Dell Wyse Management Suite

Version 1.2 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.**

Contents

Introduction

Dell Wyse Management Suite 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, remote management by using a mobile application, 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 on a private cloud to support management of up to 120,000 devices.

Hardware requirements

The following table lists the hardware requirements:

Table 1. Hardware requirements

Description	10000 devices or less	50,000 devices or less	120,000 devices or less	Wyse Management Suite – Software repository
Operating system	Microsoft Windows Server 2012 R2 or Microsoft Windows Server 2016 Supported language pack—English, French, Italian, German, Spanish, Japanese and Chinese (preview release).			
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 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 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 port 443 to the firewall exception list. The port is added to access the operating system images and application images that are managed by Wyse Management Suite.
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:**

Wyse Management Suite can be installed on a physical or a virtual machine.

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

The Wyse Management Suite and Remote Repository v 1.2 supports port 8080, but does not support HTTP access as a security feature.

Wyse Management Suite deployment architecture

The following are the Wyse Management Suite installer components to deploy at the work place:

- WMS Web Application—Application Server that hosts Wyse Management Suite.
- Memcached—Used to Cache data for performance and scalability.
- MQTT—Used to push notifications to thin clients.
- MongoDB—Relational database for structured data and normalization.
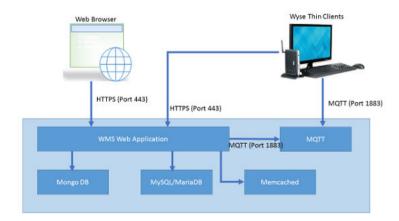- MariaDB—SQL database for performance and scalability.

Figure 1. Wyse Management Suite architecture

Deployment details

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

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

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

Deployment on a single server to support 50,000 devices

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

Table 2. Hardware specification

Application	Hardware specification
Wyse Management Suite	• 4 CPUs • 16 GB RAM • 40 GB HDD

The following diagram explains deployment of Wyse Management Suite on a single server:
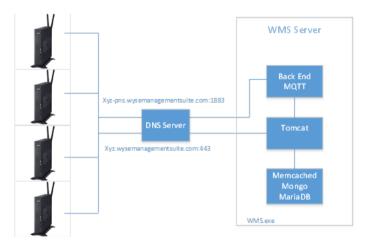

Figure 2. Single server with 50,000 devices

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	Hardware specification
Wyse Management Suite	• 16 CPUs • 32 GB RAM • 200 GB HDD • Four network interfaces (to assign 4 IP addresses to the server)

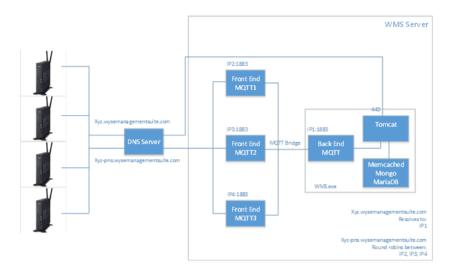Figure 3. Single server with 1,20,000 devices

FE MQTT on a separate server

You can deploy FE MQTT on a separate server. This reduces the load on the WMS server because the TCP connections to be supported is shared between the FE MQTT server and the WMS server.

The minimum hardware requirements are:

Table 4. Hardware requirements

Application details	Hardware specification
Wyse Management Suite	• 8 CPUs • 16 GB RAM • 200 GB HDD • 1 network interface
FE MQTT server on more than one server	• 4CPUs • 8 GB RAM • 40 GB HDD • 1 network interface
FE MQTT server on a single server.	• 8 CPUs • 16 GB RAM • 80 GB HDD

Application details	Hardware specification
	· 1 network interface

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

Wyse Management Suite on a separate database server

This section explains the deployment architecture of Wyse Management Suite on a separate database server. MongoDB and MariaDB may be on the same server or on separate servers.

The following diagram depicts the deployment architecture of Wyse Management Suite on a separate database server.

Figure 5. Wyse Management Suite on a separate database server

Custom port configurations

Wyse Management Suite uses the following port as the default port for the applications that are installed:
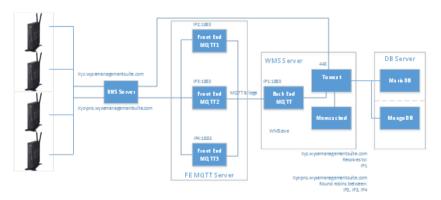
- Apache Tomcat: 443
- MariaDB database: 3306
- Mongo database: 27017
- MQTT Broker: 1883
- Memcached: 11211

To use a nondefault 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.

Topics:

Change the Tomcat service port

This section explains how to change the port after installing Wyse Management Suite. You must reinstall using Custom installation mode to change ports. If reinstallation 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 the Tomcat service. The Tomcat service is identified by **Dell WMS: Tomcat Service** entry.
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. 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 must be used for both portal access and for device registration.

   ⓘ **NOTE: The Memcached port can be changed during Wyse Management Suite installation. Dell recommends not to change the Memcached port detail after installation**

Change the MQTT port

1. Stop the Tomcat and MQTT services.
2. Perform the following steps to configure Mosquitto:
   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.

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

Change the MongoDB database port

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**.

Deploy and configure Wyse Management Suite

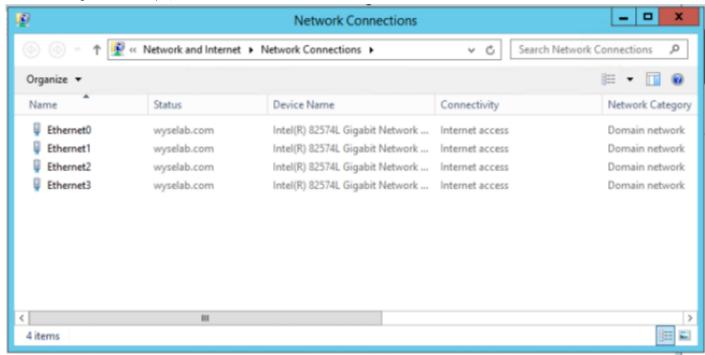This chapter describes the deployment and configuration of Wyse Management Suite on a single server.

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

- Preparing the server
- Configuring DNS
- Installing Wyse Management Suite

Perform the following steps to deploy Wyse Management Suite on a single server to support 1,20,000 devices:

1 Log in to the system. Navigate to the **Network Connections** window and verify that the server has four network connections available.

   The following window is displayed:

Figure 6. Configure IP address

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.

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

4 Configure DNS with two DNS records. For example,

   Xyz.wysemanagementsuite.com

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

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

   Xyz-pns.wysemanagementsuite.com

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

   This domain is used by the devices to establish a connection with the front-end MQTT servers.

5 Download and install the latest Wyse Management Suite for a 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 WMS installer must be configured as the back-end MQTT; front-end MQTT can be installed manually. The default installation directory is, **Drive C:\Program Files\DELL\WMS**.

Deploy front-end Mosquitto as a service

Wyse Management Suite 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. 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\mosquitto.conf** in a text editor.

4 In the **mosquitto.conf** folder, uncomment the property **bind_address**, and update the entry as, **bind_address <IP1>**.

5 Start **mq1**and do the following to confirm 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.

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 From the**Control Panel**, open Windows Local Services and confirm that the services are created as shown in the following screen shot:
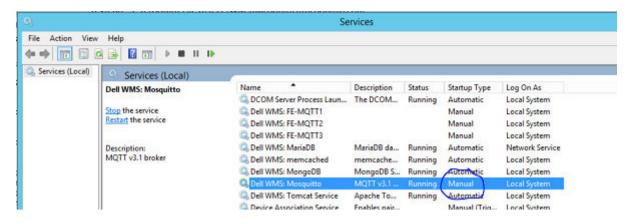
Figure 7. Services

ⓘ **NOTE:** The Startup Type is Manual, and the Mosquitto Services are started by running a script. The Mosquitto Services (including 'Dell WMS: Mosquitto') should not be started, or restarted manually, as the services get started by the script automatically when the system restarts.

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   In the **mosqquito.conf** folder, uncomment the property **bind_address**, and update the entry as, **bind_address <IP1>**.
3   Go to the **Bridges** section of the document, and run the following commands:

   # 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   In the **Windows Local Services**, set **Dell WMS: Mosquitto** service to **Manual** as shown in the following window:
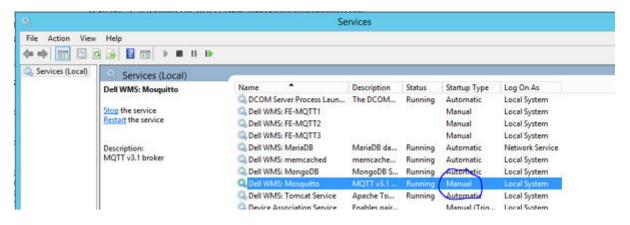
Figure 8. Start services

Edit Mosquitto service 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 commands 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 Service Startup Script, go to Windows startup folder, and in the search window, type **Shell: startup** as shown in the following screen shot:
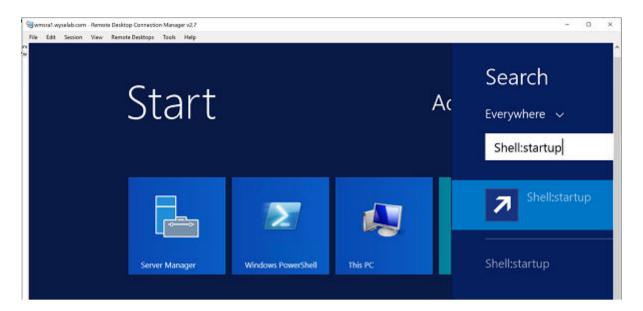
Figure 9. Start screen

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 and perform the following steps to confirm that four instances of Mosquitto are running on each of IP0, IP1, IP2, and IP3 on port 1883:

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

        PS> get-nettcpconnection -LocalPort 1883

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

        LocalAddress=IP0, IP1, IP2, IP3

        LocalPort=1883

        State=Listen

Configure front-end Mosquitto on MongoDB database

MongoDB has **bootstrapProperties** file that has various parameters to configure URLs for Tomcat to connect devices with back-end and front-end Mosquitto. The 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 the 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 and remote repositories for applications, operating system images and so on. If the user accounts are distributed across geographies, it would be efficient to have a separate 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. 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.
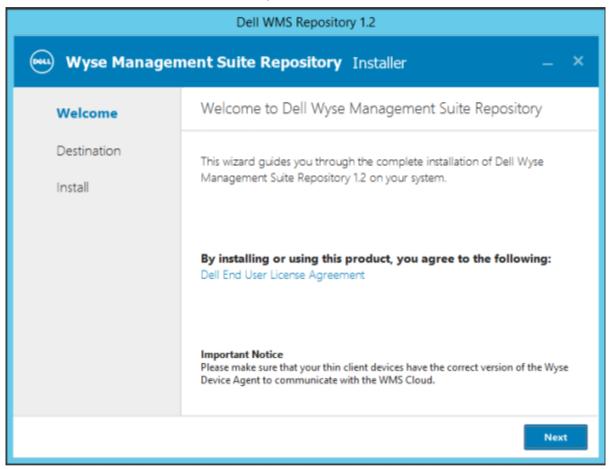3   Click **Next** and follow the instructions on the screen to complete the installation.
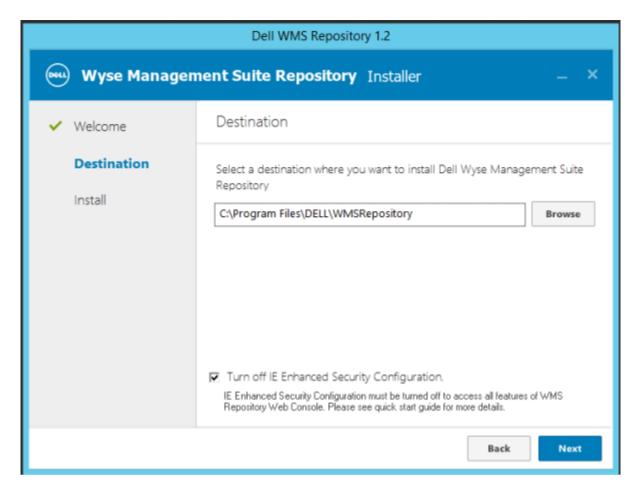

Figure 10. Welcome screen
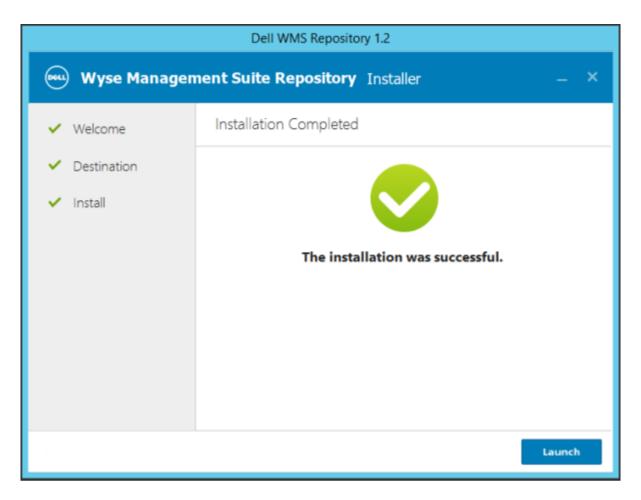
Figure 11. Destination folder

Figure 12. Installation completed

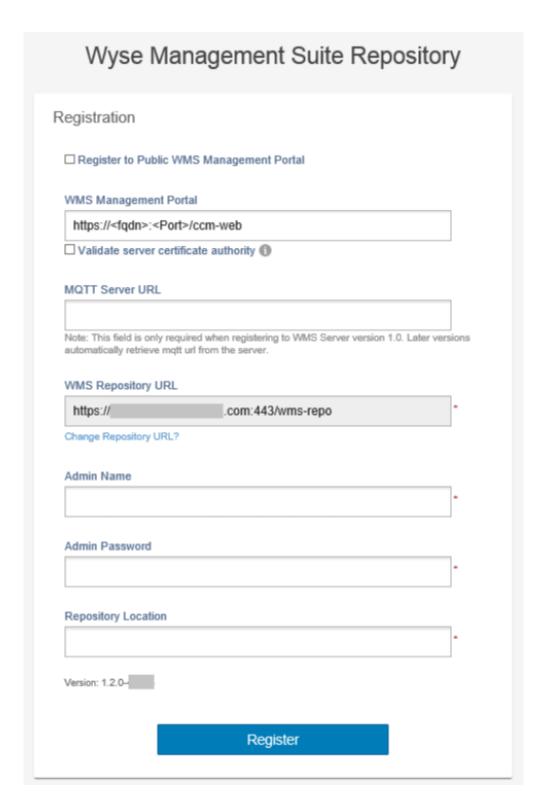4   Click **Launch** to launch the **WMS Repository registration** screen on the web browser.

Figure 13. Registration details

5   Click **Register** to start the registration. Select the **Register to public WMS Management Portal** if you are registering on the public cloud.
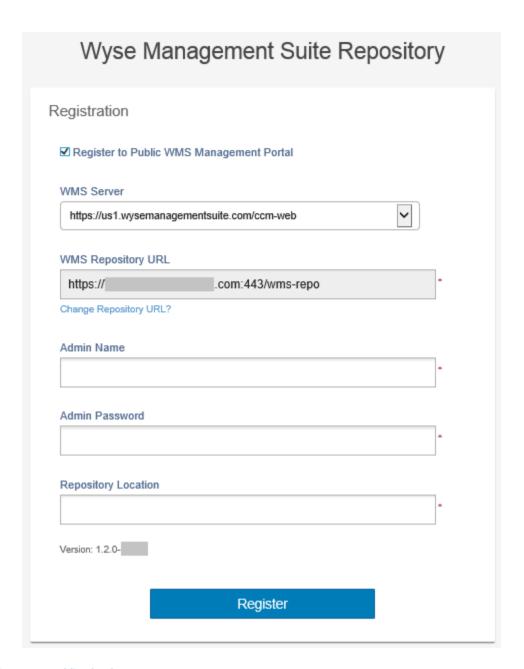
Figure 14. Register on a public cloud

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

    a   Wyse Management Suite server URL

        ⓘ **NOTE: Unless you register with Wyse Management Suite v1.0, you cannot use MQTT Server URL.**

    b

    c   WMS Repository URL (update the URL with the domain name)

    d   Wyse Management Suite administrator login username information

    e   Wyse Management Suite administrator login password information

    f   Repository path information

7   If the registration is successful, the **Registration** window is displayed:
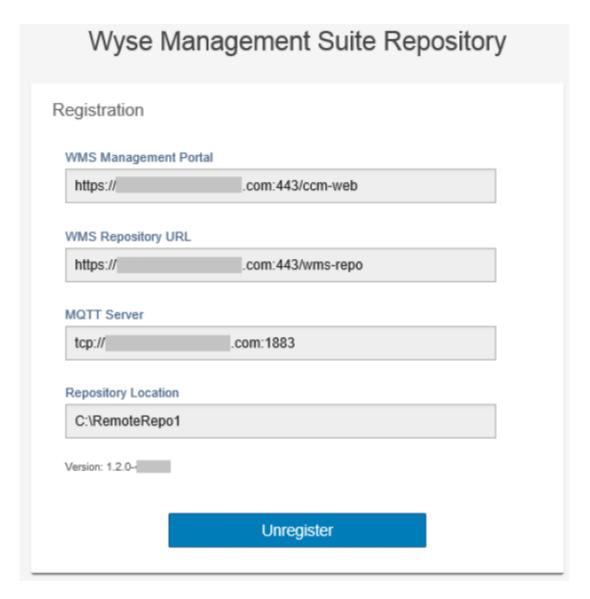
Figure 15. Registration successful

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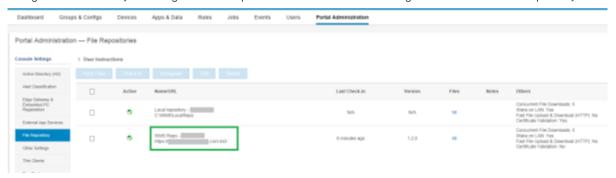

Figure 16. Registration successful on the portal

9 HTTPS is by default enabled with **WMS_Repo.exe**, and is installed with the self-signed certificate. To install your own domain-specific certificate, scroll down the registration page to upload the SSL certificates.
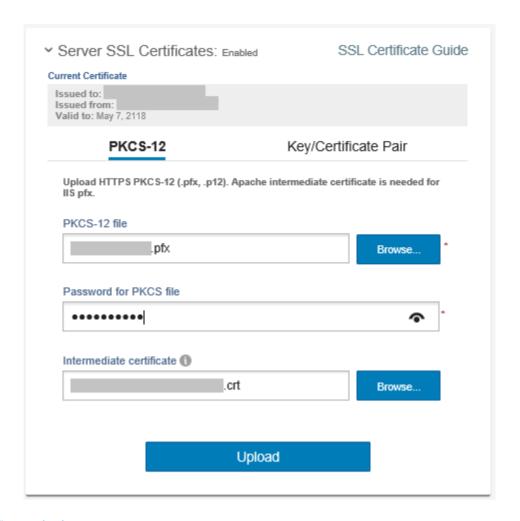
Figure 17. Cerificate upload

10   The server restarts, and the uploaded certificate is displayed.

Figure 18. 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.
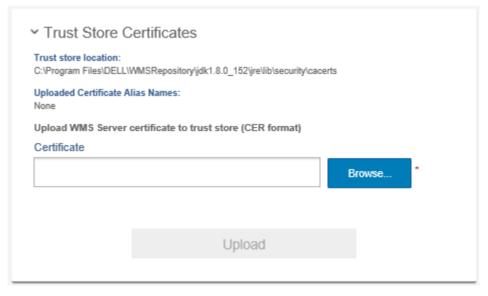

Figure 19. Trust store certificates

12 Navigate to the **C:\wmsrepo** location that you entered during registration, and you can view the folders where all the repository files are saved and managed.
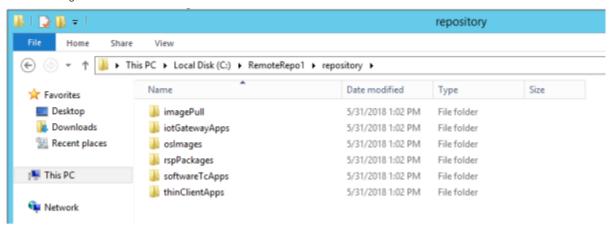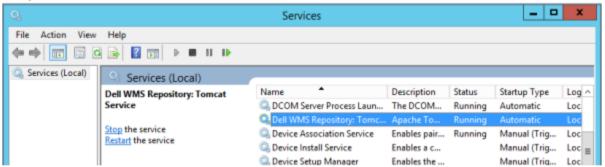

Figure 20. Repository folder

Manage Wyse Management Suite repository service

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

Maintenance

This chapter describes how to take a backup of 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.

To dump the contents of the MongoDB, run the following command:

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

To dump the contents of the MarioDB, run the following command:

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.

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

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

You must run the following command to restore the MarioDB.

mongorestore --host <db_host> -u stratus -p <db_password> --authenticationDatabase admin --db stratus ".\stratus"