **port 2883**.

   d Save the file, and start the MQTT service.

   e Check the following entry to confirm that the MQTT service is running on the new port.

   ps> get-nettcpconnection –LocalPort 2883

3 To configure Tomcat, do the following.

   a Open a command prompt session, and navigate to **cd C:\Program Files\DELL\WMS\MongoDB\bin**.

   b Run the following command at the command prompt.

   >mongo stratus -u stratus -p <mongodbPassword> -eval "db.bootstrapProperties.update({'name': ' mqtt.server.url'}, {'name': ' mqtt.server.url' , 'value' : 'tcp://xyz-pns.wysemanagementsuite.com:2883', 'isActive' : 'true', 'committed' : 'true'}, {upsert:true})"

   c Start Tomcat Service identified in **Local Services** as **Dell WMS: Tomcat Service** and re-register all the devices, so that the MQTT URL is referring to the new port.

Changing MariaDB port

This section explains how to change the MariaDB port.

1 Start the Tomcat service and stop the MariaDB service. To configure the MariaDB, do the following:

   a Edit the file **C:\Program Files\Dell\WMS\Database\SQL\my.ini** in a text editor.

   b Change the port number for both mysqld and client to your preferred port. The port numbers should be of the same value. For example,

   [mysqld]

   datadir=C:/Program Files/DELL/WMS/Database/SQL

   port=3308

   [client]

   port=3308

   c Save the file, and start the MariaDB service.

2 To configure Tomcat, do the following.

   a Edit the file **C:\Program Files\Dell\WMS\Tomcat-8\webapps\ccm-web\WEB-INF\classes\bootstrap.properties** in a text editor.

   b Update the properties in the file with your preferred port number details. For example,

   jpa.connection.url=jdbc\:mysql\://localhost\:3308/stratus?useUnicode\=true&characterEncoding \=utf-8&useLegacyDatetimeCode\=false&serverTimezone\=America/Los_Angeles

   jpa.connection.port=3308

   c Save the file, and start the Tomcat service. Verifiy that the services are running on the configured port. For example,

ps>get-nettcpconnection –LocalPort 3308

Changing the MongoDB database port

This section explains how to change the MongoDB database port details

1 Stop the Tomcat and MongoDB services.

2 To configure the MongoDB port entry, do the following.
   a Edit the file **C:\Program Files\Dell\WMS\MongoDB\mongod.cfg** in a text editor.
   b Update the property in the file with your preferred port number. For example, **port=27027**.
   c Save the file, and start the MongoDB service. Confirm that it is running on the new port.

3 To configure Tomcat, do the following.
   a Edit the file **C:\Program Files\Dell\WMS\Tomcat-8\webapps\ccm-web\WEB-INF\classes\bootstrap.properties** in a text editor.
   b Update the properties in the file with your preferred port number. For example, **mongodb.seedList=localhost\:27027**.
   c Save the file, and start the Tomcat service. Verify that the service is running on the required port. For example. **ps>get-nettcpconnection –LocalPort 27027**.

7

Maintenance

This chapter explains about the backup details for the database..

Database backup

Stop Tomcat Service before taking a backup of the database. Tomcat Service is identified as “Dell WMS: Tomcat Service” and must be stopped from Local Services.

The following command will dump the contents of the MongoDB.

mongodump --host <mongodb_host> -u stratus –p <db_password> --db stratus --out ".\wmsmongodump"

The following command will dump the contents of the MarioDB.

mysqldump --routine –h<mariadb_host> -ustratus –p<db_password> stratus > ".\wmsdump.sql"

Database restore

Stop Tomcat Service before restoring the database. Tomcat Service is identified as “Dell WMS: Tomcat Service” and can be stopped from Local Services.

The following command will restore the MongoDB. You must run the following command from the **wmsmongodump** directory – parent directory of stratus database.

echo "db.dropDatabase()" | mongo -u stratus -p <db_password> --host <db_host> stratus mongorestore --host <db_host> -u stratus -p <db_password> --db stratus ".\stratus"

The following command will restore the MarioDB. You must run the following command.

mysql –h<db_host> -ustratus –p<db_password> -e"drop database if exists stratus; show databases;"mysql –h<db_host> -ustratus –p<db_password> -e"create database stratus DEFAULT CHARACTER SET utf8 DEFAULT COLLATE utf8_unicode_ci;show databases;"mysql –h<db_host> -ustratus –p<db_password> stratus < .\wmsdump.sql