

# Master Data Services (MDS) Operations Guide

Karan Gulati

## Guide



Microsoft

# Master Data Services (MDS) Operations Guide

Karan Gulati

**Summary:** This article provides guidance about how to install, configure and manage SQL Server 2012 Master Data Services (MDS). You also learn how to deploy a Master Data Services model and create a SQL Server Integration Services (SSIS) solution to monitor MDS.

**Category:** [Guide]

**Applies to:** [SQL Server Master Data Services (MDS), SQL Server Integration Services (SSIS)]

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## Introduction

This article provides guidance about how to install, configure and manage SQL Server 2012 Master Data Services.

## SQL Server 2012 Master Data Services (MDS)

SQL Server Master Data Services provides a central data hub that ensures the integrity of information and consistency of data is constant across different applications. With MDS, you can implement a master data management (MDM) hub to manage the master data that is stored in an enterprise database.

Master data management (MDM) describes the efforts made by an organization to discover and define non-transactional lists of data, with the goal of compiling maintainable master lists. An MDM project generally includes an evaluation and restructuring of internal business processes along with the implementation of MDM technology. The result of a successful MDM solution is reliable, centralized data that can be analyzed to uncover insights for better business decisions.

With the right training, most business-domain experts can implement an MDS solution. In addition, you can use MDS to manage any domain; it is not specific to managing lists of customers, products, or accounts. When MDS is first installed, it does not include the structure for any domains—you define the domains you need by creating domain specific models.

Other MDS features include hierarchies, granular security, transactions, data versioning, and business rules.

Master Data Services includes the following components and tools:

- Master Data Services Configuration Manager, a tool you use to create and configure Master Data Services databases and web applications.
- Master Data Manager, a web application you use to perform administrative tasks, such as creating a domain model or business rules, and that user's access to update data.
- MDSModelDeploy.exe, a tool to create packages containing your model objects and data to deploy to other environments.
- Master Data Services web service, which developers can use to extend or develop custom solutions for Master Data Services.
- Master Data Services Add-in for Excel, which you use to manage data and create new entities and attributes.

## Install Master Data Services

To learn how to install Master Data Services, see [Install Master Data Services](#). In the Install Master Data Services article, you can find hardware and software requirements to install SQL Server 2012.

## System Configuration

- Internet Information Services (IIS) installed on one of the following Windows Server operating systems:
  - Windows Server 2012, Windows Server 2008 SP2, Windows Server 2008 R2
  - Windows 8
  - Windows 7 Professional, Enterprise, and Ultimate
  - Windows Vista Business, Enterprise, and Ultimate SP2

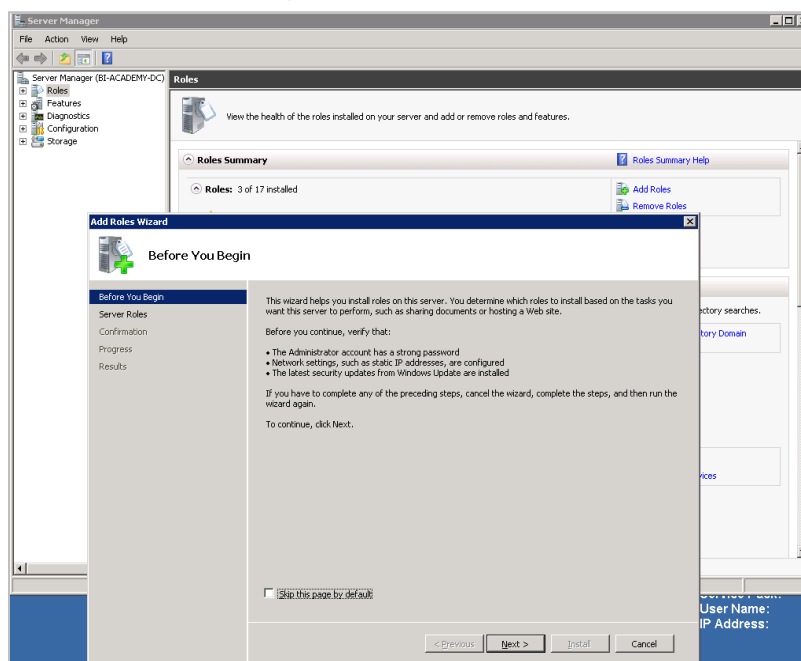
For more information about specific editions of the Windows operating systems that are supported for your edition of SQL Server 2012, see [Hardware and Software Requirements for Installing SQL Server 2012](#).

To use MDS, you need to configure a Web Server (IIS) role.

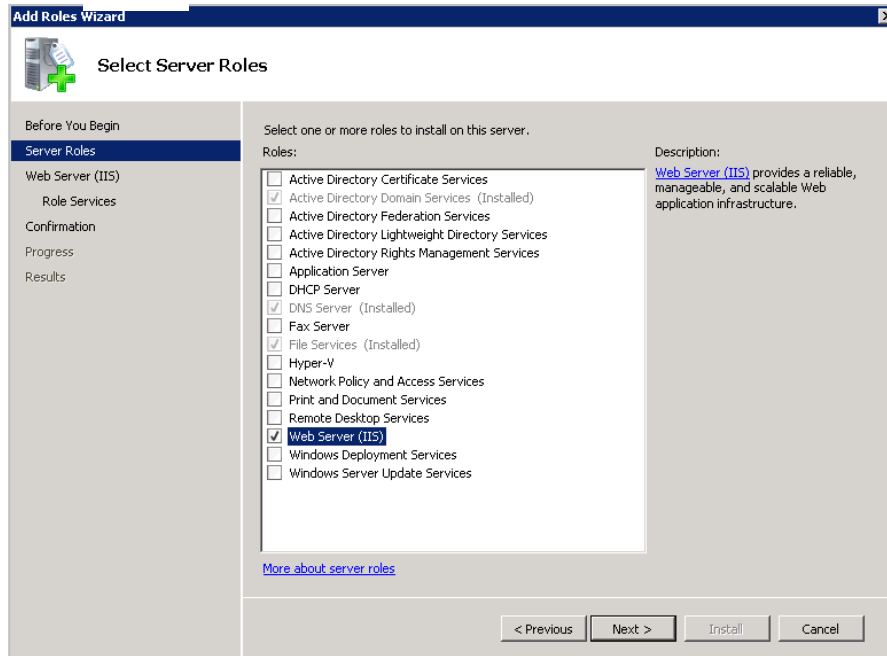
## Create a Web Server (IIS) role

Before you configure MDS, install the Web Server (IIS) server role.

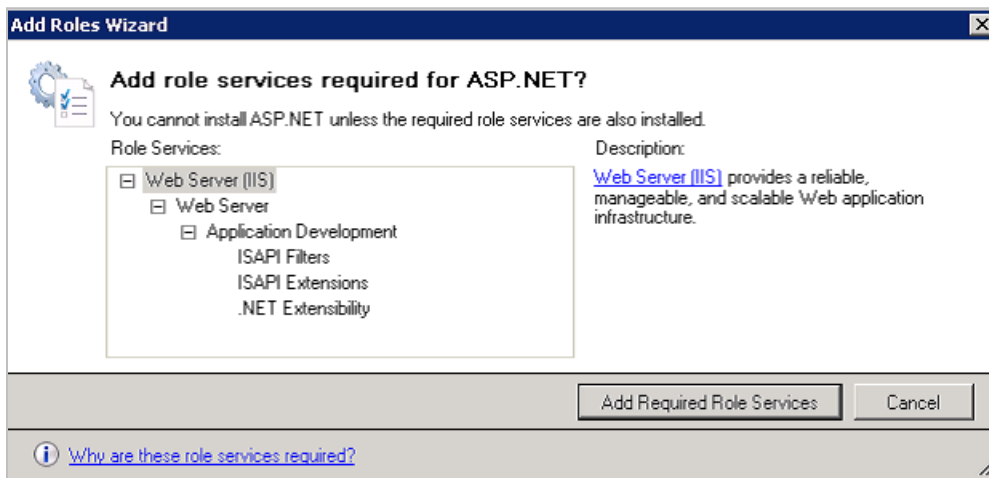
1. Log on into the SQL Server machine using an account that is a part of the built-in Administrators group.
2. Go to **Server Management** under **Start > Administrative Tools > Server Management**.
3. In the **Roles** section, click **Add Roles**.



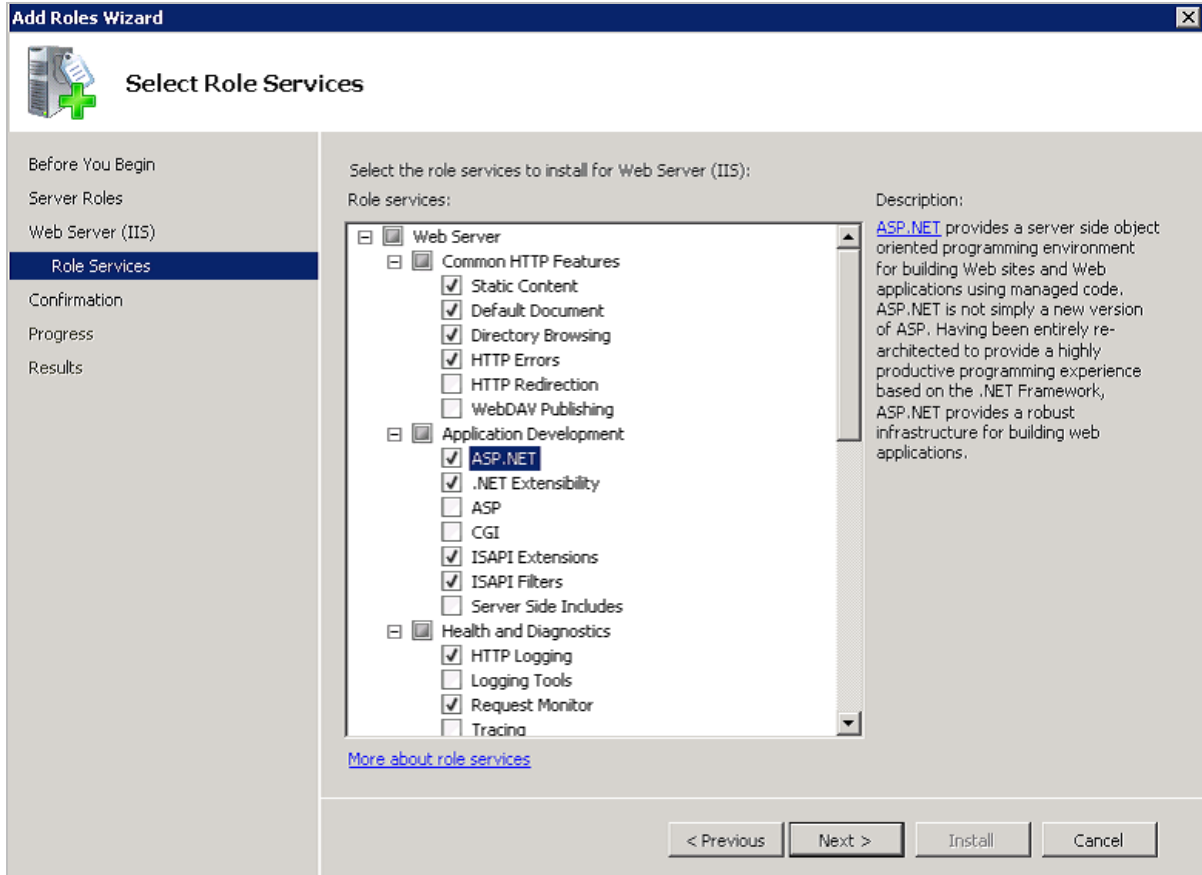
4. In the **Add Roles Wizard** window, click **Next**, choose **Web Server (IIS)** and click **Next**.



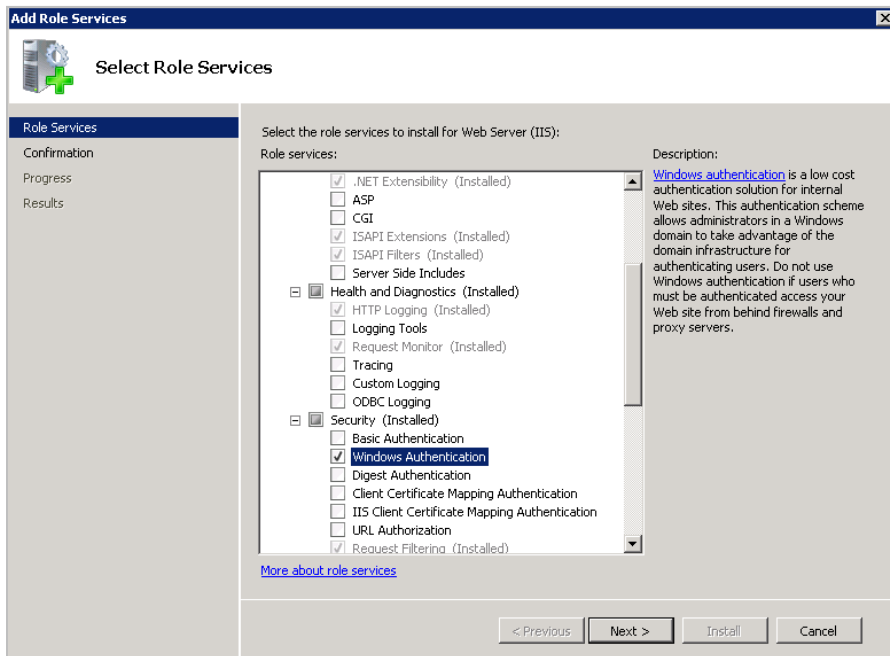
5. In the **Select Role Services** window, select **ASP .NET** role service. Note that there are other role services that are mandatory to install in order to run ASP .NET pages. Click the **Add Required Role Services** button.



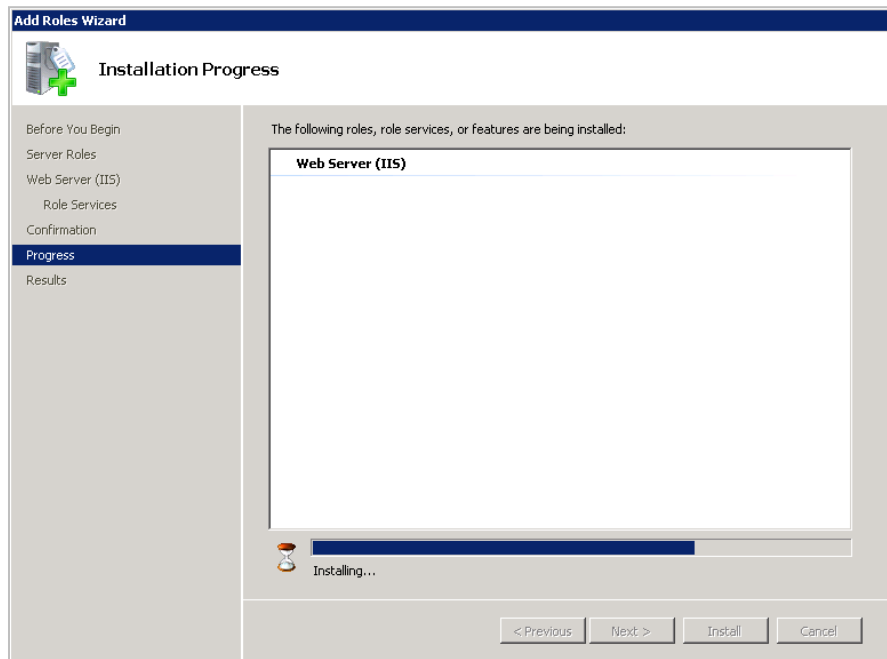




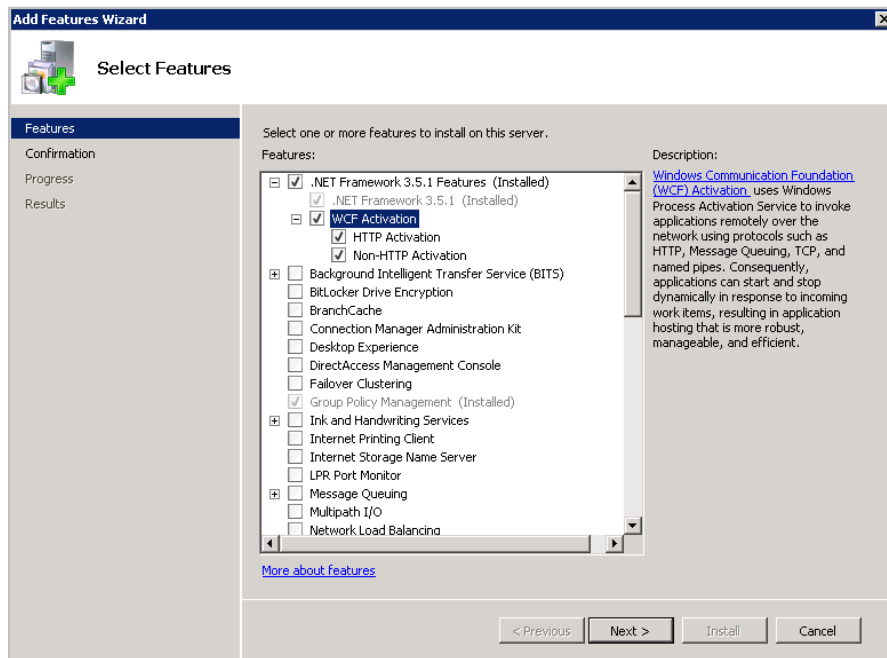
6. Under the **Security** section, select the **Windows Authentication** option.

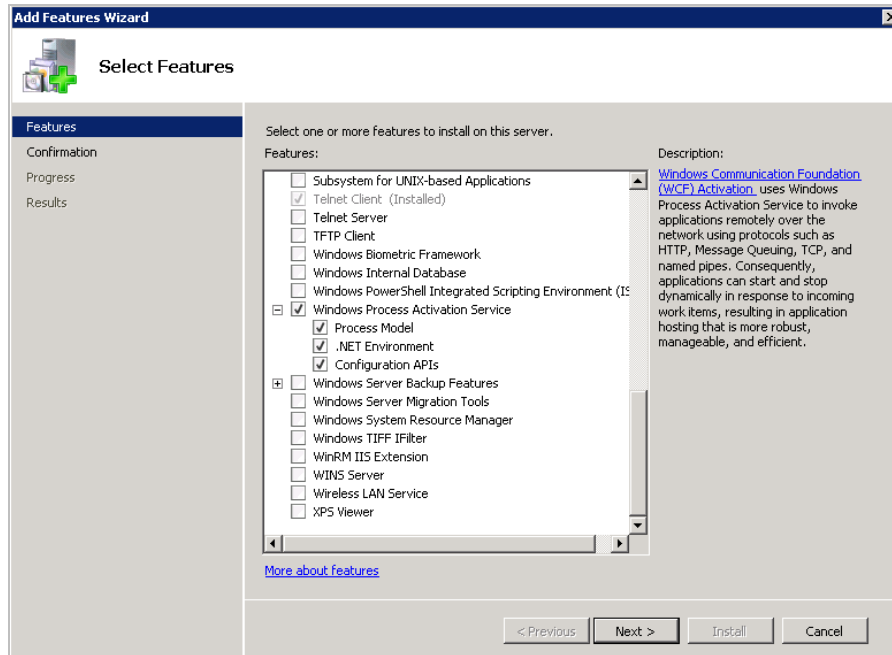


7. Click **Next**, and **Install**.



8. After IIS has been installed, you must enable the **WCF Activation** and **Windows Process Activation Service** options in the server **Features** section for the .NET Framework.
9. In the **Server Manager window** left treeview, click **Features**. In the right panel, click the **Add Feature**.
10. Add **.NET Framework 3.5.1** and **WCF Activation** and the **Windows Process Activation** features.





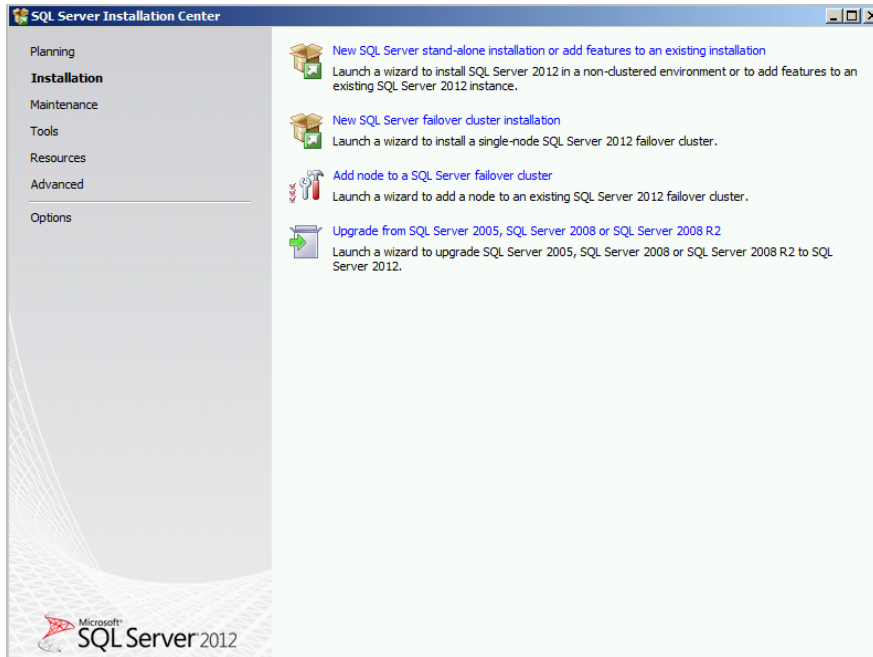
11. Click **Next** and **Install**. Perform a server restart even if is not required.

## Install and Configure Master Data Services

In this section you install, configure and upgrade Master Data Services.

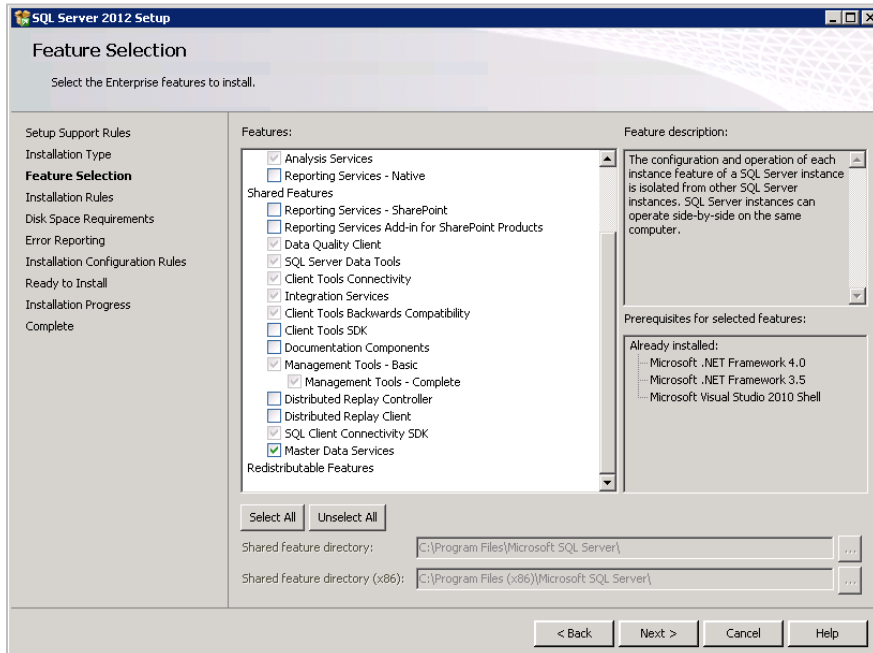
### Install Master Data Services

1. Log in to a SQL Server instance and navigate to your SQL Server 2012 media. Run the **setup.exe** file to install SQL Server 2012 components.
2. On the left panel of the **SQL Server Installation Center** window, click **Installation**. On the right side, click the **New Installation or add feature to an existing Installation** option.

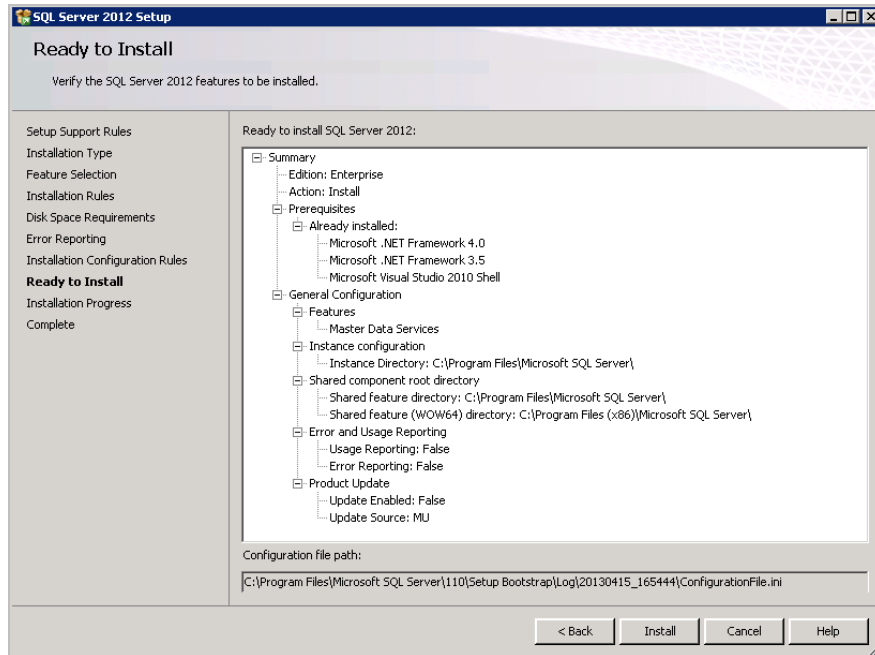


3. Follow the setup steps using the default settings until you reach the **Installation Type** page. In the **Install Updates** dialog box, skip the validation. In the **Installation Type** page, click **New Installation of SQL Server 2012**.

4. In the **Feature Selection** page, select **Master Data Services** and other features to install. Click **Next**.



5. Follow the remaining setup steps until you reach the **Ready to Install** page, and click **Install**. The SQL Server 2012 setup will start. It might take a couple of minutes for setup to complete.



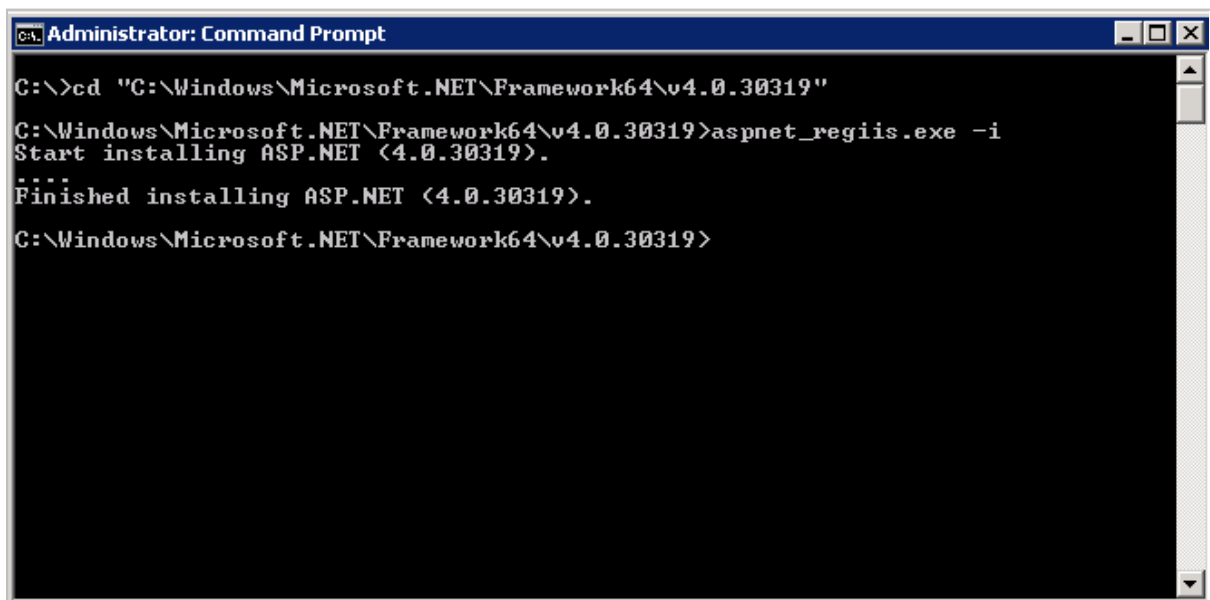
6. Once the installation is complete, close the setup window.

## Configure Master Data Services

Since MDS will run under .NET Framework 4.0, we need to configure the IIS application pool to use this version of the .NET Framework runtime. To do so, you first need to register the .NET Framework in IIS.

1. Download .NET Framework 4.1 if not installed at <http://www.microsoft.com/enyus/download/details.aspx?id=17851>.
2. Open a new **Command Prompt** with administration privileges. In the **Start** menu, right click **Command Prompt** and click **Run as Administrator**.
3. Navigate to the **C:\Windows\Microsoft.NET\Framework64\v4.0.30319** path and run the command:

```
aspnet_regiis.exe -i
```



```
Administrator: Command Prompt
C:\>cd "C:\Windows\Microsoft.NET\Framework64\v4.0.30319"
C:\Windows\Microsoft.NET\Framework64\v4.0.30319>aspnet_regiis.exe -i
Start installing ASP.NET (4.0.30319).
Finished installing ASP.NET (4.0.30319).
C:\Windows\Microsoft.NET\Framework64\v4.0.30319>
```

4. Once MDS and all related Windows features have been installed, you are ready to configure MDS.

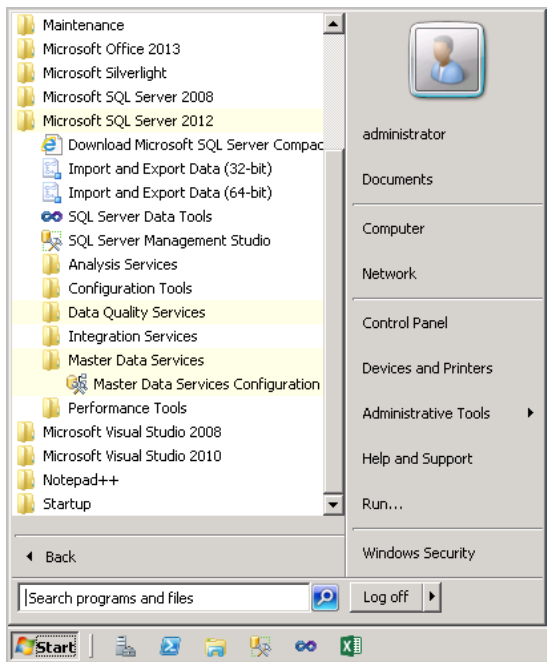
## Configure MDS

The MDS configuration process has two parts:

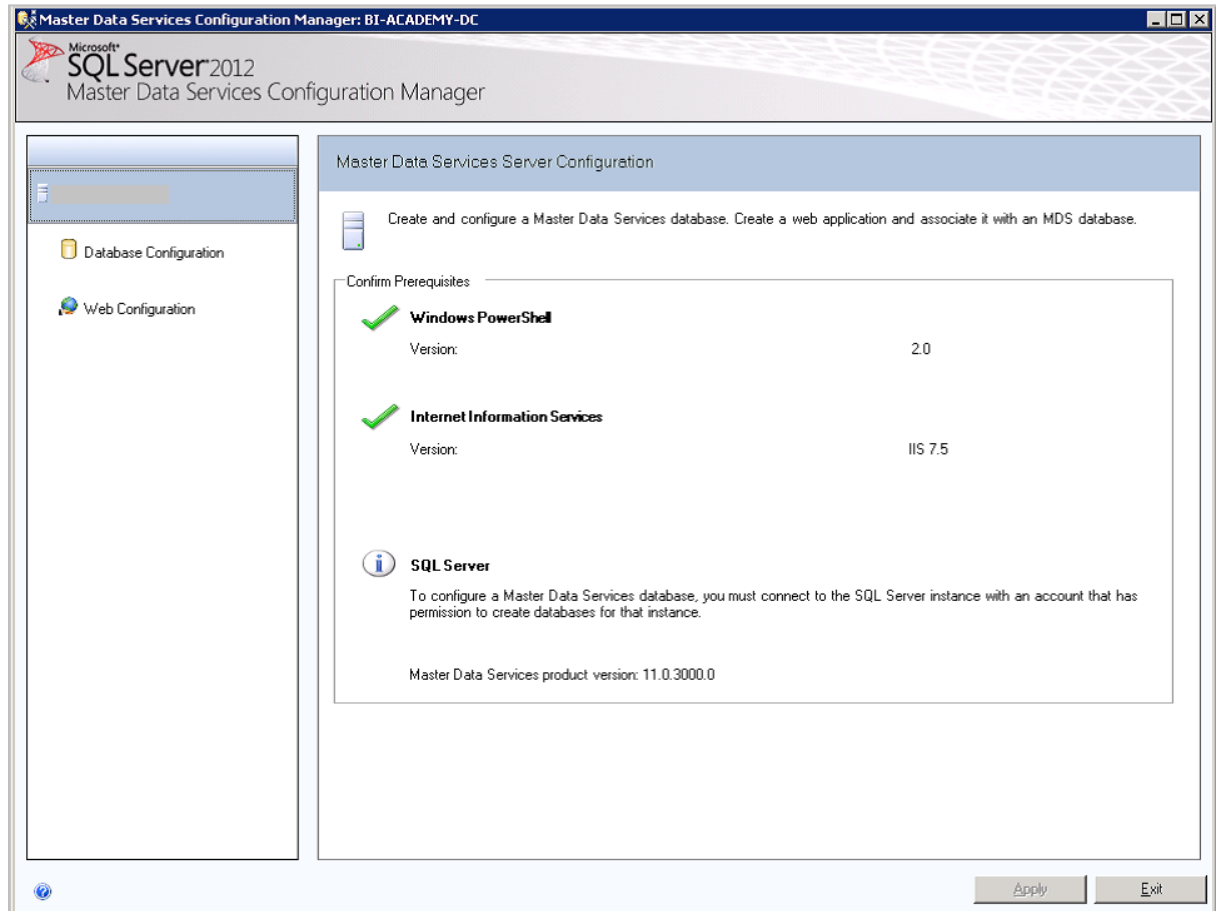
1. Master Data Services database setup.
2. Master Data Manager Web Application configuration.

### Setup a Master Data Services database

1. Open the **Master Data Services Configuration Manager** utility. To launch this utility, click **Start > Microsoft SQL Server 2012 > Master Data Services > Master Data Services Configuration Manager**.

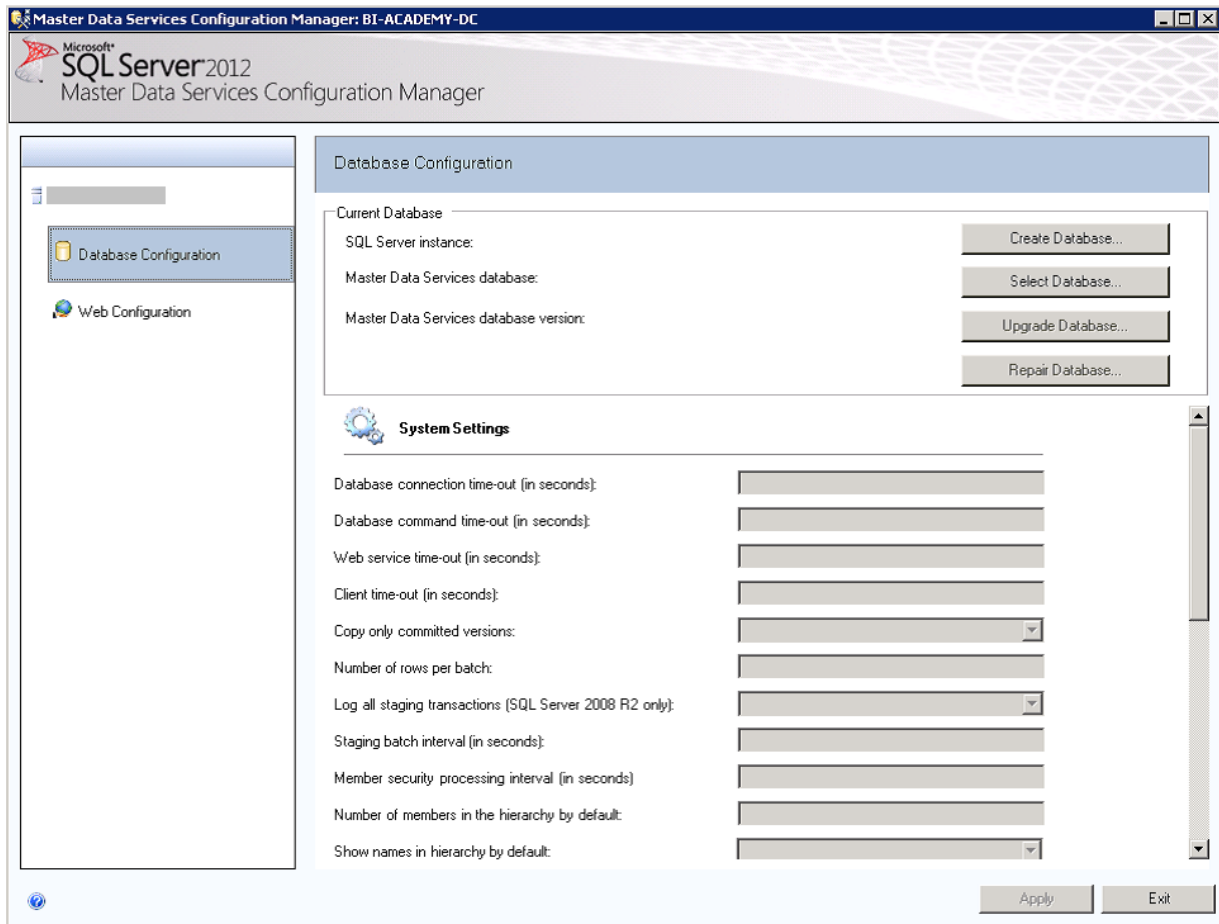


2. When the **Master Data Services Configuration Manager** utility launches, it confirms the **PowerShell** and **IIS** requirements. In the left panel, you configure the database and web settings.



3. When you click the **Database Configuration** section, the database configuration page provides high-level information about your SQL Server instance, the MDS database and database version. You can also update your MDS instance system settings in this section.





4. To start the configuration process, click **Create Database** to launch the **Create Database** wizard. The **Create Database** wizard consists of the following steps:
  - a. Specify a **SQL Server instance** where the MDS database will be located and the account that will create the MDS database, and click **Next**.

**Create Database Wizard**

Create Database  
Create a new Master Data Services database.

Database Server

Specify a local or remote instance of SQL Server Database Engine. Then specify credentials that have permission to connect to that server and create databases for that instance.

Database

Connect to the SQL Server instance:

Administrator Account

SQL Server instance:

Summary

Authentication type:

Progress and Finish

User name:

Password:

- b. Define the MDS **Database name** and choose either the default **Database collation** or configure the database **Windows collation** based on your own requirements. Name the database **MasterDB**, and click **Next**.

**Create Database Wizard**

Create Database  
Create a new Master Data Services database.

Database Server

Specify a name for the Master Data Services database, and set collation options.

Database

Database name:

Administrator Account

Database collation:  SQL Server default collation

Summary

Windows collation:

Progress and Finish

Binary  Binary-code point

Case-sensitive  Kana-sensitive

Accent-sensitive  Width-sensitive

- c. Define an **Administrator Account**. This account is given full access to all models in the MDS database. Leave **.\Administrator** in the **User name** textbox, and click **Next**.

The screenshot shows the 'Create Database Wizard' dialog box. The title bar reads 'Create Database Wizard'. The main heading is 'Create Database' with the subtitle 'Create a new Master Data Services database.' On the left, a vertical list of steps includes 'Database Server', 'Database', 'Administrator Account' (which is highlighted), 'Summary', and 'Progress and Finish'. The main area contains the instruction: 'Specify the Windows account of a user that will be automatically granted full access to all models. You can configure only one account with this permission.' Below this is a 'User name:' label followed by a text input field. At the bottom, there are three buttons: 'Previous', 'Next', and 'Cancel'. A help icon is visible in the bottom-left corner.

- d. In the **Summary** page, review your database configuration information and click **Next** prior to the actual database setup.
- e. After the database is configured, you are taken back to the database configuration page where the **Current Instance** section reflects your database configuration.

**Create Database Wizard** [X]

### Create Database

Create a new Master Data Services database.

Database Server

Database

Administrator Account

**Summary**

Progress and Finish

The following information will be used to create the Master Data Services database. Verify that this information is correct before you continue.

SQL Server instance:

Master Data Services database: MDSDB

Collation: SQL Server default collation

Administrator account:

?

**Create Database Wizard** [X]

### Create Database

Create a new Master Data Services database.

Database Server

Database

Administrator Account

Summary

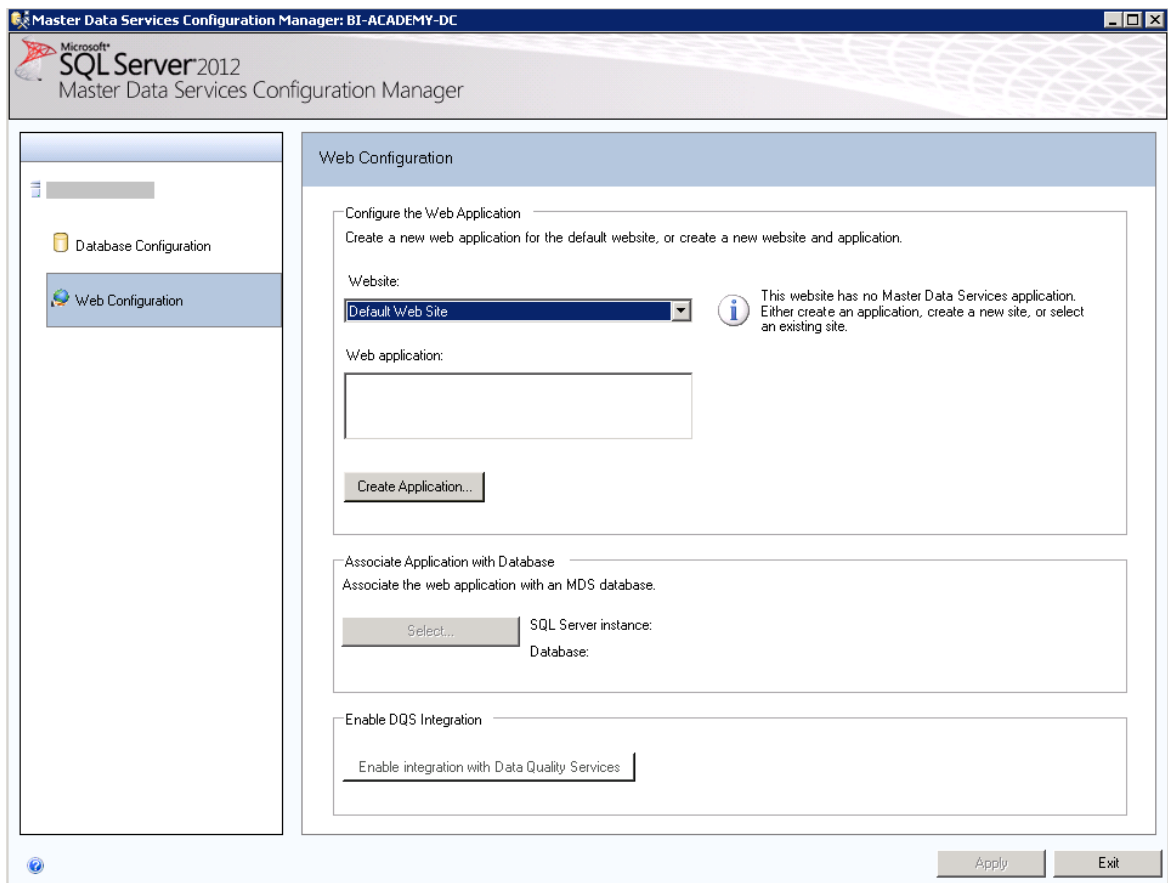
**Progress and Finish**

The wizard is creating and configuring the Master Data Services database. This might take several minutes to complete.

Task	Status
Preparing to create database.	Success
Running database script.	Success
Verify database creation.	Success

?

5. To continue the configuration process, click **Web Configuration** to launch the **Web Configuration** wizard. The **Web Configuration** wizard consists of the following steps:
- a) You use the **Master Data Services Configuration Manager** to install an MDS web site and application pool to the web server (IIS) host. Select one of several options:
- Go to **Web Configuration** section and in the Website section choose **Default Web Site** option.
  - Click **Create Application** to create a new web application.
  - Alternatively, you can choose to create a non-default web site for MDS to run within its own site.



- b) When you click **Create Application**, you configure the MDS web site in the **Create Web Application** dialog box. Enter a valid user name and password for the website to work properly. Configure the **Application Pool** settings with the following options:
- Name: **MDS Application Pool**
  - User name: {hostname}\Administrator
  - Password and Confirm Password: {your password}

**Create Web Application**

Create Web Application

Provide the virtual path and alias for the web application.

Virtual path:  Alias:

A new application pool will be created for this web application. Type a name or accept the default name, and specify identity information.

Application Pool

Name:

User name:

Password:

Confirm Password:

- c. In the **Create Web Application** window, click **OK**.
- d. With the web application configuration complete, you associate the database with the website.
  - a. Click **Select** under the **Associate Application with Database** section.
  - b. Click **Connect**. Once connected, select the **MDSDB** database and then click **OK**.

**Connect to Database**

Microsoft SQL Server 2012 Master Data Services

Connect to a Master Data Services Database

Connect to a SQL Server instance that hosts the Master Data Services database. Then select the database.

SQL Server instance:

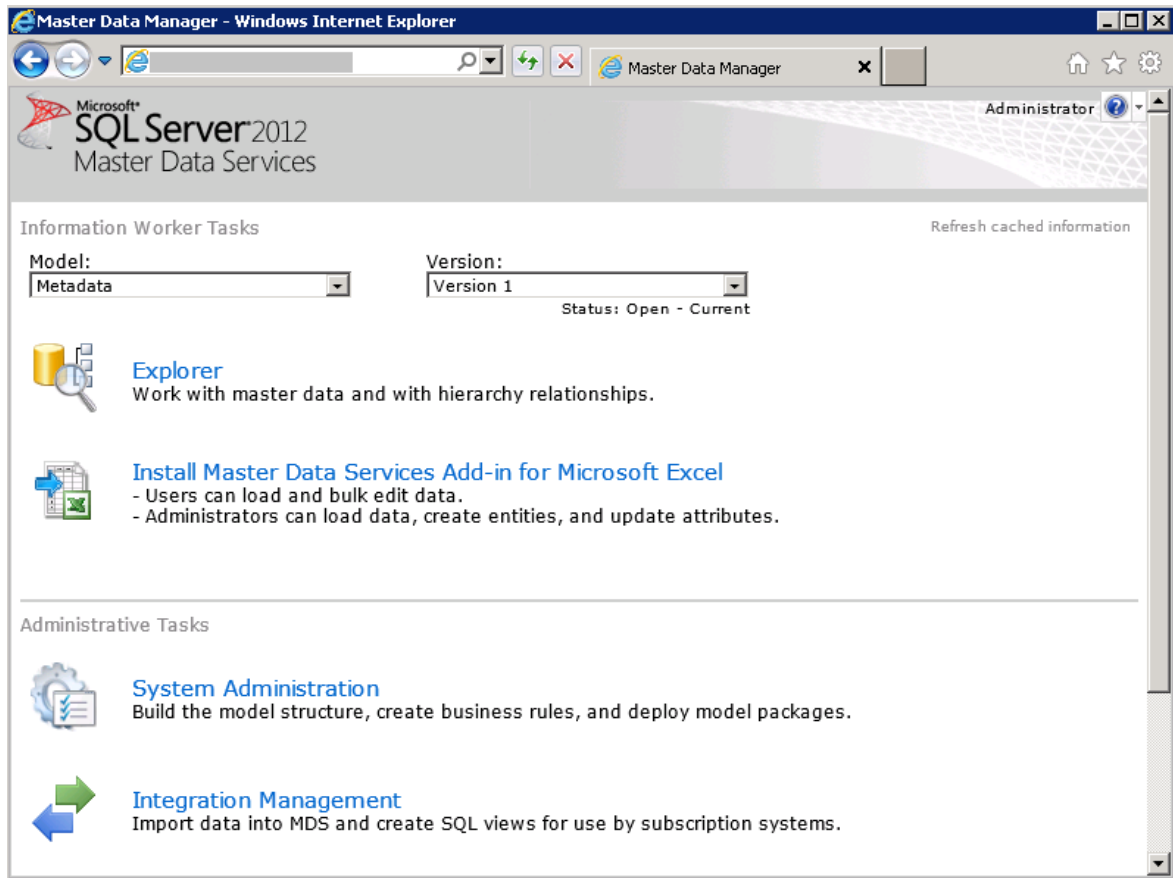
Authentication type:

User name:

Password:

Master Data Services database:

- e. In the **Master Data Services Configuration Manager** window, click **Apply**, and wait a couple of minutes until MDS configuration has finished successfully.
- f. A window appears with a message describing that configuration is complete. Leave the option to launch the web application in a browser and click **OK** to check if the MDS web site opens correctly.
- g. You should see an informational web page that has links to help you learn about Master Data Services. There is also a link to navigate to the main MDS web page to begin working with MDS features such as models and entities.



**NOTE:** The MDS web site url is <http://localhost/MDS>.

After you follow the **Database Configuration** and **Web Configuration** steps, you have updated the **Master Data Manager Web Application** configuration (web.config) file to point to the MDS database.

## Use the Master Data Services Add-in for Excel to connect to MDS

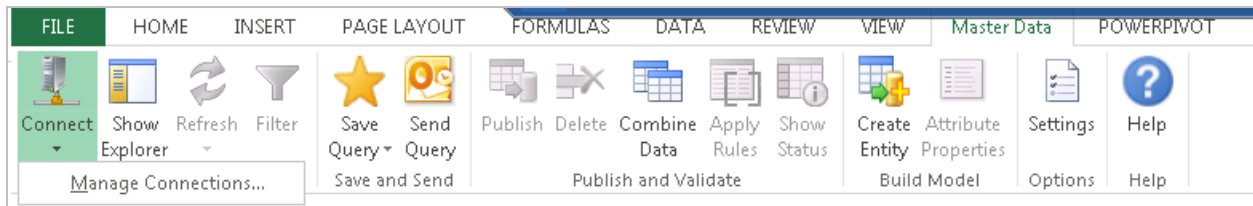
In order to have the **Master Data Services Add-in for Excel**, you must install the **Visual Studio 2010 Tools for Office Runtime** and Master Data Services Add-in for Excel. Navigate to **C:\{Download location}** and run the following installers in this order:

1. Visual Studio 2010 Tools for Office Runtime - **vstor\_redist.exe**.
2. Master Data Services Add-in for Excel - **MasterDataServicesExcelAddin.msi**.

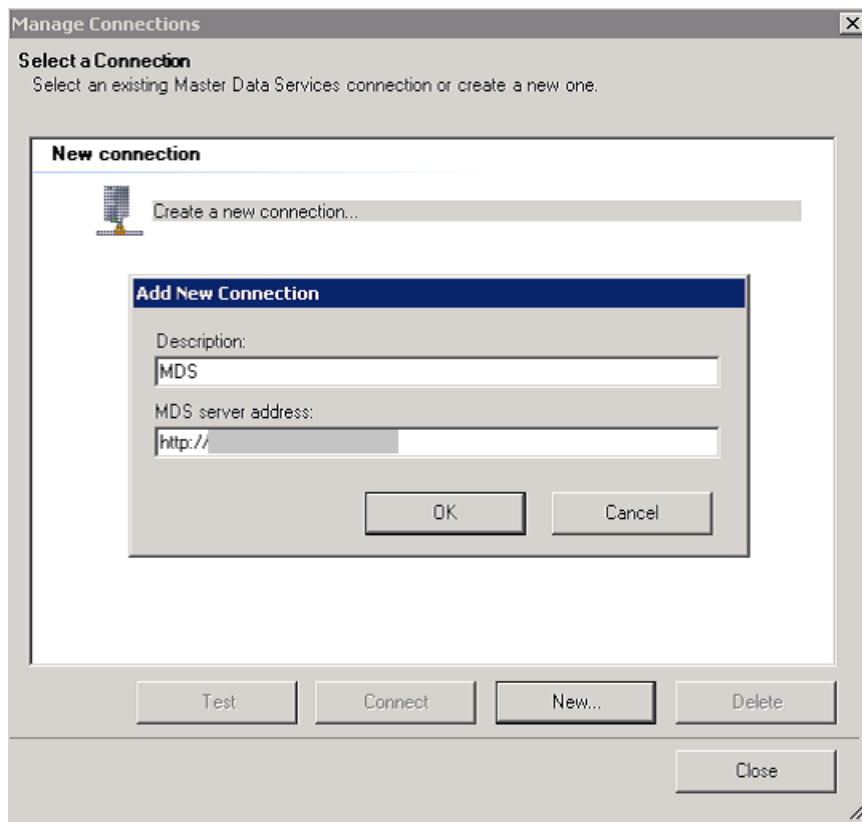
To test the connection to the MDS endpoints using **Master Data Services Add-in for Excel**.

1. Open Excel 2013 or Excel 2010 with a blank workbook.
2. In the **Master Data ribbon** tab, click **Connect > Manage Connections**.





3. Click **New** to create a new connection.
4. In the **Add New Connection** dialog box
  - a. Enter a **Description** such as **MDS**.
  - b. Enter your **MDS server address** as <http://hostname/MDS>.
  - c. Click **OK**.



5. Click **Test** to check the connection. You are now ready to use the **Master Data Services Add-in for Excel**.
6. Click **Close**.

## Upgrade SQL Server 2012 Master Data Services

Before upgrading Master Data Services, you should back up your MDS databases before you proceed with any schema or binary files changes. When upgrading MDS, you should alert MDS users about the scheduled maintenance according to your organization's change control processes. To prevent users from modifying MDS, you should stop the IIS web site and application pool while performing an MDS upgrade.

### To Upgrade Master Data Services

1. Log into your Windows server using an **Administrator** login.
2. You can optionally stop the application pool that contains the MDS web application and service, or you can stop the MDS web site that contains the web application and service.

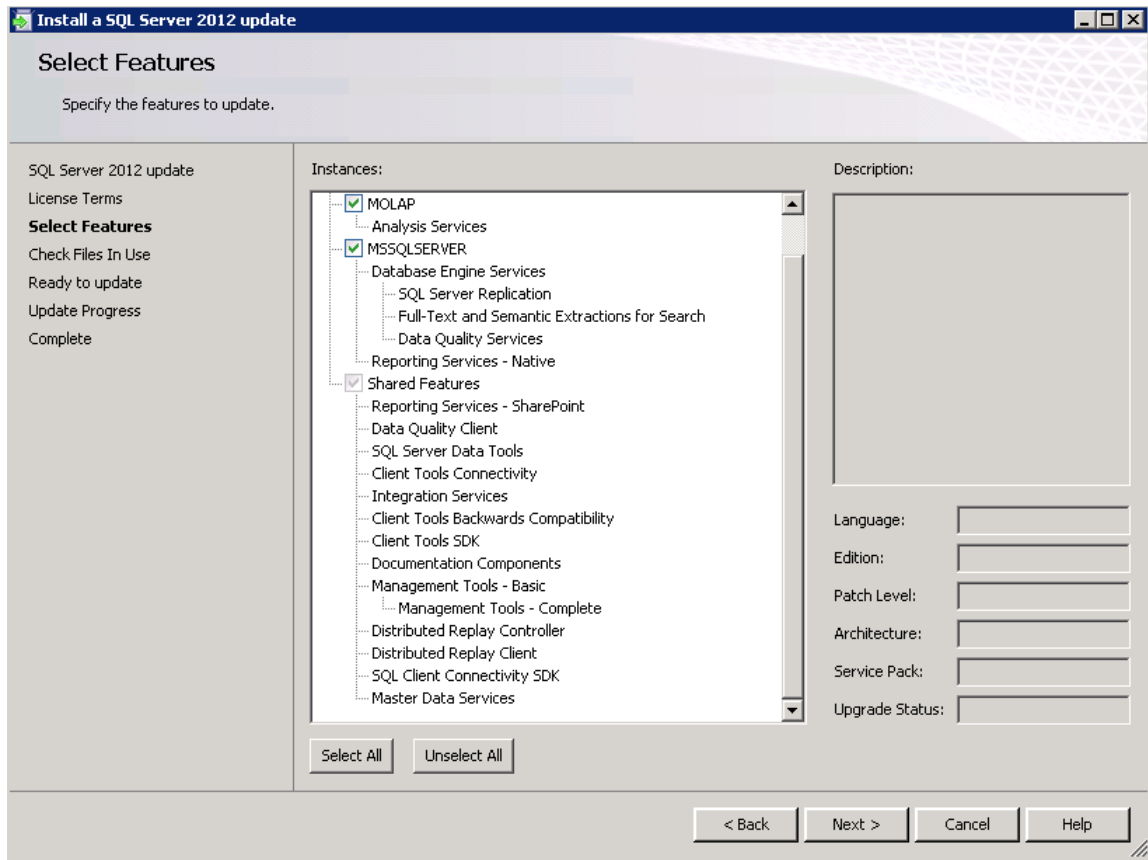
For more information about how to Start or Stop an IIS Application Pool, see [Start or Stop an Application Pool](#). For more information about how to Start or Stop an IIS Web Site, see [Start or Stop a Web Site](#).

**NOTE:** If you stop the application pool, you stop requests for all applications in that application pool. If you stop the Web site, you stop only traffic to the Web site and any applications and services it contains. In our case, we will not stop IIS site or the application pool.

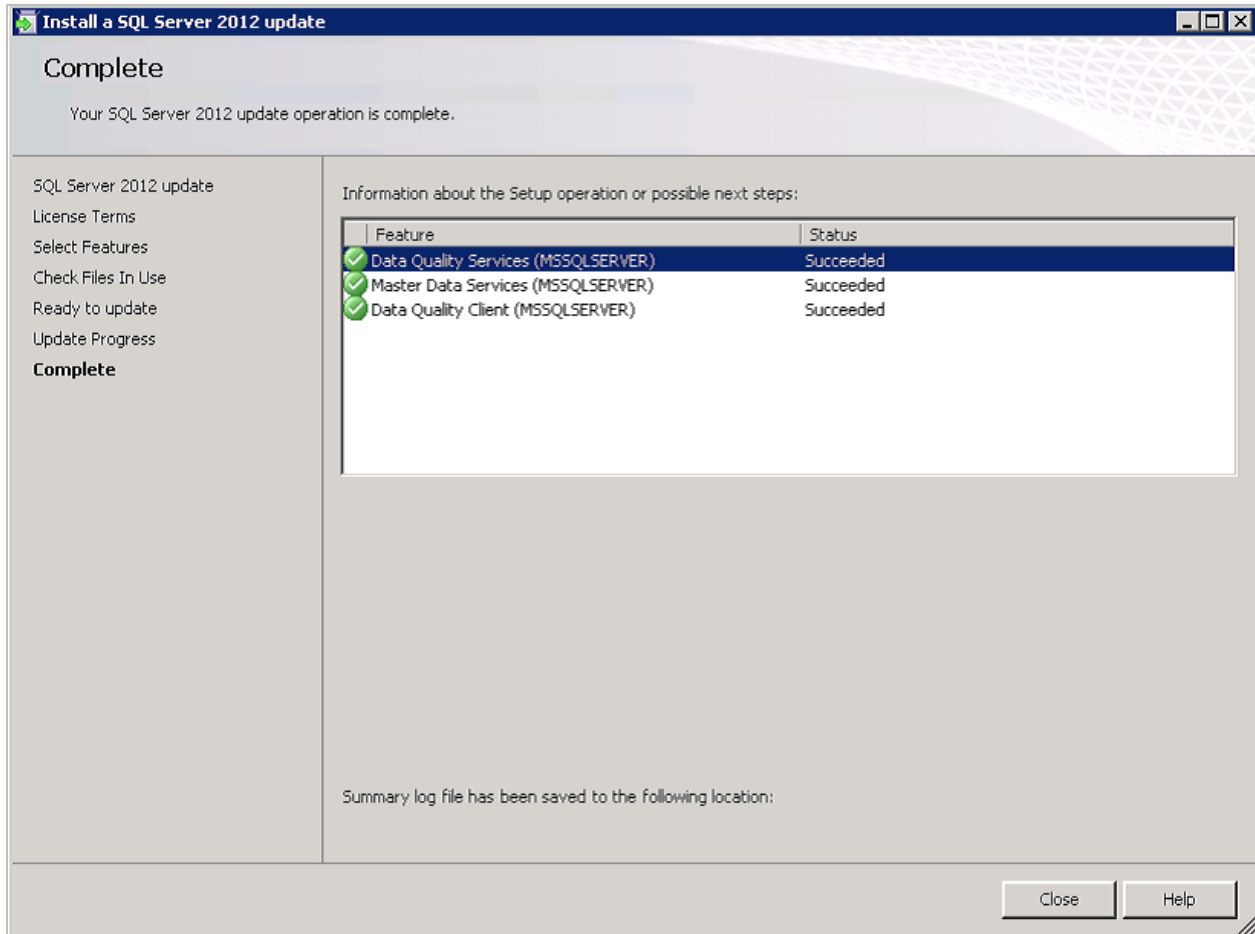
3. Navigate to <http://support.microsoft.com/kb/2812412>, and download and run SQLServer2012\_SP1\_CU3\_2812412\_11\_0\_3349\_x64. This installer contains the SQL Server 2012 SP1 Cumulative Update 3 (CU3).

In the **SQL Server 2012 SP1 CU3** update window click **Next**.

4. Accept the license terms and click **Next**.
5. Review the SQL Server 2012 features to be upgraded:
  - Database engine
  - Analysis Services
  - Data Quality Services and Data Quality Client
  - Master Data Services
  - Integration Services
  - SQL Server Data Tools
  - Management Tools



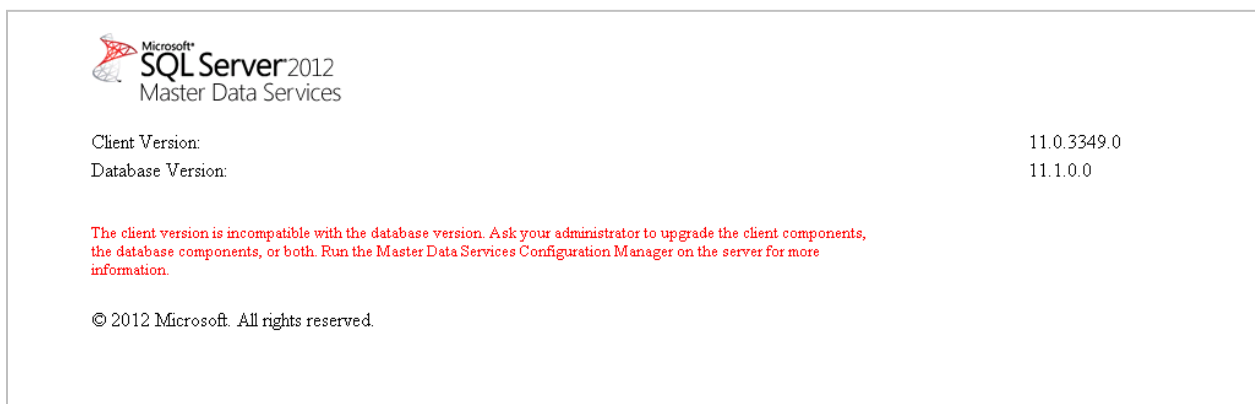
6. Click **Next**.
7. In the **Check Files In use** page, wait for check files operation to complete, and click **Next**.
8. In the **Ready to update** page, review installation operations, and click **Update**.
9. In the **Complete** page, click **Close**.



10. Navigate to your MDS web site.

### Version incompatible error

When you navigate to your MDS web site after performing an upgrade, you might get a **version incompatible error**. This is expected behavior when the schema version increases because the MDS binaries are upgraded, but the database is not yet upgraded. Each patch is different and may not update the database schema so these steps are not always necessary.

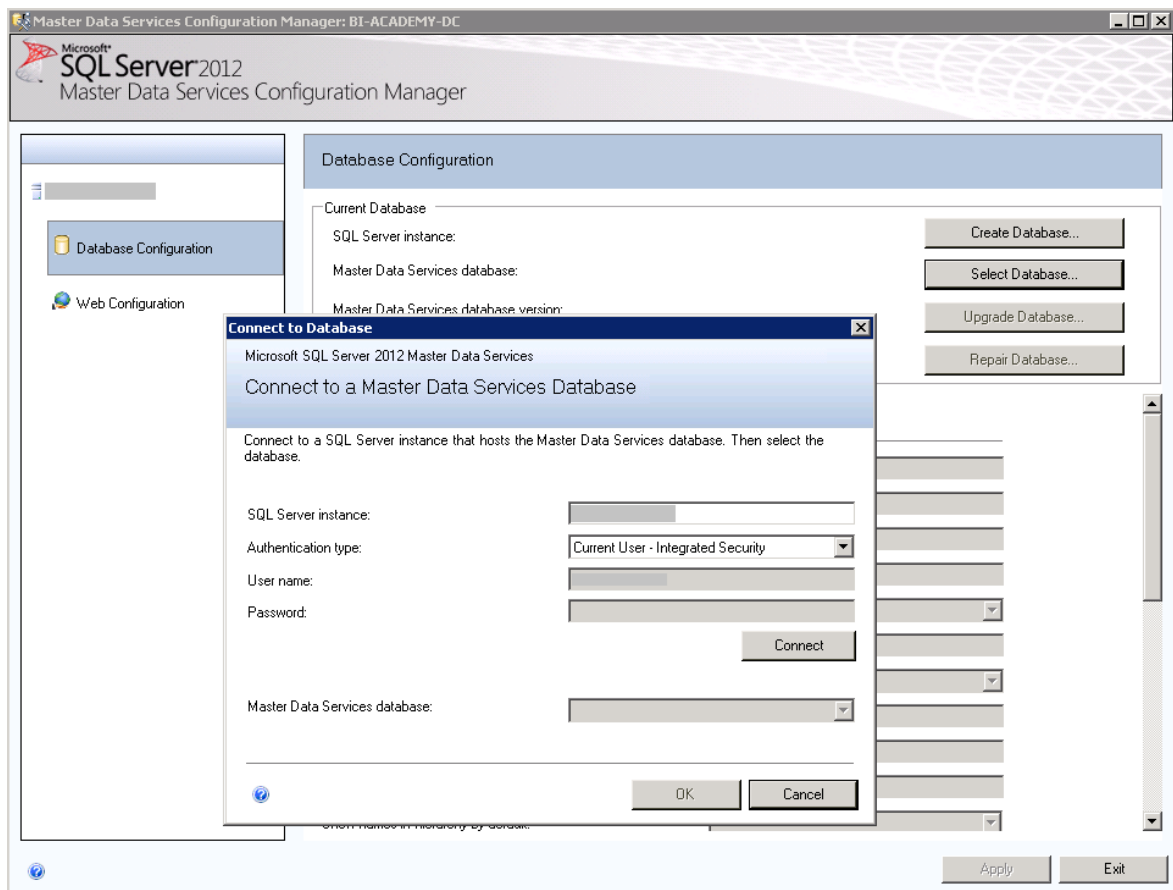


At this point in upgrade guide, binaries and scripts are upgraded to **11.0.3349.0** version. To resolve the **version incompatible error**, you upgrade the **MDS** database schema.

1. Open the **Master Data Services Configuration Manager**. To launch this utility, click the **Start > Microsoft SQL Server 2012 > Master Data Services > Master Data Services Configuration Manager**.

**NOTE:** To upgrade the MDS database schema, you must be logged in as an Administrator Account that was specified when the MDS database was created. In the MDS database, in **mdm.tblUser**, this user has the ID value of 1.

2. In the left pane, click **Database Configuration**.
3. In the right pane, click **Select Database** and click **Connect** to get database information from SQL Server 2012 database instance.

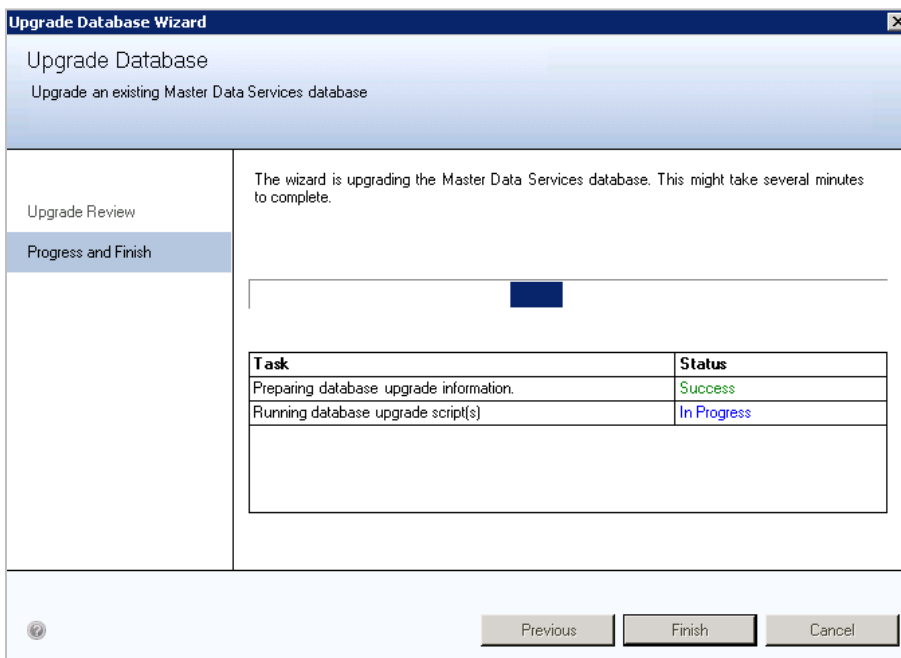


4. **Master Data Services Configuration Manager** will automatically detect the **MDS\_DB** for you.
5. Click **OK**.

- The Database Configuration page displays a warning message to upgrade MDS database. Click **Upgrade Database** to start the **Upgrade Database Wizard**.



- Click **Next** to review the database configuration information, and click **Next** to start the upgrade. Wait until the upgrade is finished.



- To close the **Upgrade Database Wizard**, click **Finish**.
- Open a new Internet Explorer window and navigate to <http://localhost/MDS/>. You should be able to see the MDS start page without the upgrade message.

NOTE: To check the MDS version, go to upper right corner in the MDS web site and click in the **down arrow** next to the question mark and click **About Master Data Manager**.



### **Troubleshoot installation and configuration issues**

For more information about how to troubleshoot installation and configuration issues, see [Troubleshooting Installation and Configuration Issues \(Master Data Services\)](#) that discusses common installation and configuration issues.

### **Master Data Services Security (MDS)**

The next section discusses how to deploy Master Data Services models. Before describing MDS models, you should become familiar with security in MDS. In Master Data Services, use security to ensure that users have access to the specific master data necessary to do their jobs, and to prevent them from accessing data that should not be available to them. For more information about security in MDS, see [Security \(Master Data Services\)](#).

### **Deploy Master Data Services Models**

In Master Data Services, a package is an XML file that contains a model structure to deploy to an MDS environment, and optionally, data from the model. Use model packages to move copies of models from one MDS environment to another, or to create new models in your existing MDS environment.

## Packages Contents

A model package is an XML file with the .pkg extension. When you create a deployment package, you can decide whether or not to include data. If you decide to include data, you select a version of the data to include.

The following model objects are included in a package:

- Entities
- Attributes
- Attribute groups
- Hierarchies
- Collections
- Business rules
- Version flags
- Subscription views

User-defined metadata, file attributes, business rule notification information, and user and group permissions are not included. After you deploy a model, you must update these items manually.

## Deploying Model Deployment Tools

- **MDSModelDeploy** tool: To create and deploy model objects and data, use the MDSModelDeploy.exe tool. If you selected the default path when installing MDS, this tool is located on drive\Program Files\Microsoft SQL Server\110\Master Data Services\Configuration.
- **Model Deployment wizard**: To create and deploy packages of the model structure only, use the wizard in the Master Data Manager web application. You cannot use this wizard to deploy data.
- **Model Package Editor**: To edit a model package, use the ModelPackageEditor.exe that launches the Model Package Editor wizard. You use this wizard to edit a package that was created by the MDSModelDeploy tool or the Model Deployment wizard. If you selected the default path when installing MDS, this tool is located on drive:\Program Files\Microsoft SQL Server\110\Master Data Services\Configuration.

## Prerequisites for using Deployment tools

- In the **Master Data Manager** web application, you must have permission to access the System Administration functional area.
- You must be a model administrator.
- A model must exist for you to create a package.



## Model Deployment wizard

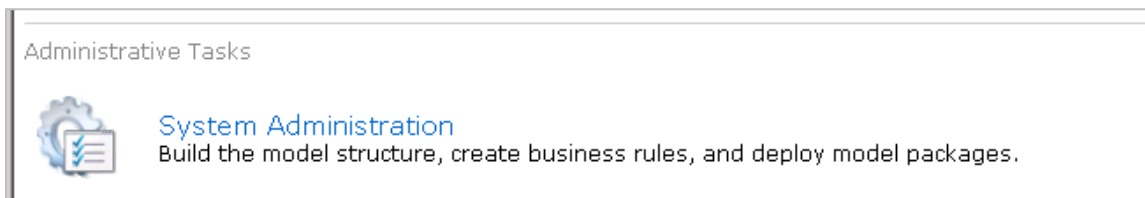
### Create a Package using Model Deployment Wizard

1. In **Master Data Manager**, click **System Administration**.
2. On the **Model View** page, from the menu bar, click **System > Deployment**.
3. On the **Model Deployment** wizard, click **Create**.
4. On the **Create Package** page, select a model from the **Model** list.
5. Click **Next**.
6. Click **Download**.
7. Save the file.
8. Click **Close**.

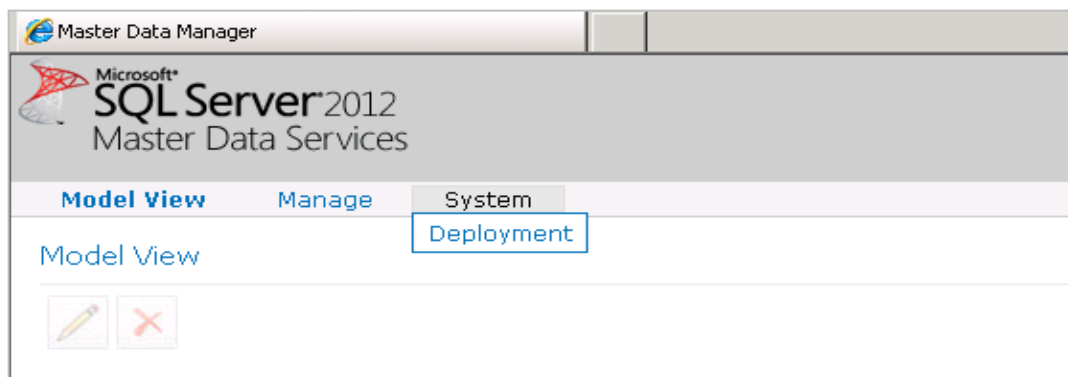
### Deploy a Package using Model Deployment wizard

You can use the **Model Deploy** wizard to create a new model, create a clone of a model, or update an existing model and its data. If you use the MDSModelDeploy tool to update an existing model and its data, and the package does not contain an entity, attribute, or member that exists in the destination model, MDSModelDeploy will not delete that entity, attribute, or member from the model.

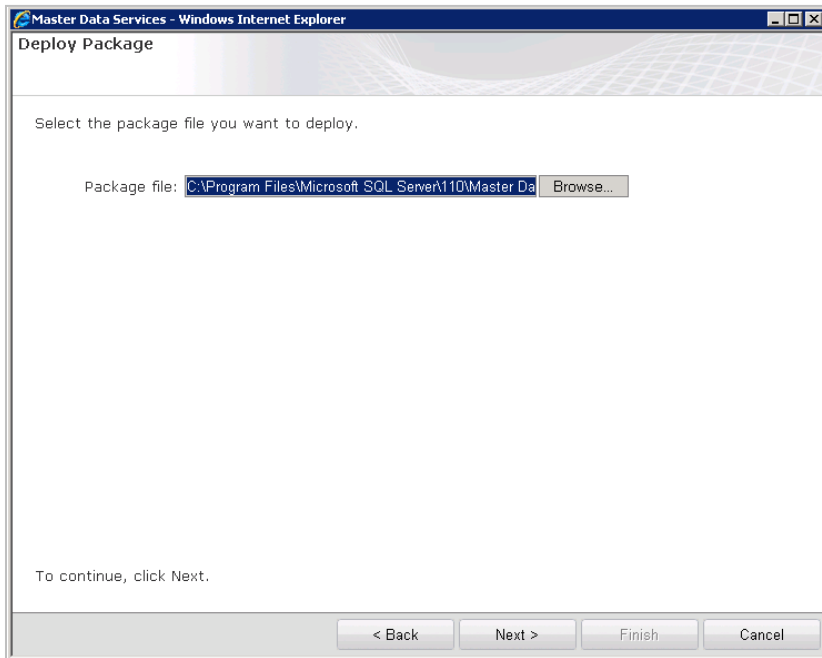
1. In **Master Data Manager**, click **System Administrator**.



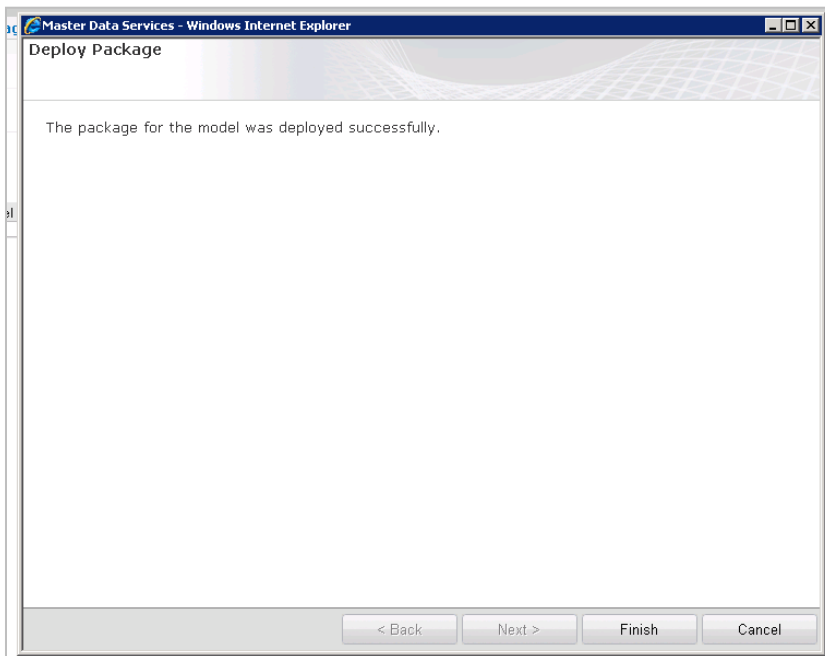
2. On the **Model View** page, from the menu bar, click **System > Deployment**.



3. Click **Browse** and navigate to the product\_en.pkg sample package in C:\Program Files\Microsoft SQL Server\110\Master Data Services\Samples\Packages\product\_en.pkg.



4. Click **Next** to import the model structure.



For more information about how to deploy MDS Samples in SQL Server 2012, see [Deploying MDS Samples in SQL Server 2012](#).

### **MDSModelDeploy tool**

You use the **MDSModelDeploy** tool to create a new model, create a clone of a model, or update an existing model and its data.

## Create a Package using MDSModelDeploy

1. Open a command prompt as an administrator.
2. Navigate to MDSModelDeploy.exe.
  - If MDS was installed in the default location, the file is in drive:\Program Files\Microsoft SQL Server\110\Master Data Services\Configuration.
  - If MDS was not installed in the default location, search the local computer for MDSModelDeploy.exe.
3. Optional: View options and help.
  - To display all available options, type MDSModelDeploy and press **Enter**.
  - To display help for an option, type the following, where OptionName is the name of the option: MDSModelDeploy help OptionName.
4. Optional: If you have multiple web applications, determine the name of the service you will deploy to by typing this command and press **Enter**:

```
MDSModelDeploy listservices
```

A list of values is returned, for example MDS1, Default Web Site, MDS. The first value in this list (in this case, MDS1) is needed to deploy the model.

5. To create a package that contains model objects and data, type the following, where ModelName, VersionName, ServiceName, and PackageName are the names of the model, version, service, and of the .pkg output file respectively:

```
MDSModelDeploy createpackage -model ModelName -version VersionName -service ServiceName -package PackageName -includedata
```

If you do not want to include data, do not use the -version and -includedata switches.

6. Press **Enter**. When the package is successfully created, a message stating “MDSModelDeploy operation completed successfully” is displayed.

## Deploy a Package using MDSModelDeploy

1. If you already have a model named Product you will need to rename the model since you are about to import a new Product model.
2. Navigate to **Master Data Manager**, click **System Administration**.
3. On the **Model View** page, from the menu bar, click **Manage > Models**.
4. Click on the Product model and click **Edit Model**. Change the name to **Product\_BeforeDataExport**.
5. Deploy the Master Data Services sample model package **product\_en.pkg** located at **C:\Program Files\Microsoft SQL Server\110\Master Data Services\Samples\Packages**. Launch a command prompt as an administrator from **Start > Cmd** and **right click**. Choose **Run as Administrator** option.

6. Navigate to the SQL Folder:

```
cd "C:\Program Files\Microsoft SQL Server\110\Master Data Services\Configuration"
```

7. List the MDS web services to connect to if you are unsure of the service name. The default is MDS1 as shown by this command:

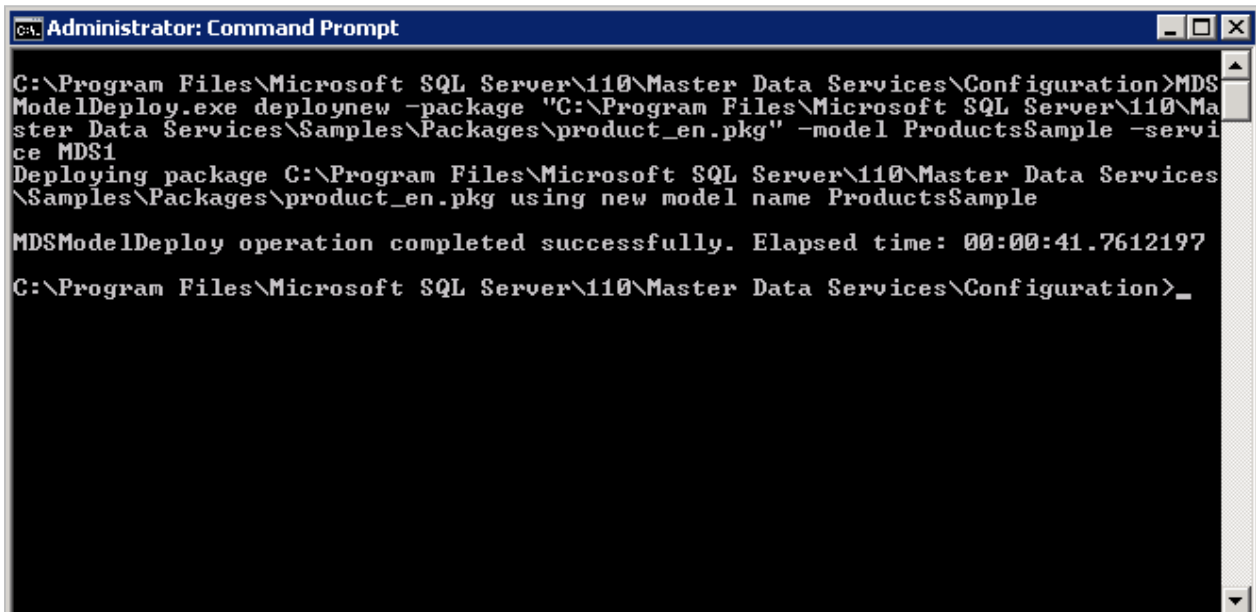
```
MDSModelDeploy.exe listservices
```

8. Review the list that was returned and use the first one in the list that is **MDS1**.

9. Deploy the package by pointing to the package file, and connect to the **MDS1** service.

Run the following command:

```
MDSModelDeploy.exe deploynew -package "C:\Program Files\Microsoft SQL Server\110\Master Data Services\Samples\Packages\product_en.pkg" -model ProductsSample -service MDS1
```



```
Administrator: Command Prompt
C:\Program Files\Microsoft SQL Server\110\Master Data Services\Configuration>MDSModelDeploy.exe deploynew -package "C:\Program Files\Microsoft SQL Server\110\Master Data Services\Samples\Packages\product_en.pkg" -model ProductsSample -service MDS1
Deploying package C:\Program Files\Microsoft SQL Server\110\Master Data Services\Samples\Packages\product_en.pkg using new model name ProductsSample
MDSModelDeploy operation completed successfully. Elapsed time: 00:00:41.7612197
C:\Program Files\Microsoft SQL Server\110\Master Data Services\Configuration>_
```

10. On the **Master Data Manager** web page, click the **Refresh cached information** hyperlink on the right so that the cache gets the latest list of models, and you can explore the newly added sample model.

## Backup an MDS Database

Creating a backup of an MDS database is the same as creating a backup of another SQL Server database.

1) In **Microsoft SQL Server Management Studio**, right click on an MDS database.

- 2) Click **Tasks > Back Up**.
- 3) In the **Back Up Database** dialog box, click OK.

For details about how to back up a SQL Server database, see [Back Up and Restore of SQL Server Databases](#).

## Restore an MDS Database

- 1) Stop your MDS web site.
- 2) Restore your MDS database. For details about how to restore a SQL Server database, see Back Up and Restore of SQL Server Databases.
- 3) Start your MDS web site.
- 4) Open the MDS **Configuration Manager**.
- 5) On the **Data Configuration** page select **Master Data Services database** that you restored.

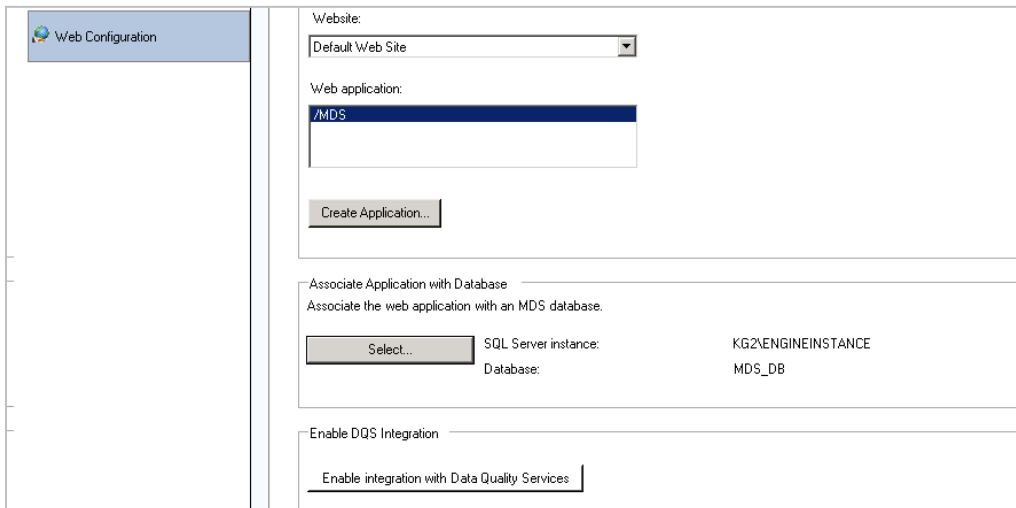


The screenshot shows the 'Database Configuration' page. It displays the current database settings:

Current Database	
SQL Server instance:	
Master Data Services database:	MDS_DB
Master Data Services database version:	11.1.0.0

On the right side, there are four buttons: 'Create Database...', 'Select Database...', 'Upgrade Database...', and 'Repair Database...'.

- 6) On the **Web Configuration** page select a **Website**, or **Default Web Site**, and a **Web application**.
- 7) Select **Restored** database, click **Apply**.



The screenshot shows the 'Web Configuration' page. It displays the following configuration options:

- Website:** A dropdown menu with 'Default Web Site' selected.
- Web application:** A text box containing '/MDS'.
- Create Application...** button.
- Associate Application with Database:** A section with the instruction 'Associate the web application with an MDS database.' It includes a 'Select...' button and the following information:
  - SQL Server instance: KGZ\ENGINEINSTANCE
  - Database: MDS\_DB
- Enable DQS Integration:** A section with a checkbox for 'Enable integration with Data Quality Services'.

- 8) After **Completion** of configuration, the MDS **Configuration Manager** automatically opens the Web Application.

## Disaster Recovery Plan

An MDS disaster recovery plan is the same as a traditional SQL Server or IIS disaster recovery plan.

- 1) Build an instance of Microsoft Windows Server.
- 2) Follow the steps in [System Configuration](#).
- 3) Follow the steps in [Install Master Data Services](#).
- 4) Restore your MDS database back up and follow the steps in [Restore MDS Database](#).
- 5) Follow the steps in [Configuration Master Data Services](#).
- 6) In the **Configuration Manager** Database Configuration Page, select the database that you restored in step 4.

The screenshot shows a 'Connect to Database' dialog box for Microsoft SQL Server 2012 Master Data Services. The title bar reads 'Connect to Database' with a close button. The main text says 'Microsoft SQL Server 2012 Master Data Services' and 'Connect to a Master Data Services Database'. Below this, it instructs the user to 'Connect to a SQL Server instance that hosts the Master Data Services database. Then select the database.' The form contains the following fields and controls:

- 'SQL Server instance:' followed by an empty text input field.
- 'Authentication type:' followed by a dropdown menu currently set to 'Current User - Integrated Security'.
- 'User name:' followed by a text input field containing 'SQL Login'.
- 'Password:' followed by an empty text input field.
- A 'Connect' button to the right of the password field.
- 'Master Data Services database:' followed by a dropdown menu currently set to 'MasetrDB'.
- At the bottom, there are 'OK' and 'Cancel' buttons.

- 7) Follow steps 23 to 34 in [Configure Master Data Services Section](#).

## Monitoring MDS

MDS trace logging is not recommended to enable longer than necessary when troubleshooting an MDS issue. The log file can quickly grow large and there is no clean-up process or size limitations for the log. For more information about MDS logging, see [How to enable Trace Logging in SQL Server 2008 R2 and 2012 Master Data Services](#).

## High Availability in MDS

- Starting with 2012 RTM CU1, you can cluster an MDS database. For more information how to cluster an MDS database, see [FIX: Master Data Services is not supported on a clustered installation of SQL Server 2012](#).
- Starting with 2012 SP1, you can install MDS in an AlwaysOn environment. For more information, see [Installing Master Data Services in an AlwaysOn Environment](#).
- To learn more about how to scale out an MDS web application, see [Web Application Requirements \(Master Data Services\)](#); however, most of the work is done on the database backend so we do not see it implemented much. MDS load balancing can be easily configured with IIS tools like [ARR](#).

## MDS Extract, Transform, and Load (ETL) Package Monitoring

You can monitor the ETL process outside of MDS. Although there are no built-in tools for ETL in MDS, you can use SQL Server Integration Services (SSIS) to monitor MDS:

- Import and Export - Use SSIS packages to import and export data and implement monitoring and logging tasks during those processes using SQL Server staging tables and subscription views.
- Data validation and change tracking - You can run external SSIS workflow tasks containing business rules that are triggered by data changes. Within the workflow you can implement monitoring and logging tasks. For more information about change tracking using business rules, see [Change Tracking \(Master Data Services\)](#) and [Initiate Actions Based on Attribute Value Changes \(Master Data Services\)](#).

## Subscription Handling

Subscription views are best suited to bulk, batch-oriented exports of master data. For event-based integration, use change tracking notification. In Master Data Services, you can create a business rule to initiate actions based on changes to attribute values. For more information, see [Initiate Actions Based on Attribute Value Changes \(Master Data Services\)](#).

## Subscription View

MDS subscription views appear as ordinary views within the MDS master data management (MDM) schema. The view formats include the following:

- The **Attributes view** format lists all leaf, consolidated, or collection members for an entity, and it includes columns for all attributes. Each domain-based attribute in a subscription view is identified by three columns: **Name**, **Node**, and **ID**.
- The **Hierarchy view** format represents hierarchies as level-based columns, in which each column represents a level, or parent-child relationship, in which each row represents a

relationship of one child to one parent. Hierarchy views provide relationship data for all types of relationships in MDS, including explicit and derived hierarchies, and collection members.

Subscription views contain system attributes that are not in the master data. System attributes provide context about the master data: version data, validation data (for attribute views), and data about when the master data was entered and by whom. Subscribers can use context data to determine how to update their records with master data. For example, when you import the data into a subscribing system, you can filter the master data by the following:

- The date and time that the data was last changed.
- Validation status, to ensure that you are only using valid data.
- Only those rows that have a certain type of data, such as price.
- Only data created by a specific user.

### Subscription view limitations

- Subscription views do not enforce MDS application security permissions. There is no row-level or member-level security on subscription views. As a result, permissions to subscription views should only be granted to those who have permissions to the MDS data.
- After you create a subscription view for an entity or hierarchy, changes to the associated model objects are not automatically reflected in the view. You will need to regenerate a subscription view in **Master Data Manager** to reflect changes to model objects. The **Changed** column on the **Export** page is updated to true when model objects change. If this value is true, you should regenerate the view.
- You cannot create a subscription view on a recursive derived hierarchy that has one or more non-recursive levels beneath the recursion.
- There is no direct correlation between the order of entity columns in an MDS model and the order of columns in the subscription view.
- Querying the MDS tables directly is not recommended because schema changes are likely in subsequent releases and if done incorrectly it can cause locking and performance issues. The supported method is to use subscription views and query the related SQL view.

### How to create an MDS Subscription View

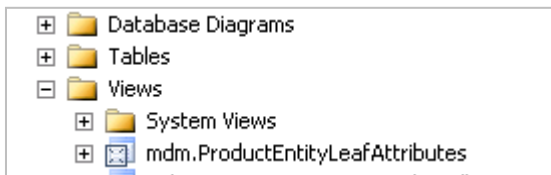
1. On the **Master Data Management** home page, select the model, and click **Integration Management**.
2. From the menu bar, click **Create Views**.
3. On the **Subscription Views** page, click the **Add subscription view** icon.



4. In the **Create Subscription** View pane, in the **Subscription view name** box, enter “ProductEntityLeafAttributes”.
5. From the Model list, select **product\_en**.
6. Click **Version option**, and click **VERSION\_1**.
7. Click **Entity**, and select **Product** from the list.
8. In the **Format** dropdown, select **Leaf members**.
9. Click **Save**.

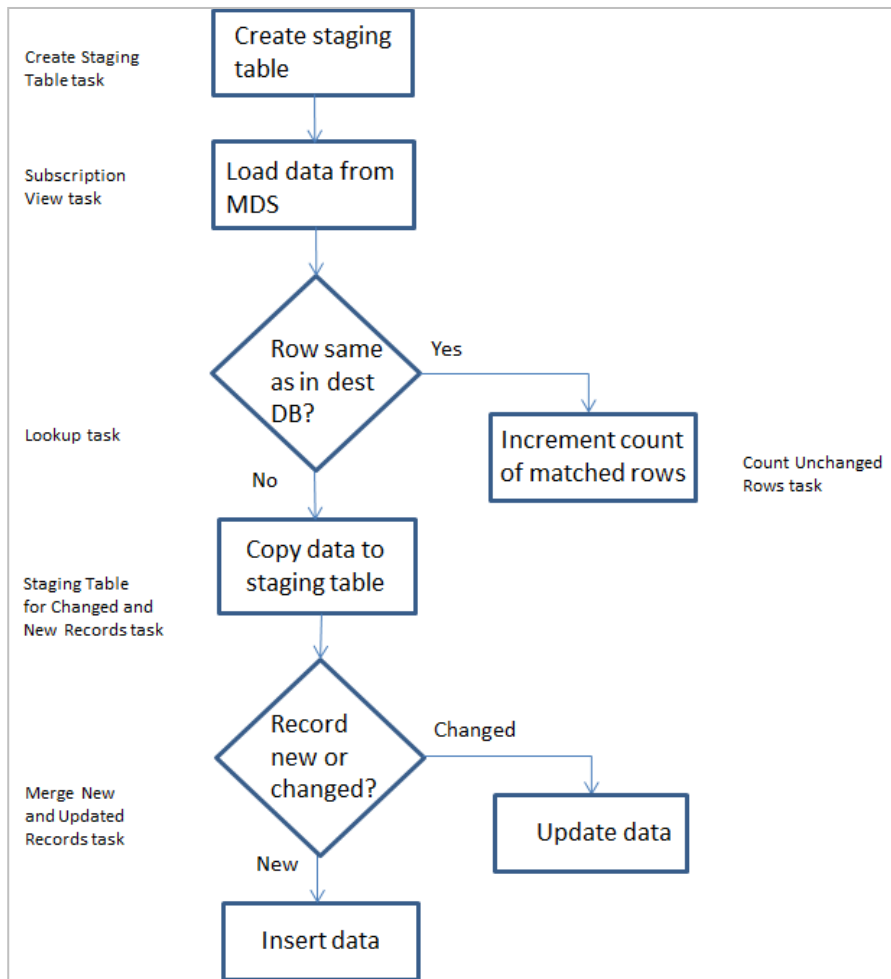
The screenshot shows the 'Create Subscription View' dialog box. The 'Subscription view name' field contains 'ProductEntityLeafAttributes'. The 'Model' dropdown is set to 'MyModel'. Under the 'Version option' section, 'VERSION\_1' is selected. Under the 'Entity' section, 'Products' is selected. Under the 'Format' section, 'Leaf members' is selected. The 'Level' dropdown is set to '1'. A note below the level dropdown reads '(level-based hierarchy views only)'.

10. Open **SQL Server Management Studio**, move to the MDS database **Views** folder, and verify that the **mdm.ProductEntityLeafAttributes** view has been created.



## Master Data Export and Import Sample

The Master Data Export and Import sample demonstrates how to import master data from a subscription view into a SQL Server database table using a SQL Server Integration Services (SSIS) package. The sample compares selected data in each row of the subscription view to the data in the destination database. The sample inserts data in a row if it is new, updates data if it has changed, and increments a counter if the data is the same. The workflow in the Master Data Export and Import sample includes creation of the subscription view and an SSIS package.



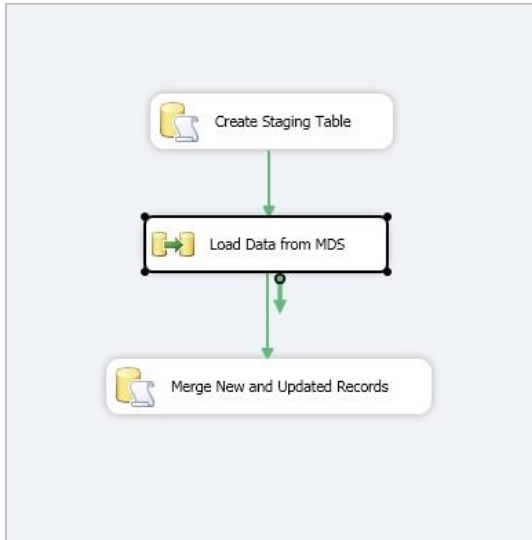
**Figure 1: Master Data Export and Import sample package flow**

The sample works as follows:

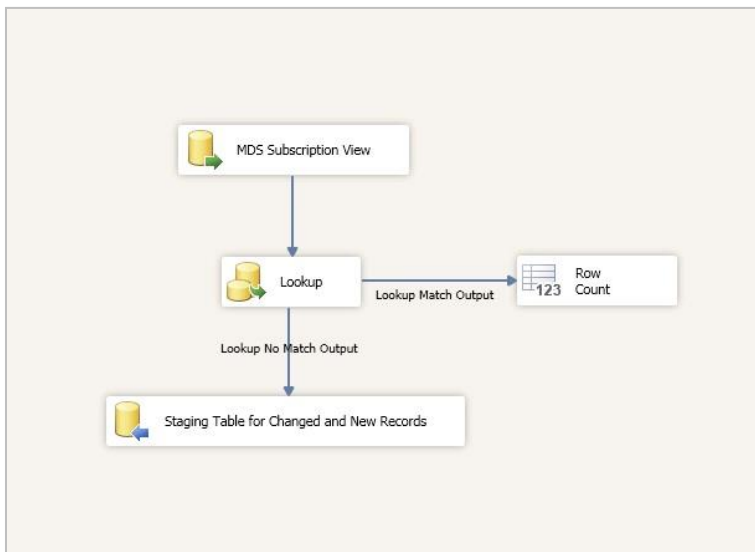
1. In the **Create Staging Table** task, the package creates an MDS\_Merge\_Records staging table to temporarily store data returned from the lookup. If the MDS\_Merge\_Records table already exists, this step drops the table.
2. In the **MDS Subscription View** task of the Load Data from MDS control flow, the package accesses the master data stored in three columns of the view, and then it passes the data to the lookup shape.
3. In the **Lookup** task, the package compares the data returned from the view with the data that already exists in the destination table. The package sends matched results to the **Count Unchanged Rows** task and unmatched results to the **Staging Table for Changed and New record** tasks.
4. In the **Count Unchanged Rows** task, the count of matched rows is incremented if a row in the staging table matches a row in the destination table.

5. In the **Staging Table for Changed and New Records** task, all records in the staging table that have changed from the data currently in the destination table, and all new records, are saved in the staging table.
6. In the **Merge New and Updated** records task, all records in the staging table that have changed are updated in the destination table and all records that are new are inserted into the destination table.

The control flow and data flow of the SSIS package are as follows.



### Export and import control flow



## Setup the Master Data Export and Import Sample

1. Install **SQL Server 2012** on a test computer with **Master Data Services** and **Integration Services** installed and the **Master Data Management** web application configured. This sample is designed to work on a single computer.
2. Deploy the **Master Data Services** sample model package product\_en.pkg. For steps about how to deploy an MDS package, see [Deploy Master Data Services Models](#).
3. Create a destination SQL Server database named “Contoso”. In that database, create a table:

```
CREATE TABLE [dbo].[Product.Price](
    [ProductName] [nvarchar](250) NULL,
    [ProductCode] [nvarchar](250) NOT NULL,
    [MSRP] [numeric](34, 4) NULL
)
```

4. In the **Contoso** database, create a staging table:

```
CREATE TABLE [dbo].[MDS_Merge_Records](
    [Name] [nvarchar](250) NULL,
    [Code] [nvarchar](250) NULL,
    [MSRP] [numeric](34, 4) NULL
)
```

## Setup a Subscription View

To setup the subscription view, see [Setup a Subscription View](#).

## Create the Import Package

1. Create a new Integration Services project:
  - a. On the **Start** menu, click **All Programs > Microsoft SQL Server 2012 > SQL Server Data Tools**.
  - b. In the Microsoft Visual Studio **Start** page, click **New Project**.
  - c. In the **Installed Templates** pane, under **Business Intelligence**, click **Integration Services**.
  - d. In the middle pane, click **Integration Services Project**.
  - e. In the **Name** text box, enter “Import Master Data”, and click **OK**.
  - f. In the **Solution Explorer** pane, name the SSIS package (Package.dtsx) ImportPackage.dtsx.
2. Create an **MDS Load Data** task:
  - a. Drag a **Data Flow** task onto the SSIS workflow design workspace.
  - b. Name the task “Load Data from MDS”.

- c. Double-click the **Load Data from MDS** task to open the **Data Flow** design workspace.
3. Create a **Source** task:
  - a. Drag a **Source Assistant** onto the design workspace.
  - b. In the **Add New Source** dialog box, select SQL Server, and double-click **New** on the data source.
  - c. In the **Connection Manager** dialog box, for **Provider** select **Microsoft OLE DB Provider for SQL Server** under Native OLE DB, and click **OK**.
  - d. For **Server** name, enter "localhost" (or ".").
  - e. Leave **Use Windows Authentication** selected.
  - f. In **Select** or **enter a database name**, select the name of your MDS database.
  - g. Click **Test Connection**, ensure a successful test, click **OK**, and click **OK** again.
  - h. Name the OLE DB Source task "MDS Subscription View".
  - i. Double-click the **MDS Subscription View** task. In the **OLE DB Source Editor** dialog box, ensure that **Table or view** is selected for **Data Access mode**.
  - j. In **Name of the table or the view**, select [mdm].[ProductEntityLeafAttributes]. Note that this is in the views section of the list.
  - k. Click **Columns**, clear **Name** at the top, and select **Name** (fifth row from the top), **Code**, and **MSRP**.
  - l. Click **OK**.
4. Create a **Lookup** task:
  - a. Drag a **Lookup** task onto the design workspace and position it under the **MDS Subscription View** task.
  - b. Select the **MDS Subscription View** task, and drag the left-pointing arrow from the **MDS Subscription View** task to the **Lookup** task.
  - c. Double-click the **Lookup** task.
  - d. In the **Lookup Transformation Editor**, select **General**, **No Cache** for the **Cache mode**, and **OLE DB connection manager** for **Connection type**.
  - e. For **Specify how to handle rows with no matching entries**, select **Redirect rows to no match output**.
  - f. Select **Connection**. In **OLE DB connection manager**, click **New**.
  - g. In the **Configure OLE DB Connection Manager** dialog box, click **New**.
  - h. In the **Connection Manager** dialog box, for **Provider** select **Microsoft OLE DB Provider for SQL Server** under Native OLE DB, and click **OK**. For Server name enter "localhost". For **Select** or **enter a database name**, select **Contoso**.
  - i. Test the connection, and if successful, click **OK** twice.
  - j. For **Use a table or a view**, select [dbo].[Product.Price].

- k. Select **Columns**. Select **Name** at the top of the rightmost **Available Lookup Columns**, and drag arrows from **Name** to **ProductName**, **Code** to **ProductCode**, and **MSRP** to **MSRP**. Leave **Lookup Operation** as <Add as new column> for all three mappings.
    - l. Click **OK**.
5. Create a **Destination** task:
  - a. Drag the **Destination Assistant** onto the design workspace.
  - b. In the **Add New Destination** dialog box, with **SQL Server** selected, double-click **New**.
  - c. In the **Connection Manager** dialog box, for **Provider** select **Microsoft OLE DB Provider for SQL Server** under **Native OLE DB**, and click **OK**.
  - d. Enter “localhost” for **Server name**.
  - e. Leave **Use Windows Authentication** selected.
  - f. With **Select or enter a database name** selected, select **Contoso**.
  - g. Click **Test Connection**, ensure a successful test and click **OK**, and click **OK** again.
  - h. Name the **OLE DB Destination** task “Staging Table for Changed and New Records”.
  - i. Select the **Lookup** task, and drag the left-pointing arrow from the **Lookup** task to **Staging Table for Changed and New Records**.
  - j. In the **Input Output Selection** dialog box, select **Lookup No Match Output** for **Output**. Click **OK**.
  - k. Double-click the **Staging Table for Changed and New Records** task. Ensure that **Data access mode** is set to **Table** or **view**. For **Name of the table or the view**, select **MDS\_Merge\_Records**.
  - l. Click **Mappings**, and verify that there are mappings from **Name** to **Name**, **Code** to **Code**, and **MSRP** to **MSRP**. Click **OK**.
6. Add a task to create the staging table:
  - a. Click **Control Flow**.
  - b. Drag an **Execute SQL** task onto the design workspace above the **Load Data** from **MDS** task.
  - c. Name the task “Create Staging Table”.
  - d. Double-click the **Create Staging Table** task. In the **Execute SQL Task Editor**, set **ConnectionType** to **OLE DB**, and for **Connection** select **Localhost.Contoso**.
  - e. Select **SQL Statement**, click the ellipsis, and enter the following.

```
IF OBJECT_ID ('[MDS_Merge_Records]') IS NOT NULL
    DROP TABLE [MDS_Merge_Records]
GO
```

```
CREATE TABLE [MDS_Merge_Records] (
    [Name] nvarchar(250),
    [Code] nvarchar(250),
    [MSRP] numeric(34,4)
)
```

- f. Click **OK**, and click **OK** again.
  - g. Drag the arrow from the **Create Staging Table** task to the **Load Data from MDS** task.
7. Add a row count function:
- a. Click **Data Flow**.
  - b. Drag **Row Count** to the right of the **Lookup** task.
  - c. Name the **Row Count** task "Count Unchanged Rows".
  - d. Select the **Lookup** task, and drag the leftmost free arrow for **Lookup Match Output** from the **Lookup** task to the **Count Unchanged Rows** task.
  - e. Click the **Add Variable** icon in the **Variables** pane. Name the variable "UnmatchedRowCount".
  - f. Double-click the **Count Unchanged Rows** task. Select the **User::UnmatchedRowCount** variable.
  - g. Click **OK**.
8. Merge records:
- a. Click **Control Flow**.
  - b. Drag an **Execute SQL** task to under the **Load Data from MDS** task.
  - c. Right-click the task, click **Rename**, and enter "Merge New and Updated Records".
  - d. Double-click the **Merge New and Updated Records** task. In **Execute SQL Task Editor**, set **ConnectionType** to **OLE DB**, and for **Connection** select **Localhost.Contoso**.
  - e. Select **SQL Statement**, click the ellipsis, and enter the following.

```
MERGE INTO [dbo].[Product.Price] AS Target
    USING [dbo].[MDS_Merge_Records] AS MDS
    ON MDS.Code = Target.ProductCode
    WHEN MATCHED THEN
        UPDATE SET Target.ProductName = MDS.NAME,
                Target.MSRP = MDS.MSRP
    WHEN NOT MATCHED THEN
```

```
INSERT (ProductName, ProductCode, MSRP) VALUES (MDS.Name, MDS.Code,
MDS.MSRP);
```

- f. Click **OK**, and click **OK** again.
- g. Select the **Load Data from MDS** task, and drag arrow from the **Load Data from MDS** task to the **Merge New and Updated Records** task.
- h. In Visual Studio, click **File** and click **Save All**.

## Test the Solution

1. With ImportPackage.dtsx displayed, press F5.
2. When the run is complete, verify that there are green checks by all tasks in ImportPackage.dtsx.
3. Click **Data Flow**, and verify that there are green checks by all those tasks. Verify that 505 rows were sent from the **MDS Subscription View** task to the **Lookup** task, and from the **Lookup** task to the **Staging Table for Changed and New Records** task.
4. Open **SQL Server Management Studio**, and connect to the Database Engine on the local server.
5. Right-click the dbo.Product.Price table in the Contoso database, and click **Select Top 1000 Rows**. Verify that 505 rows are found in the table (if you have not changed the sample model).
6. Execute the following query and verify that no records are returned:

```
SELECT * FROM [Contoso].[dbo].[Product.Price] WHERE ProductName = 'Bike Computer'
```

7. Open **Internet Explorer**, and navigate to your **Master Data Manager Web** site.
8. Select the “product\_en” sample **Model**, click **Explorer**.
9. Verify that the **Product Entity** is displayed. Click **Add Member**. In the **Details** pane, enter “Bike Computer” for Name, “BC-1112” for Code, and “79.99” for MSRP.
10. Open **SQL Server Management Studio**, move to the mdm.ProductEntityLeafAttributes view under the Views folder for your MDS database, and execute the following query and verify that a single row for the Bike Computer is displayed:

```
SELECT * FROM [MDS].[mdm].[ProductEntityLeafAttributes] WHERE Name = 'Bike
Computer'
```

11. Open ImportPackage.dtsx in Visual Studio. Stop debugging if necessary. Press **F5**.
12. When the run is complete, verify that there are green checks by all the tasks in ImportPackage.dtsx.



13. Click **Data Flow**, and verify that 506 rows were sent from the **MDS Subscription View** task to the **Lookup** task, the majority were sent to the **Count Unchanged Rows** task, and at least one row was sent from the **Lookup** task to the **Staging Table for Changed and New Records** task.
14. Open **SQL Server Management Studio**.
15. Click the dbo.Product.Price table in the Contoso database, and execute the following query:

```
SELECT * FROM [Contoso].[dbo].[Product.Price] WHERE ProductName = 'Bike Computer'
```

16. Verify that a single record for the Bike Computer is returned.

## Conclusion

In this guide, you learned how to configure, monitor and manage SQL Server 2012 Master Data Services. You also learned how to deploy a Master Data Services model and create a SQL Server Integration Services (SSIS) solution to monitor MDS.

## Resources

- [Developer's Guide](#)
- [Samples](#)

## Case Studies

- [City of Charlotte](#) (2012)
- [Vizio](#) (2012)
- [Rackspace Hosting](#) (2012)
- [Oranta Insurance](#) (2012)
- [RealtyTrac](#) (2012)
- [China Guangdong Nuclear Power Holding Corporation](#) (2012)
- [Super 8 Hotels](#) (2012)
- [Areva](#) (2012)