

# Microsoft System Center 2012 R2

## **Deploying System Center 2012 R2 Orchestrator**

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Microsoft Corporation

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### **Applies To**

System Center 2012 SP1

System Center 2012 R2 Orchestrator

### **Feedback**

Send suggestions and comments about this document to [sc2012docs@microsoft.com](mailto:sc2012docs@microsoft.com)

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## Revision History

Release Date	Changes
October 17, 2013	Original release of this guide.
November 1, 2013	Minor updates for this guide.

# Contents

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Deploying System Center 2012 - Orchestrator .....	5
Deployment Overview .....	5
Plan Your Orchestrator Deployment .....	6
System Requirements .....	7
Single-Computer Requirements for System Center 2012 - Orchestrator .....	7
Single-Computer Requirements for Orchestrator in System Center 2012 SP1 .....	9
Single-Computer Requirements for System Center 2012 R2 Orchestrator .....	10
Individual Feature Requirements .....	12
Management Server Requirements for System Center 2012 R2 Orchestrator .....	13
Runbook Server Requirements for System Center 2012 R2 Orchestrator.....	14
Orchestrator Web Service Requirements for System Center 2012 R2 Orchestrator .....	15
Runbook Designer Requirements for System Center 2012 R2 Orchestrator .....	16
Runbook Designer Requirements for Orchestrator in System Center 2012 SP1 .....	17
Orchestrator Web Service Requirements for Orchestrator in System Center 2012 SP1 .....	18
Runbook Server Requirements for Orchestrator in System Center 2012 SP1.....	19
Management Server Requirements for Orchestrator in System Center 2012 SP1 .....	20
Management Server Requirements for System Center 2012 - Orchestrator .....	21
Runbook Server Requirements for System Center 2012 - Orchestrator .....	22
Orchestrator Web Service Requirements for System Center 2012 - Orchestrator .....	23
Runbook Designer Requirements for System Center 2012 - Orchestrator .....	24
Orchestrator Security Planning.....	25
Orchestrator Service Accounts.....	25
Orchestrator Users Group .....	27
Orchestration Database Security .....	27
Runbook Security .....	32
Orchestrator Web Service and Orchestration Console Security .....	32
Using Windows Firewall with Orchestrator.....	33
Orchestrator Security Scenarios .....	34
Orchestrator Data Encryption.....	38
TCP Port Requirements.....	40
Scale Planning.....	42
Feature Performance Considerations .....	43
Evaluate System Requirements .....	44
Deployment Recommendations .....	47
Install Orchestrator .....	48
How to Install Orchestrator on a Single Computer .....	49
Install Individual Orchestrator Features .....	52
How to Install a Management Server for System Center 2012 - Orchestrator.....	52
How to Install a Runbook Server for System Center 2012 - Orchestrator .....	54

How to Install the Orchestrator Web Service .....	56
How to Install the Runbook Designer for System Center 2012 - Orchestrator .....	58
Install with the Orchestrator Command Line Install Tool .....	59
Use Sysprep to Deploy Orchestrator .....	61
Perform Post-Installation Tasks .....	64
How to Install an Integration Pack .....	64
How to Install GnuPG .....	67
Migrate Opalis Policies to Orchestrator .....	67
Policy Migration Overview .....	68
Planning your Opalis Policy Migration .....	68
Supported Opalis Policy Migration Paths .....	69
System Requirements.....	69
Modify Opalis Policies that Contain Special Characters.....	70
How to Migrate Opalis Policies to Orchestrator .....	71
Modify Migrated Orchestrator Runbooks .....	71
How to Test Migrated Runbooks .....	76
How to Configure the Orchestrator Web Service to use HTTPS.....	76
Troubleshoot Your Orchestrator Installation .....	77

# Deploying System Center 2012 - Orchestrator

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System Center 2012 - Orchestrator is a workflow management solution for the data center. It enables you to automate the creation, monitoring, and deployment of resources in your environment. This document describes System Center 2012 - Orchestrator planning and deployment.

## Deployment topics

- [Deployment Overview](#)  
Provides a brief overview of the steps to deploy Orchestrator.
- [Plan Your Orchestrator Deployment](#)  
Provides planning guidelines and best practices for your Orchestrator deployment.
- [Install Orchestrator](#)  
Provides step-by-step instructions to install Orchestrator.
- [Perform Post-Installation Tasks](#)  
Describes required and optional post-installation tasks.
- [Troubleshoot Your Orchestrator Installation](#)  
Provides guidance on common installation issues.

## Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- **Getting Started with System Center 2012 - Orchestrator Release Candidate**
- **Administering System Center 2012 - Orchestrator Release Candidate**
- **Integration Packs for System Center 2012 - Orchestrator Release Candidate**
- **Using Runbooks in System Center 2012 - Orchestrator Release Candidate**
- **Using the Orchestration Console in System Center 2012 - Orchestrator Release Candidate**
- **Runbook Activity Reference for System Center 2012 - Orchestrator Release Candidate**

## Deployment Overview

The procedures in the following sections describe how to plan your deployment and install System Center 2012 - Orchestrator.

Use the following steps to install Orchestrator.

Task	Information
Step 1: Plan your deployment.	<a href="#">Plan Your Orchestrator Deployment</a>
Step 2: Review the system prerequisites.	<a href="#">System Requirements</a>
Step 3: Install Orchestrator.	<a href="#">Install Orchestrator</a>
Step 4: Perform post-installation tasks.	<a href="#">Perform Post-Installation Tasks</a>



**Note**

This release supports only databases that are compatible with System Center 2012 - Orchestrator. You cannot use the databases from Opalis 6.3 or the System Center 2012 - Orchestrator beta version with this product.

**Other resources for this product**

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)

**Plan Your Orchestrator Deployment**

This section describes the planning required before you install System Center 2012 - Orchestrator.

**Planning Your Deployment**

- [System Requirements](#)  
Describes the hardware, operating system, and software requirements for Orchestrator.
- [Orchestrator Security Planning](#)  
Describes the service accounts and security groups for Orchestrator.
- [TCP Port Requirements](#)  
Describes the TCP port and web service requirements for Orchestrator.
- [Scale Planning](#)  
Provides scale planning for Orchestrator.

**Other resources for this product**

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Deployment Overview](#)
- [Install Orchestrator](#)
- [Perform Post-Installation Tasks](#)

- [Troubleshoot Your Orchestrator Installation](#)

## System Requirements

The following sections describe the system requirements for System Center 2012 - Orchestrator, Orchestrator in System Center 2012 Service Pack 1 (SP1), and System Center 2012 R2 Orchestrator, depending on your System Center 2012 version, your particular configuration, and choice of features to install.

### System requirements topics

- [Single-Computer Requirements for System Center 2012 R2 Orchestrator](#)  
Describes the minimum hardware and software requirements of a single computer running all Orchestrator features in System Center 2012 R2.
- [Single-Computer Requirements for Orchestrator in System Center 2012 SP1](#)  
Describes the minimum hardware and software requirements of a single computer running all Orchestrator features in System Center 2012.
- [Single-Computer Requirements for System Center 2012 - Orchestrator](#)  
Describes the minimum hardware and software requirements of a single computer running all Orchestrator features in System Center 2012 - Orchestrator.
- [Individual Feature Requirements](#)  
Describes the minimum hardware and software requirements for each Orchestrator feature.

### Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Plan Your Orchestrator Deployment](#)
- [Orchestrator Security Planning](#)
- [TCP Port Requirements](#)
- [Scale Planning](#)

### Single-Computer Requirements for System Center 2012 - Orchestrator

This section describes the minimum hardware and software configuration required for a full installation of System Center 2012 - Orchestrator on a single computer.



#### Note

Orchestrator is not supported when installed on the same computer as a domain controller.

#### Hardware

The following minimum hardware configuration is required for a full installation of Orchestrator:

- Minimum 1 gigabyte (GB) of RAM, 2 GB or more recommended

- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or better

### Operating system

The following table lists the supported operating systems for a full installation of Orchestrator on a single computer.

Feature	Operating system
Management server Orchestrator web service Runbook Designer runbook server	Windows Server 2008 R2

### Software

The following software is required for a full installation of Orchestrator on a single computer:

- Microsoft SQL Server 2008 R2 – Orchestrator requires only the basic SQL Server features found in the Database Engine Service. No additional features are required. Orchestrator supports SQL\_Latin1\_General\_CP1\_CI\_AS for collation. The installation wizard uses SQL\_Latin1\_General\_CP1\_CI\_AS as the default collation to create the orchestration database.



#### Note

Management servers and runbook servers installed on the same computer must use the same database. The management server must run as a 32-bit application.

- Microsoft Internet Information Services (IIS) – Orchestrator Setup enables IIS if it is not enabled.
- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.
- Microsoft .NET Framework 4

We recommend the following software for a full installation of Orchestrator on a single computer:

- Join the computer to an Active Directory domain.



#### Note

On first use of the Orchestration console, you are prompted to install Microsoft Silverlight 4 on the computer if it is not already installed.

### Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Plan Your Orchestrator Deployment](#)
- [System Requirements](#)



- [Individual Feature Requirements](#)

## Single-Computer Requirements for Orchestrator in System Center 2012 SP1

This section describes the minimum hardware and software configuration required for a full installation of System Center 2012 - Orchestrator on a single computer.



### Note

Orchestrator is not supported when installed on the same computer as a domain controller.

### Hardware

The following minimum hardware configuration is required for a full installation of Orchestrator:

- Minimum 1 gigabyte (GB) of RAM, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or better

### Operating system

The following table lists the supported operating systems for a full installation of Orchestrator on a single computer.

Feature	Operating system
management server Orchestrator web service Runbook Designer runbook server	Windows Server 2008 R2, Windows Server 2012

### Software

The following software is required for a full installation of Orchestrator on a single computer:

- Microsoft SQL Server 2008 R2 or Microsoft SQL Server 2012– Orchestrator requires only the basic SQL Server features found in the Database Engine Service. No additional features are required. Orchestrator supports SQL\_Latin1\_General\_CP1\_CI\_AS for collation. The installation wizard uses SQL\_Latin1\_General\_CP1\_CI\_AS as the default collation to create the orchestration database.



### Note

Management servers and runbook servers installed on the same computer must use the same database. The management server must run as a 32-bit application.

- Microsoft Internet Information Services (IIS) – Orchestrator Setup enables IIS if it is not enabled.

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.
- Microsoft .NET Framework 4.5 (which further requires HTTP Activation)
- WCF HTTP Activation)

▶ **To install .NET Framework 4.5 and HTTP Activation on Windows Server 2012**

1. On the Windows **Start** screen, click the **Server Manager** tile.
2. On the **Manage** menu in the Server Manager console, click **Add Roles and Features**.
3. Go through the wizard until you reach the **Features** page.
4. Expand **.NET Framework 4.5 Features**.
5. Select **.NET Framework 4.5** if it isn't already selected.
6. Expand **WCF Services**.
7. Select **HTTP Activation** if it isn't already selected.
8. Click **Next** and follow the prompts to finish the installation. If you have problems, check the issues covered in [Troubleshoot Your Orchestrator Installation](#).

We recommend the following software for a full installation of Orchestrator on a single computer:

- Join the computer to an Active Directory domain.



**Note**

On first use of the Orchestration console, you are prompted to install Microsoft Silverlight 4 on the computer if it is not already installed.

**Other resources for this product**

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Plan Your Orchestrator Deployment](#)
- [System Requirements](#)
- [Individual Feature Requirements](#)

**Single-Computer Requirements for System Center 2012 R2 Orchestrator**

This section describes the minimum hardware and software configuration required for a full installation of System Center 2012 R2 Orchestrator on a single computer.



**Note**

Orchestrator is not supported when installed on the same computer as a domain controller.

**Hardware**

The following minimum hardware configuration is required for a full installation of Orchestrator:

- Minimum 1 gigabyte (GB) of RAM, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space

- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or better

### Operating system

The following table lists the supported operating systems for a full installation of Orchestrator on a single computer.

Feature	Operating system
Management server	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2
Orchestrator web service	
Runbook Designer	
Runbook server	

### Software

The following software is required for a full installation of Orchestrator on a single computer:

- Microsoft SQL Server 2008 R2 or Microsoft SQL Server 2012– Orchestrator requires only the basic SQL Server features found in the Database Engine Service. No additional features are required. Orchestrator supports SQL\_Latin1\_General\_CP1\_CI\_AS for collation. The installation wizard uses SQL\_Latin1\_General\_CP1\_CI\_AS as the default collation to create the orchestration database.



#### Note

- Management servers and runbook servers installed on the same computer must use the same database. The management server must run as a 32-bit application.
- Microsoft Internet Information Services (IIS) – Orchestrator Setup enables IIS if it is not enabled.
- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.
- Microsoft .NET Framework 4.5 (which further requires WCF HTTP Activation)

### ▶ To install .NET Framework 4.5 and HTTP Activation on Windows Server 2012

1. On the Windows **Start** screen, click the **Server Manager** tile.
2. On the **Manage** menu in the Server Manager console, click **Add Roles and Features**.
3. Go through the wizard until you reach the **Features** page.
4. Expand **.NET Framework 4.5 Features**.
5. Select **.NET Framework 4.5** if it isn't already selected.
6. Expand **WCF Services**.
7. Select **HTTP Activation** if it isn't already selected.
8. Click **Next** and follow the prompts to finish the installation. If you have problems, check the issues covered in [Troubleshoot Your Orchestrator Installation](#).

We recommend the following software for a full installation of Orchestrator on a single computer:

- Join the computer to an Active Directory domain.

**Note**

On first use of the Orchestration console, you are prompted to install Microsoft Silverlight 4 on the computer if it is not already installed.

**Running Orchestrator on Windows Azure virtual machines**

System Center 2012 R2 Orchestrator runs on Windows Azure just as it does on physical computer systems.

Orchestrator was tested by Microsoft by installing and using it in a Windows Azure virtual machine. The testing concluded that Orchestrator was fully functional and operated exactly the same as it does on physical hardware. Stability and performance benchmarks inside a Windows Azure virtual machine were at a level where no special considerations were needed. Orchestrator does not require a domain controller to be deployed with it, and the virtual machine requirements do not differ from what is recommended for the product that is deployed in an on-premises virtual machine.

**Other resources for this product**

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Plan Your Orchestrator Deployment](#)
- [System Requirements](#)
- [Individual Feature Requirements](#)

**Individual Feature Requirements**

This section describes the minimum hardware and software configuration required to install individual features in System Center 2012 - Orchestrator, Orchestrator in System Center 2012 Service Pack 1 (SP1), or System Center 2012 R2 Orchestrator depending on your version of System Center 2012.

**Individual Feature Requirements for System Center 2012 R2 Orchestrator**

- [Management Server Requirements for System Center 2012 R2 Orchestrator](#)
- [Runbook Server Requirements for System Center 2012 R2 Orchestrator](#)
- [Orchestrator Web Service Requirements for System Center 2012 R2 Orchestrator](#)
- [Runbook Designer Requirements for System Center 2012 R2 Orchestrator](#)

**Individual Feature Requirements for Orchestrator in System Center 2012 SP1**

- [Management Server Requirements for Orchestrator in System Center 2012 SP1](#)
- [Runbook Server Requirements for Orchestrator in System Center 2012 SP1](#)
- [Orchestrator Web Service Requirements for Orchestrator in System Center 2012 SP1](#)
- [Runbook Designer Requirements for Orchestrator in System Center 2012 SP1](#)

### Individual Feature Requirements for System Center 2012 - Orchestrator

- [Management Server Requirements for System Center 2012 - Orchestrator](#)
- [Runbook Server Requirements for System Center 2012 - Orchestrator](#)
- [Orchestrator Web Service Requirements for System Center 2012 - Orchestrator](#)
- [Runbook Designer Requirements for System Center 2012 - Orchestrator](#)

### Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Plan Your Orchestrator Deployment](#)
- [Single-Computer Requirements for Orchestrator in System Center 2012 SP1](#)

### Management Server Requirements for System Center 2012 R2 Orchestrator

#### Important

These system requirements are for System Center 2012 R2 Orchestrator. To see the system requirements for Orchestrator in System Center 2012 Service Pack 1 (SP1), see [Management Server Requirements for Orchestrator in System Center 2012 SP1](#). To see the system requirements for System Center 2012 - Orchestrator, see [Management Server Requirements for System Center 2012 - Orchestrator](#).

This topic describes the hardware and software requirements for installation of the System Center 2012 - Orchestrator management server.

#### Hardware

The following minimum hardware configuration is required for the Orchestrator management server:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or better

#### Operating system

The following table lists the supported operating systems for the Orchestrator management server.

Feature	Operating system
Management server	Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2

#### Software

The following software must be deployed and available to install the Orchestrator management server:

- Microsoft SQL Server 2008 R2 or Microsoft SQL Server 2012- Orchestrator requires only the basic SQL Server features found in the Database Engine Service. No additional features are required. The instance of SQL Server can either be installed locally on the management server or on a separate dedicated database server. Orchestrator supports SQL\_Latin1\_General\_CP1\_CI\_AS for collation. The installation wizard uses SQL\_Latin1\_General\_CP1\_CI\_AS as the default collation to create the orchestration database.

 **Note**

Management servers and runbook servers installed on the same computer must use the same database. The management server must run as a 32-bit application.

The targeted computer requires the following software to install the Orchestrator management server:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

**See Also**

[Individual Feature Requirements](#)

**Runbook Server Requirements for System Center 2012 R2 Orchestrator**

 **Important**

These system requirements are for System Center 2012 R2 Orchestrator. To see the system requirements for Orchestrator in System Center 2012 Service Pack 1 (SP1), see [Management Server Requirements for Orchestrator in System Center 2012 SP1](#). To see the system requirements for System Center 2012 - Orchestrator, see [Management Server Requirements for System Center 2012 - Orchestrator](#).

This topic describes the hardware and software requirements for installation of the Orchestrator runbook server.

**Hardware**

The following minimum hardware configuration is required for an Orchestrator runbook server:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigabyte (GHz) or faster

**Operating system**

The following table lists the supported operating systems for an Orchestrator runbook server.

Feature	Operating system
runbook server	Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2

## Software

The following software must be deployed and available to install the Orchestrator runbook server:

- A functional Orchestrator management server and database.

The targeted computer requires the following software to install the Orchestrator runbook server:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

## See Also

[Install Individual Orchestrator Features](#)

## Orchestrator Web Service Requirements for System Center 2012 R2 Orchestrator

### Important

These system requirements are for System Center 2012 R2 Orchestrator. To see the system requirements for Orchestrator in System Center 2012 Service Pack 1 (SP1), see [Management Server Requirements for Orchestrator in System Center 2012 SP1](#). To see the system requirements for System Center 2012 - Orchestrator, see [Management Server Requirements for System Center 2012 - Orchestrator](#).

This topic describes the hardware and software requirements for an installation of the Orchestrator web service.

## Hardware

The following minimum hardware configuration is required for the Orchestrator web service:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or faster

## Operating system

The following table lists the supported operating systems for the Orchestrator web service.

Feature	Operating system
Orchestrator web service	Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2

## Software

The following must be deployed and available to successfully install the Orchestrator web service:

- A functional Orchestrator management server and database.

The targeted computer requires the following software to install the Orchestrator web service:

- Internet Information Services (IIS) 7.0 and enabled IIS role – Orchestrator Setup enables the IIS role if it is not already enabled.

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.
- Microsoft .NET Framework 4.5 (which further requires HTTP Activation)
- WCF HTTP Activation)

▶ **To install .NET Framework 4.5 and HTTP Activation on Windows Server 2012**

1. On the Windows **Start** screen, click the **Server Manager** tile.
2. On the **Manage** menu in the Server Manager console, click **Add Roles and Features**.
3. Go through the wizard until you reach the **Features** page.
4. Expand **.NET Framework 4.5 Features**.
5. Select **.NET Framework 4.5** if it isn't already selected.
6. Expand **WCF Services**.
7. Select **HTTP Activation** if it isn't already selected.
8. Click **Next** and follow the prompts to finish the installation. If you have problems, check the issues covered in [Troubleshoot Your Orchestrator Installation](#).



**Note**

Microsoft Silverlight 4 is not required for the Orchestrator web service installation. It is required for any computer that runs the Orchestration console.

**See Also**

[Install Individual Orchestrator Features](#)

**Runbook Designer Requirements for System Center 2012 R2 Orchestrator**



**Important**

These system requirements are for System Center 2012 R2 Orchestrator. To see the system requirements for Orchestrator in System Center 2012 Service Pack 1 (SP1), see [Management Server Requirements for Orchestrator in System Center 2012 SP1](#). To see the system requirements for System Center 2012 - Orchestrator, see [Management Server Requirements for System Center 2012 - Orchestrator](#).

This topic describes the hardware and software requirements for an installation of the Orchestrator Runbook Designer.

**Hardware**

The following minimum hardware configuration is required for the Orchestrator Runbook Designer:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigabyte (GHz) or faster

**Operating system**

The following table lists the supported operating systems for the Orchestrator Runbook Designer.



Feature	Operating system
Runbook Designer	Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Windows 7, 32-bit or 64-bit

### Software

The following software must be deployed and available to successfully install the Orchestrator Runbook Designer:

- A functional Orchestrator management server and database.

The targeted computer requires the following software to install the Orchestrator Runbook Designer:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

### See Also

[Install Individual Orchestrator Features](#)

### Runbook Designer Requirements for Orchestrator in System Center 2012 SP1

#### Important

These system requirements are for Orchestrator in System Center 2012 Service Pack 1 (SP1). To see the system requirements for System Center 2012 R2 Orchestrator, see [Runbook Designer Requirements for System Center 2012 R2 Orchestrator](#). To see the system requirements for System Center 2012 - Orchestrator, see [Runbook Designer Requirements for System Center 2012 - Orchestrator](#).

This topic describes the hardware and software requirements for an installation of the System Center 2012 - Orchestrator Runbook Designer.

### Hardware

The following minimum hardware configuration is required for the Orchestrator Runbook Designer:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigabyte (GHz) or better

### Operating system

The following table lists the supported operating systems for the Orchestrator Runbook Designer.

Feature	Operating system
Runbook Designer	Windows Server 2008 R2

Feature	Operating system
	Windows Server 2012
	Windows 7, 32-bit or 64-bit

### Software

The following software must be deployed and available to successfully install the Orchestrator Runbook Designer:

- A functional Orchestrator management server and database.

The targeted computer requires the following software to install the Orchestrator Runbook Designer:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

### See Also

[Install Individual Orchestrator Features](#)

## Orchestrator Web Service Requirements for Orchestrator in System Center 2012 SP1

### Important

These system requirements are for Orchestrator in System Center 2012 Service Pack 1 (SP1). To see the system requirements for System Center 2012 R2 Orchestrator, see [Orchestrator Web Service Requirements for System Center 2012 R2 Orchestrator](#). To see the system requirements for System Center 2012 - Orchestrator, see [Orchestrator Web Service Requirements for System Center 2012 - Orchestrator](#).

This topic describes the hardware and software requirements for an installation of the Orchestrator web service.

### Hardware

The following minimum hardware configuration is required for the Orchestrator web service:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or better

### Operating system

The following table lists the supported operating systems for the Orchestrator web service.

Feature	Operating system
Orchestrator web service	Windows Server 2008 R2
	Windows Server 2012

### Software

The following must be deployed and available to successfully install the Orchestrator web service:

- A functional Orchestrator management server and database.

The targeted computer requires the following software to install the Orchestrator web service:

- Internet Information Services (IIS) 7.0 and enabled IIS role – Orchestrator Setup enables the IIS role if it is not already enabled.
- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.
- Microsoft .NET Framework 4.5 (which further requires HTTP Activation)
- WCF HTTP Activation)

### ▶ To install .NET Framework 4.5 and HTTP Activation on Windows Server 2012

1. On the Windows **Start** screen, click the **Server Manager** tile.
2. On the **Manage** menu in the Server Manager console, click **Add Roles and Features**.
3. Go through the wizard until you reach the **Features** page.
4. Expand **.NET Framework 4.5 Features**.
5. Select **.NET Framework 4.5** if it isn't already selected.
6. Expand **WCF Services**.
7. Select **HTTP Activation** if it isn't already selected.
8. Click **Next** and follow the prompts to finish the installation. If you have problems, check the issues covered in [Troubleshoot Your Orchestrator Installation](#).



#### **Note**

Microsoft Silverlight 4 is not required for the Orchestrator web service installation. It is required for any computer that runs the Orchestration console.

#### **See Also**

[Install Individual Orchestrator Features](#)

### **Runbook Server Requirements for Orchestrator in System Center 2012 SP1**



#### **Important**

These system requirements are for Orchestrator in System Center 2012 Service Pack 1 (SP1). To see the system requirements for System Center 2012 R2 Orchestrator, see [Runbook Server Requirements for System Center 2012 R2 Orchestrator](#). To see the system requirements for System Center 2012 - Orchestrator, see [Runbook Server Requirements for System Center 2012 - Orchestrator](#).

This topic describes the hardware and software requirements for installation of the System Center 2012 - Orchestrator runbook server.

#### **Hardware**

The following minimum hardware configuration is required for an Orchestrator runbook server:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space

- Dual-core Intel microprocessor, 2.1 gigabyte (GHz) or better

### Operating system

The following table lists the supported operating systems for an Orchestrator runbook server.

Feature	Operating system
runbook server	Windows Server 2008 R2 Windows Server 2012

### Software

The following software must be deployed and available to install the Orchestrator runbook server:

- A functional Orchestrator management server and database.

The targeted computer requires the following software to install the Orchestrator runbook server:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

### See Also

[Install Individual Orchestrator Features](#)

## Management Server Requirements for Orchestrator in System Center 2012 SP1

### Important

These system requirements are for Orchestrator in System Center 2012 Service Pack 1 (SP1). To see the system requirements for System Center 2012 R2 Orchestrator, see [Management Server Requirements for System Center 2012 R2 Orchestrator](#). To see the system requirements for System Center 2012 - Orchestrator, see [Management Server Requirements for System Center 2012 - Orchestrator](#).

This topic describes the hardware and software requirements for installation of the System Center 2012 - Orchestrator management server.

### Hardware

The following minimum hardware configuration is required for the Orchestrator management server:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or better

### Operating system

The following table lists the supported operating systems for the Orchestrator management server.

Feature	Operating system
Management server	Windows Server 2008 R2

Feature	Operating system
	Windows Server 2012

## Software

The following software must be deployed and available to install the Orchestrator management server:

- Microsoft SQL Server 2008 R2 or Microsoft SQL Server 2012- Orchestrator requires only the basic SQL Server features found in the Database Engine Service. No additional features are required. The instance of SQL Server can either be installed locally on the management server or on a separate dedicated database server. Orchestrator supports SQL\_Latin1\_General\_CP1\_CI\_AS for collation. The installation wizard uses SQL\_Latin1\_General\_CP1\_CI\_AS as the default collation to create the orchestration database.



### Note

Management servers and runbook servers installed on the same computer must use the same database. The management server must run as a 32-bit application.

The targeted computer requires the following software to install the Orchestrator management server:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

## See Also

[Individual Feature Requirements](#)

## Management Server Requirements for System Center 2012 - Orchestrator



### Important

These system requirements are for System Center 2012 - Orchestrator. To see the system requirements for System Center 2012 R2 Orchestrator, see [Management Server Requirements for System Center 2012 R2 Orchestrator](#). To see the system requirements for Orchestrator in System Center 2012 Service Pack 1 (SP1), see [Management Server Requirements for Orchestrator in System Center 2012 SP1](#).

This topic describes the hardware and software requirements for installation of the System Center 2012 - Orchestrator management server.

## Hardware

The following minimum hardware configuration is required for the Orchestrator management server:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or better

## Operating system

The following table lists the supported operating systems for the Orchestrator management server.

Feature	Operating system
Management server	Windows Server 2008 R2

## Software

The following software must be deployed and available to install the Orchestrator management server:

- Microsoft SQL Server 2008 R2 - Orchestrator requires only the basic SQL Server features found in the Database Engine Service. No additional features are required. The instance of SQL Server can either be installed locally on the management server or on a separate dedicated database server. Orchestrator supports SQL\_Latin1\_General\_CP1\_CI\_AS for collation. The installation wizard uses SQL\_Latin1\_General\_CP1\_CI\_AS as the default collation to create the orchestration database.



### Note

Management servers and runbook servers installed on the same computer must use the same database. The management server must run as a 32-bit application.

The targeted computer requires the following software to install the Orchestrator management server:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

## See Also

[Individual Feature Requirements](#)

## Runbook Server Requirements for System Center 2012 - Orchestrator



### Important

These system requirements are for System Center 2012 - Orchestrator. To see the system requirements for System Center 2012 R2 Orchestrator, see [Runbook Server Requirements for System Center 2012 R2 Orchestrator](#). To see the system requirements for Orchestrator in System Center 2012 Service Pack 1 (SP1), see [Runbook Server Requirements for Orchestrator in System Center 2012 SP1](#).

This topic describes the hardware and software requirements for installation of the System Center 2012 - Orchestrator runbook server.

## Hardware

The following minimum hardware configuration is required for an Orchestrator runbook server:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigabyte (GHz) or better

## Operating system

The following table lists the supported operating systems for an Orchestrator runbook server.

Feature	Operating system
runbook server	Windows Server 2008 R2

## Software

The following software must be deployed and available to install the Orchestrator runbook server:

- A functional Orchestrator management server and database.

The targeted computer requires the following software to install the Orchestrator runbook server:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

## See Also

[Install Individual Orchestrator Features](#)

## Orchestrator Web Service Requirements for System Center 2012 - Orchestrator

### Important

These system requirements are for System Center 2012 - Orchestrator. To see the system requirements for System Center 2012 R2 Orchestrator, see [Orchestrator Web Service Requirements for System Center 2012 R2 Orchestrator](#). To see the system requirements for Orchestrator in System Center 2012 Service Pack 1 (SP1), see [Orchestrator Web Service Requirements for Orchestrator in System Center 2012 SP1](#).

This topic describes the hardware and software requirements for an installation of the Orchestrator web service.

## Hardware

The following minimum hardware configuration is required for the Orchestrator web service:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigahertz (GHz) or better

## Operating system

The following table lists the supported operating systems for the Orchestrator web service.

Feature	Operating system
Orchestrator web service	Windows Server 2008 R2

## Software

The following must be deployed and available to successfully install the Orchestrator web service:

- A functional Orchestrator management server and database.

The targeted computer requires the following software to install the Orchestrator web service:

- Internet Information Services (IIS) 7.0 and enabled IIS role – Orchestrator Setup enables the IIS role if it is not already enabled.
- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.
- Microsoft .NET Framework 4



**Note**

Microsoft Silverlight 4 is not required for the Orchestrator web service installation. It is required for any computer that runs the Orchestration console.

**See Also**

[Install Individual Orchestrator Features](#)

**Runbook Designer Requirements for System Center 2012 - Orchestrator**



**Important**

These system requirements are for System Center 2012 - Orchestrator. To see the system requirements for System Center 2012 R2 Orchestrator, see [Runbook Designer Requirements for System Center 2012 R2 Orchestrator](#). To see the system requirements for Orchestrator in System Center 2012 Service Pack 1 (SP1), see [Runbook Designer Requirements for Orchestrator in System Center 2012 SP1](#).

This topic describes the hardware and software requirements for an installation of the System Center 2012 - Orchestrator Runbook Designer.

**Hardware**

The following minimum hardware configuration is required for the Orchestrator Runbook Designer:

- 1 gigabyte (GB) of RAM minimum, 2 GB or more recommended
- 200 megabyte (MB) of available hard disk space
- Dual-core Intel microprocessor, 2.1 gigabyte (GHz) or better

**Operating system**

The following table lists the supported operating systems for the Orchestrator Runbook Designer.

Feature	Operating system
Runbook Designer	Windows Server 2008 R2 Windows 7, 32-bit or 64-bit

**Software**

The following software must be deployed and available to successfully install the Orchestrator Runbook Designer:

- A functional Orchestrator management server and database.



The targeted computer requires the following software to install the Orchestrator Runbook Designer:

- Microsoft .NET Framework 3.5 Service Pack 1 - Orchestrator Setup installs and enables .NET Framework 3.5 SP1 if it is not installed and enabled.

**See Also**

[Install Individual Orchestrator Features](#)

## Orchestrator Security Planning

This topic describes the service account and user account requirements, as well as security considerations for your System Center 2012 - Orchestrator deployment. You should review this topic, create the required accounts and groups, and determine if you have any additional security requirements before starting the Orchestrator installation.

The following topics are discussed:

- [Orchestrator Service Accounts](#)
- [Orchestrator Users Group](#)
- [Orchestration Database Security](#)
- [Runbook Security](#)
- [Orchestrator Web Service and Orchestration Console Security](#)
- [Using Windows Firewall with Orchestrator](#)
- [Orchestrator Security Scenarios](#)
- [Orchestrator Data Encryption](#)

## Orchestrator Service Accounts

Service accounts are required for the services listed in the following table. You must create these accounts before installing the features that use them. Details for about each account are provided below.

Server	Service
Management server	Orchestrator Management Service Orchestrator Runbook Server Monitor service
Runbook server	Orchestrator Runbook Service

### Orchestrator Management Service account

The Orchestrator Management Service is installed on the management server. Its service account is specified during the installation of Orchestrator. If you installed the management server and the runbook server on the same computer at the same time, this is the same account used by the Management Server Service and Runbook Server Service on each computer to access system resources. If you installed the runbook server after you already installed the management

server, or if you installed the runbook server on a different computer, you can use different accounts.

The Orchestrator Management Service is responsible for maintaining the orchestration database, communicating with the Runbook Designers, and communicating with the Deployment Manager.

The account used for the Orchestrator Management Service can be a local account on the management server if the database is installed locally or if you are using SQL Server authentication to communicate with the database (although this is not recommended). However, this configuration might not allow access to other network resources. If the database is located on another server, either the account must be joined to the Active Directory domain so it can access the database server, or you must use SQL Server authentication. Use the latter option if your database server is in a different domain than the management server.

This service account does not have to be an Administrator or a domain Administrator account.

Note, however, that the Deployment Manager requires administrator privileges.

The service account for the Management Server Service must have the following permissions:

- Permission to log on to the management server as a service. This permission is automatically granted during the installation process.
- Member of the Microsoft.SystemCenter.Orchestrator.Admins role in the orchestration database. The account is automatically added to this role during the installation process.

#### **Orchestrator Runbook Server Monitor service account**

The Runbook Server Monitor is installed on the management server and is responsible for monitoring the health of runbook servers. It uses the same account as the Orchestrator Management Service and requires the same permissions.

#### **Orchestrator Runbook Service account**

The Runbook Server Service is installed on each runbook server. If you installed the management server and the runbook server on the same computer at the same time, this is the same account used by the Management Server Service and Runbook Server Service on each computer to access system resources. If you installed the runbook server after you already installed the management server, or if you installed the runbook server on a different computer, you can use different accounts. The service is responsible for running runbooks and for communicating with the orchestration database.

By default, all activities in a runbook run under the service account of the runbook server on which they are running. Some activities can specify different credentials to be used for individual actions as required. Because runbook activities often access resources on other computers, it is recommended that the account used for the Orchestrator Runbook Service be an Active Directory domain account so that it can be granted access to these external resources.

The account for the Orchestrator Runbook Service must have the following permissions:

- Permission to log on to the runbook server as a service.
- Depending on the resources that the activities in your runbooks access, the service account might require additional credentials on remote computers. Specific activities can also be

configured with alternate credentials if the service account does not have access to particular resources.

## Orchestrator Users Group

Users gain access to Orchestrator through membership in the Orchestrator Users group. Any user account added to this group is granted permission to use the Runbook Designer and Deployment Manager tools. By default, users in this group have the authority to perform the following actions:

- Create new runbooks. View, change, and run existing runbooks.
- Deploy new runbook servers
- Deploy new Runbook Designers
- Register and deploy integration packs
- View and change global settings for a management server

The Orchestrator Users group has the following permissions in the management server DCOM component:

- Local & Remote Launch
- Local & Remote Activation
- Local & Remote Access

If you enable remote access for the user group (by selecting **Remote Permissions** during installation), the user group is added to the machine limits – Local and Remote launch, activation and access.

You specify the Orchestrator Users group during the Orchestrator installation process. Because the Orchestrator web service uses the same group for authorization, you must use a domain group in Active Directory if the Orchestration console is not installed on the management server. If the Orchestration console is installed on the management server, the group can be a local group on the management server.

The decision of which to use depends on where you want to manage the group's users. Typically using an Active Directory group provides better centralized access to the group as opposed to managing it locally on the management server.



### Note

A member of the Orchestrator Users group can grant access to other users to view and run runbooks from the Orchestration console without having to add those users to the group. Those who only use the Orchestration console are referred to as operators. They typically require the ability to run runbooks, but not to create them. For information about setting permissions for individual runbooks, see **Runbook Permissions in Using Runbooks in System Center 2012 - Orchestrator**.

## Orchestration Database Security

The following sections provide information about securing the orchestration database in Orchestrator:

- [Database roles](#)
- [Securing SQL server connections](#)
- [Encryption keys](#)

### Database roles

Security to the orchestration database is implemented through database roles in the supported versions of Microsoft SQL Server. The table below lists the roles that are created in the orchestration database and the permissions granted to each. These roles are configured and populated with the required members during the installation process, so there is typically no requirement to work directly with them. The information provided here is to help the administrator better understand the security behind the configuration and prepare for possible custom scenarios.

Account	Database role
Management Service Account	Microsoft.SystemCenter.Orchestrator.Admins
Member of Orchestrator Admins Group	Microsoft.SystemCenter.Orchestrator.Admins
Orchestrator Runbook Service Account	Microsoft.SystemCenter.Orchestrator.Runtime
Orchestrator Runbook Server Monitor Service Account	Microsoft.SystemCenter.Orchestrator.Runtime
Orchestrator Web Service User Account	Microsoft.SystemCenter.Orchestrator.Operators

Role	Permission	Object
Microsoft.SystemCenter.Orchestrator.Operators	SELECT	[Microsoft.SystemCenter.Orchestrator.Runtime].[Jobs], [Microsoft.SystemCenter.Orchestrator.Runtime].[RunbookInstances], [Microsoft.SystemCenter.Orchestrator.Runtime].[RunbookInstanceParameters], [Microsoft.SystemCenter.Orchestrator.Runtime].[RunbookServers], [Microsoft.SystemCenter.Orchestrator.Runtime].[ActivityInstances], [Microsoft.SystemCenter.Orchestrator.Runtime].[ActivityInstanceData], [Microsoft.SystemCenter.Orchestrator.Runtime].[Events], [Microsoft.SystemCenter.Orchestrator.Statistics].[Statistics]
Microsoft.SystemC	EXECUTE	[Microsoft.SystemCenter.Orchestrator].[GetSecurityToken],

Role	Permission	Object
enter. Orchestrator.Operators		[Microsoft.SystemCenter.Orchestrator].[AccessCheck], [Microsoft.SystemCenter.Orchestrator].[ComputeAuthorizationCache], [Microsoft.SystemCenter.Orchestrator.Statistics.Internal].[GetStatisticsSummary], [Microsoft.SystemCenter.Orchestrator.Runtime].[CreateJob], [Microsoft.SystemCenter.Orchestrator.Runtime].[CancelJob]
Microsoft.SystemCenter. Orchestrator.Runtime	SELECT	All tables, dbo.[POLICIES_VIEW], dbo.[POLICY_REQUEST_HISTORY]
Microsoft.SystemCenter. Orchestrator.Runtime	INSERT	dbo.[OBJECT_AUDIT]
Microsoft.SystemCenter. Orchestrator.Runtime	INSERT, UPDATE	dbo.[OBJECTS], dbo.[ACTIONSERVERS], dbo.[POLICYINSTANCES], dbo.[OBJECTINSTANCES], dbo.[OBJECTINSTANCEDATA]
Microsoft.SystemCenter. Orchestrator.Runtime	INSERT, DELETE	dbo.[COUNTERINSTANCES], dbo.[POLICYRETURNDATA]
Microsoft.SystemCenter. Orchestrator.Runtime	UPDATE	dbo.[POLICY_PUBLISH_QUEUE]
Microsoft.SystemCenter. Orchestrator.Runtime	CONTROL	[ORCHESTRATOR_ASYM_KEY], [ORCHESTRATOR_SYM_KEY]
Microsoft.SystemCenter. Orchestrator.Runtime	EXECUTE	dbo.sp_insertevent, dbo.sp_PublishPolicy, dbo.sp_UnpublishPolicy, dbo.sp_UnpublishPolicyRequest,

Role	Permission	Object
		dbo.fn_GetPolicyInstanceStatus, dbo.fn_NumFailedInstancesPerServer, dbo.fn_NumInstancesPerServer, dbo.fn_NumRunningInstancesPerServer, [Microsoft.SystemCenter.Orchestrator.Cryptography].[Encrypt] , [Microsoft.SystemCenter.Orchestrator.Cryptography].[Decrypt] , [Microsoft.SystemCenter.Orchestrator.Internal].[RethrowError]
Microsoft.SystemCenter.Orchestrator.Admins	SELECT, INSERT, UPDATE, DELETE, ALTER, CREATE TABLE	SCHEMA::dbo
Microsoft.SystemCenter.Orchestrator.Admins	REFERENCES	dbo.[OBJECTS]
Microsoft.SystemCenter.Orchestrator.Admins	SELECT	dbo.[POLICIES_VIEW], GRANT SELECT ON dbo.[POLICY_REQUEST_HISTORY]
Microsoft.SystemCenter.Orchestrator.Admins	CONTROL	[ORCHESTRATOR_ASYM_KEY], [ORCHESTRATOR_SYM_KEY]
Microsoft.SystemCenter.Orchestrator.Admins	EXECUTE	[Microsoft.SystemCenter.Orchestrator.Cryptography].[CreateOrchestratorKeys], [Microsoft.SystemCenter.Orchestrator.Cryptography].[DropOrchestratorKeys], [Microsoft.SystemCenter.Orchestrator.Cryptography].[Encrypt] , [Microsoft.SystemCenter.Orchestrator.Cryptography].[Decrypt] , [Microsoft.SystemCenter.Orchestrator.Internal].[RethrowError],

Role	Permission	Object
		dbo.sp_CustomLogCleanup, dbo.sp_GetLogEntriesForDelete_FilterByDays, dbo.sp_GetLogEntriesForDelete_FilterByEntries, dbo.sp_GetLogEntriesForDelete_FilterByEntriesAndDays, dbo.sp_insertevent, dbo.sp_PublishPolicy, dbo.sp_UnpublishPolicy, dbo.sp_UnpublishPolicyRequest, dbo.fn_GetPolicyInstanceStatus, dbo.fn_NumFailedInstancesPerServer, dbo.fn_NumInstancesPerServer, dbo.fn_NumRunningInstancesPerServer, [Microsoft.SystemCenter.Orchestrator.Internal].AddUserToRole, [Microsoft.SystemCenter.Orchestrator].[SetPermissions], [Microsoft.SystemCenter.Orchestrator.Internal].[SetProductInfo]

The Database Configuration Utility (**DBSetup.exe**) requires permissions as a user on the computer where the management server is installed and is a member of either the Administrators or Orchestrator Users Group to access the settings.dat file. Custom tools that connect to the database directly through DBDataStore.dll require the same permissions.

### Security

When installing Orchestrator, ensure that the account used to connect to SQL server has minimum privileges on the SQL server to avoid a potential elevation of privileges.

### Securing SQL server connections

The SQL server connections in a default deployment of Orchestrator are not secure. The exception to this is when Orchestrator stores or retrieves sensitive data. In this case, Orchestrator creates a secure connection to SQL server with a self-signed certificate. This certificate does not provide strong security and is susceptible to man-in-the-middle attacks.

For information about encrypting connections to SQL Server, go to [Encrypting Connections to SQL Server \(configuring SSL\)](#). For information on how to enable connections to the database engine, go to [How to: Enable Encrypted Connections to the Database Engine \(SQL Server Configuration Manager\)](#).

## Encryption keys

As part of your security planning, you should plan for rotating your encryption keys at a regular interval. The National Institute of Standards and Technology(NSIT) recommends that keys be rotated at least once every two years. For more information about NSIT security standards, go to [NSIT Computer Security Division Computer Security Resource Center](#).

### ▶ To rotate encryption keys

1. From the Runbook Designer, export all of your runbooks, global settings, variables, schedules, and so on.  
You should provide a password for the export.  
During export, all encrypted data is decrypted and re-encrypted with a new key created by the password.
2. If you want, change the SQL Server Master Database key.  
Orchestrator encrypts data using both the SQL Server Master Database key and the master database key for the orchestration database.  
For information on how to change the SQL Server Master Database key, go to [SQL Server and Database Encryption Keys \(Database Engine\)](#).
3. Re-install the management server and create a new database.  
For information on how to install the management server, see the topic [How to Install a Management Server for System Center 2012 - Orchestrator](#).  
Do not connect to the existing database. A new cryptographic key is generated when a new database is created.
4. From the Runbook Designer, re-import the runbooks and any other data you exported.  
Provide the password used for the export. The data in the export file is decrypted using the password, and encrypted as it is imported to the database using the new Orchestrator master database key.

## Runbook Security

All elements of a runbook are accessible to all Runbook Designers, as well as to any runbook servers in your environment. You can modify the permissions for runbook elements (such as a folder), but any permissions you set are not enforced.

## Orchestrator Web Service and Orchestration Console Security

If you plan to install the Orchestrator web service and orchestration console, you should choose a secure protocol such as HTTPS to secure communication and prevent malformed requests from a man-in-the-middle attack. For more information on securing your Orchestrator web service and the Orchestration console, go to [How to Configure the Orchestrator Web Service to use HTTPS](#).



In the default configuration of an Orchestrator deployment, web service calls are not logged. This applies to requests made with the Orchestration console as well as the Orchestration Integration Toolkit (OIT). The result is that a user can start a job and pass parameters into a runbook with no record of who started the job.

To record all requests to your Orchestrator web service, you should enable audit trail logging with **atlc.exe**. For more information about logging using **atlc.exe**, go to **Audit Trail**.

## Using Windows Firewall with Orchestrator

Windows Firewall with Advanced Security is enabled by default on all Windows 2008 R2 computers, and blocks all incoming traffic unless it is a response to a request by the host or it is specifically allowed by a firewall rule to allow the traffic. You can explicitly allow traffic by specifying a port number, application name, service name, or other criteria by configuring Windows Firewall with Advanced Security settings.

When you configure a Runbook Designer or a runbook server outside of a firewall, certain rules must be enabled on the management server computer to allow the Runbook Designer and the runbook server to communicate with the management. Additionally, for some activities such as the Monitoring Activities, if the target computer is outside the firewall, you must enable certain firewall rules to allow WMI communication.

### Configuration of Orchestrator computers

When a Runbook Designer or a runbook server is installed behind a firewall, specific firewall rules are required between the management server and the remote computers.

Enable the following rules as they apply to your configuration.

#### ▶ To enable access to your SQL server

1. On the remote computer where a Runbook Designer or a runbook server is installed, open a port to connect to your SQL server. The default SQL port is TCP:1433.

#### ▶ To enable access between the Runbook Designer and the management server

1. On the computer running the Management Server Service, add a firewall rule to allow Runbook Designer or runbook server to access **ManagementService.exe**.

#### Location of Orchestrator Management Service

Operating system	Firewall rule
64-bit	%Program Files (x86)%\Microsoft System Center 2012\Orchestrator\Management Server\ManagementService.exe

#### ▶ To grant privilege to the Runbook Server Service account

1. On the remote runbook server computer, confirm that the Runbook Server Service

account has the **Logon as service** privilege.

► **To allow remote deployments with the Deployment Manager**

1. On the remote computer where you deployed the runbook server or the Runbook Designer, add a rule to allow the Deployment Manager to access the Orchestrator Remoting Service.

**Location of Orchestrator Remoting Service**

Operating system	File location
64-bit	%SystemRoot%\SysWOW64\OrchestratorRemotingService.exe
32-bit	%SystemRoot%\System32\OrchestratorRemotingService.exe

For more information about adding firewall rules see [Add or Edit a Firewall Rule](#).

**Firewall rules for activities**

Any activities that use WMI communication, such as any of the Monitoring Activities, require certain Windows Firewall rules to function correctly.

For Windows Server 2008 R2, enable the following rules to allow any activity that uses WMI to function correctly:

- Windows Management Instrumentation (Async-In)
- Windows Management Instrumentation (DCOM-In)
- Windows Management Instrumentation (WMI-In)

**Orchestrator Security Scenarios**

The following information provides best practices for using Orchestrator securely. This information is provided in the format of scenarios. The following scenarios are available:

- [Scenario: Securely transitioning from development to test to production environments](#)
- [Scenario: Effectively managing Orchestrator Users group membership](#)

**Scenario: Securely transitioning from development to test to production environments**

The Orchestrator password data contained in runbooks can be securely shared between different instances of Orchestrator. For example, one may wish to export runbooks built in a development environment and import them into a test environment or export tested runbooks into a production environment. This export and import process would need to secure the encrypted data in each phase of the export in such a way that the exported data could be imported into a different Orchestrator environment.

This is accomplished using the Import/Export functionality available in the Runbook Designer. The export and import features are available from the **Actions** item on the Runbook Designer menu bar or by right-clicking a runbook folder. The export feature is also available by right-clicking a runbook tab, a feature commonly referred to as a “single runbook export.”

Regardless of how a runbook is exported, the encrypted data contained in runbooks will be stored securely in the resulting XML export file. This is accomplished by providing a password upon export. When Orchestrator exports the runbooks and their related configuration, any encrypted data contained in Runbooks is decrypted and encrypted again upon export using the provided password.

 **Note**

1. The encryption key used for the export is different from that used to store the data in the Orchestrator database. Essentially, the "export" feature decrypts the encrypted data and re-encrypts it in the export file. The export file contains the encrypted password.
2. The export process does not protect the runbook itself nor the non-encrypted data contained in Runbooks. The export only protects encrypted data contained in Runbooks.

When an export file is re-imported the import requires a password be provided. If the password matches then the encrypted data contained in export will be imported and re-encrypted for storage in the Orchestrator database by using the encryption key.

 **Note**

1. The Export/Import password feature does not support password complexity rules that may be required by your organization. A blank value for the password is permitted, although not recommended for exports that contain sensitive data that has been encrypted.
2. If the password for your export is lost one can still perform an import of the runbooks and their related configuration. On the Import screen simply clear the **Import Orchestrator encrypted data** option. Any Orchestrator platform-encrypted data will not be imported and created with blank values in the Orchestrator database.

**Scenario: Effectively managing Orchestrator Users group membership**

Orchestrator has two core user roles: Runbook Authors and Operators. These user roles have different rights in Orchestrator. Runbook Authors are individuals that have rich administrative access to Orchestrator including its database and configuration. Runbook Authors grant access to Runbook Operators. Runbook Operators have access to the Orchestration Console and Web Service based on rights granted to them by Runbook Authors.

User Role	Identified by	Rights
<b>Runbook Author</b>	Membership in the Orchestrator Users Group (see below)	<ul style="list-style-type: none"> <li>• Administrators of Orchestrator</li> <li>• Read, write, update Orchestrator configuration</li> <li>• Full control of the Orchestrator database</li> <li>• Full encrypt/decrypt rights</li> <li>• Access to Runbook Activities that can interact with external systems via</li> </ul>

User Role	Identified by	Rights
		Integration Packs
<b>Runbook Operator</b>	Runbook Folder permissions granted by Runbook Authors in the Runbook Designer	<ul style="list-style-type: none"> <li>• Non-administrative rights to Orchestrator</li> <li>• Access to the Orchestration Console and Web Service</li> <li>• View and invoke runbooks based on rights granted by Runbook Authors</li> <li>• No access to the Orchestrator database</li> <li>• No encrypt/decrypt rights</li> </ul>



**Note**

Placing a user account in the Orchestrator Users group identifies this user account as being an administrator of Orchestrator. All Orchestrator users are essentially equally-privileged administrators with full access to Orchestrator and the data contained in the database. This would include access to encrypt and decrypt data contained in the Orchestrator database.

Orchestrator manages security through membership in two security groups created at installation time. These are the Orchestrator Users group and the Orchestrator System group. Membership in either or both of these groups identifies accounts that are considered administrators of Orchestrator ("trusted personas"). Administrative rights include the ability to update runbooks and their related configuration data, update the configuration of runbook servers, interact with external systems via integration packs, install and deploy integration packs, interact programmatically with the Orchestrator database, update the database configuration and encrypt/decrypt encrypted data stored in the Orchestrator database.



**Note**

Membership in either or both of these groups grants full administrative access to Orchestrator including access to all data contained in the Orchestrator database and full encrypt/decrypt rights.

Security group	Associated persona	Security group purpose
<b>Orchestrator Users Group</b>	Runbook authors and anyone who deploys integration packs	This security group defines user accounts that will be able to launch the Runbook Designer, Deployment Manager and Data Store

Security group	Associated persona	Security group purpose
		Configuration utility. Membership in this group grants privileged access to the Orchestrator database. This would include the ability to read and update the database configuration as well as access and decrypt encrypted data.
<b>Orchestrator System Group</b>	None (used for service accounts)	This security group defines the service accounts that require privileged access to the Orchestrator database. This would include the ability to read and update the database configuration as well as access and decrypt encrypted data.

The following user roles are considered trusted/untrusted personas in Orchestrator.

Security domain	Context	Cryptography rights	Identified by	Trusted persona
Run Time	Orchestrator Services "Invoke Runbook" Alternate Credentials	Full encrypt & decrypt	Orchestrator Systems Group in Active Directory / Credentials on "Invoke Runbook" Runbook Activity	Yes
Design Time	Runbook Designer Deployment Manager Data Store Configuration	Full encrypt & decrypt	Orchestrator Users Group in Active Directory	Yes
Operator	Orchestration Console Web Service	No explicit access to encrypted or decrypted data.	User rights defined in the Runbook Designer by the Runbook Author role	No

Security domain	Context	Cryptography rights	Identified by	Trusted persona
Database Administrator	MS SQL Server 2008 R2	Full Encrypt & decrypt	Rights to SQL Server as a DBA with rights to the Orchestrator database	Yes
Windows Administrator	Windows Server 2008 R2	No explicit rights are granted, however Windows administrators are considered trusted personas.	Rights to Windows	Yes

## Orchestrator Data Encryption

The following sections provide information about data encryption in Orchestrator:

- [What data is encrypted and decrypted in Orchestrator?](#)
- [How is encrypted data managed in Orchestrator?](#)
- [How can encrypted data be moved between Orchestrator instances?](#)

### Best practices for encrypted variables

Introduced in System Center 2012, encrypted variables in Orchestrator allow you to more securely use variables to provide sensitive data to runbook activities. Encrypted variables are used exactly like standard global variables; that is, by means of a subscription. If you subscribe to these variables in activity fields that get republished, the variable contents can be exposed on the data bus. Because of this, encrypted variables should be subscribed to only in fields that are not republished. This best practice is not enforced by Orchestrator, but it should be a part of your planning process.

However, if encrypted data must be published on the data bus in order to be sent to another system (for example, a product that runs on a different server), you should ensure that the channel to that product is secure. For example, BMC Remedy supports a secure mode for connection, and products with web interfaces typically allow using the Secure Sockets Layer connection (using the HTTPS protocol).

### What data is encrypted and decrypted in Orchestrator?

Orchestrator provides a code set of encryption and decryption services that are used to generate Orchestrator platform-encrypted data. These services are used to secure data flagged for encryption in the Orchestrator database as well as decrypt the data to plain-text so it can be used as part of a runbook. These core encryption services are managed by the Orchestrator database

and management server. Rights to these services are granted through membership in the Orchestrator Users group or the Orchestrator System group.



**Note**

Orchestrator runbooks could contain data encrypted by an external encryption service and used as runbook Published data. Orchestrator would not handle data from such an external system any differently than any other piece of data.

Orchestrator uses encryption in the following product feature areas:

Feature area	Description
Runbook activities	Any property masked out when one types in the field is an encrypted property. This would include passwords on the <b>Security Credentials</b> tab but can include other properties as well.
<b>Options</b> menu	The <b>Options</b> menu is used to store credentials and other information used to configure integration packs. Properties of connection settings can contain encrypted properties.
Variables	Variables that have the <b>Encrypted Variable</b> checkbox selected will be encrypted.



**Note**

Encrypted variables are intended to be used via subscription in properties that require an encrypted value such as a password used in a runbook activity. If an encrypted variable is subscribed to in a non-encrypted field the encrypted value will be provided. The plain-text value is only available when used in an encrypted property.

**How is encrypted data managed in Orchestrator?**

Orchestrator has a core cryptographic service whose design is based on AES using SQL Server cell-level encryption. As such, all encryption and decryption is performed centrally by SQL Server. Encryption keys are centrally managed by SQL Server. Both the SQL Server Service Master Key and the Orchestrator Database Master Key are required to encrypt and decrypt data.

Orchestrator uses cryptography in both the Run Time and Design Time experiences. Runbook authors interact with runbook activities in the Runbook Designer and often these activities will interact with external systems to "discover" property grids, list values, and other properties. Likewise, when a runbook is tested in the Runbook Tester the encrypted data provided in protected fields needs to be decrypted so it can be passed to the target system. Finally, the Runbook Servers need to be able to decrypt encrypted data to allow runbooks to interact with external systems. As such, the database cryptographic services need to be accessed from the Runbook Servers, Runbook Designer and Runbook Tester.

Since the core cryptographic services reside in the Orchestrator database, access to the database essentially defines access to the unencrypted data.

- Runbook servers access the database directly. As such they directly access the crypto services provided by SQL Server. Run Time access to the crypto services provided by SQL Server are limited to members of the Orchestrator System Group.
- Runbook Designers and the Runbook Tester access the database indirectly through the management server. The management server offers a new service that services requests for encryption/decryption from the Runbook Designer and Runbook Tester. The management server passes through the security context of the runbook author and these credentials are used to access the crypto services. Design Time access to the crypto services provided by SQL Server are limited to members of the Orchestrator Users group.

Access to encrypted data from Orchestrator is managed by the Orchestrator Users group and the Orchestrator Systems group. Members of these two security groups essentially have rich administrative access to Orchestrator including rights to access the core cryptographic services as well as decrypt data stored encrypted in the database.

### How can encrypted data be moved between Orchestrator instances?

When the Orchestrator database is installed a database master encryption key is created. This database master key is used in conjunction with the SQL Server master key to encrypt and decrypt data stored in the Orchestrator database. This means encrypted data is essentially "keyed" to the instance of SQL Server 2008 R2 where the data was encrypted. For example, one can't "copy" an encrypted string from a column of one instance of SQL Server 2008 R2 and "paste" the value into another instance of an Orchestrator database and decrypt the data unless both the database master key and server master key matched that of the system where the data was encrypted.

Hence moving encrypted data between Orchestrator instances requires one of two scenarios:

1. Both the SQL Server service master key and the Orchestrator database master key are the same as the keys on the system where the data was originally encrypted.
2. Export the runbooks and related encrypted data and Import into the new system.

Essentially, the Export functionality creates an export file whose encrypted data has been encrypted a password provided by the user during export. This export file contains encrypted data that can be decrypted by providing the same password during import. The data will be encrypted and stored into the database by using the encryption keys for the new database.

## TCP Port Requirements

Communication between Orchestrator features on different computers occurs over TCP/IP. If you have firewalls in your environment between these features, you must enable the ports indicated in the following table.

Source	Targeted computer	Default port	Configurable	Notes
Runbook Designer	Management	135, 1024-	Yes	The Runbook



Source	Targeted computer	Default port	Configurable	Notes
	server	65535		Designer communicates with the management server over DCOM. By default, DCOM communicates over port 135 and dynamically allocates a port between 1024 and 65535. For information about configuring DCOM for a specific port range, see <a href="#">Configuring Microsoft Distributed Transaction Coordinator (DTC) to work through a firewall.</a>
Management server runbook server Web service	orchestration database	1433	Yes	Specified during Microsoft SQL Server installation
Client browser	Orchestrator REST-based web service	81	Yes	Specified during Orchestrator installation. Both ports must be accessible for the Orchestration console.
	Orchestration console	82		
Activities	Various targeted computers depending on activity	For information about individual integration packs, see <b>Integration Packs for System Center 2012 - Orchestrator.</b>		

## Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Plan Your Orchestrator Deployment](#)
- [System Requirements](#)
- [Orchestrator Security Planning](#)
- [Scale Planning](#)

## See Also

[Plan Your Orchestrator Deployment](#)

## Integration Packs for System Center 2012 - Orchestrator

## Scale Planning

This section describes planning considerations for designing a large-scale deployment of System Center 2012 - Orchestrator. When planning your system requirements, you have to consider how to use Orchestrator runbooks, the types and number of runbooks you plan to run, the amount of required data logging, the systems you are integrating with, and the level of fault tolerance you require.

### Scale planning

- [Feature Performance Considerations](#)  
Describes the Orchestrator features and how their behaviors affect system performance.
- [Evaluate System Requirements](#)  
Provides guidance for evaluating your deployment tasks.
- [Deployment Recommendations](#)  
Provides recommendations for the number of systems to install in your Orchestrator deployment.

## Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Plan Your Orchestrator Deployment](#)
- [System Requirements](#)
- [Orchestrator Security Planning](#)
- [TCP Port Requirements](#)

## Feature Performance Considerations

This section describes the Orchestrator processes that influence performance in a production environment. The focus of this procedure is lies in identifying processes that occur during runtime, in the web service, and during authoring. While many authoring activities occur outside a production environment, considerations for setting up a production environment to test performance should also include variances, for example, whether special requests by an Orchestrator administrator are supported.

### Runbooks

Despite the variance in their design and complexity, runbooks have a simple structure. They perform three operations: they run activities, manage published data, and perform branch logic. The following sections provide more details about these operations.

### Activity internals

Runbook activities contain two types of code: platform code and domain code. Platform code is built on a framework that is shared between all runbooks. Platform code manages Orchestrator processes. Domain code refers to the code in a runbook activity that manages processes outside Orchestrator. For example, the Invoke Web Service activity contains platform code to handle processing in Orchestrator, such as publishing data, and domain code specific to invoking a web service.

There is little processing variability between runbooks when you compare activities that run similar platform code. Domain code depends on latency issues external to Orchestrator. Potentially, domain code varies greatly between activities. To understand the domain code dependencies and their impact on runbook performance, you must test the performance of individual activities before you determine the requirements for the production environment.

### Published Data

Runbooks in Orchestrator share data between activities. Every activity consumes Published Data that earlier runbook activities created. How an activity uses the published data depends on the domain code. All runbook activities publish a minimum set of run-time parameters called Common Published Data. Domain code can, but is not required to, publish data. The Published Data that the domain code creates is called Activity-Specific Published Data. The data that an activity produces can contain data elements that are single or multi-valued. For example, every activity produces a single record of single-value Common Published Data. Domain code can produce multiple records of single and multi-value data.

Publishing data to the orchestration database is a resource-intensive activity. Runbook performance depends on the amount of data that each activity publishes and the performance and resiliency of the computer that hosts the orchestration database. As part of planning your performance requirements, consider the amount of published data your runbooks require and the performance of the computer that hosts your orchestration database.

### Branching

Runbook activities create a branch if an activity requires data to pass at the same time to two or more activities. When a runbook starts, processing consists of a single thread. When this thread

encounters a branch, a thread is created for each branch. Each thread references the published data from all previous activities along the thread. The total number of threads in a runbook depends on the number of branches used in a runbook. Multi-threaded runbooks require more processing power than single threaded runbooks.

As part of assessing your runbook performance requirements, consider the number of branches you plan to include in a runbook. Runbooks with lots of branches require more processing power on the runbook servers than runbooks that contain no branches.

### **Operator experience**

The operator experience occurs on the Orchestration console and the Orchestrator web service. The Orchestration console is a Microsoft Silverlight-based web application that requires Orchestrator web service to connect to the orchestration database. The Orchestration console and the Orchestrator web service depend on the performance of the orchestration database and the Internet Information Services (IIS) server that hosts the Orchestrator web service.

### **Service Manager connector**

The Orchestrator web service supports the Service Manager connector. Service Manager targets IT customers who serve approximately 50,000 users. Service Manager request-management scenarios assume that each user submits one request per month. This produces a request volume of 2,500 requests per day (200 requests/hour or approximately three requests every minutes). Service Manager uses the Orchestrator web service to update the status of activities, requiring support for a like number of status requests. Also, note that the Service Manager connector discovers published runbooks. The response time to discover any given runbook folder depends on the number of runbooks in the folder.

### **See Also**

[Scale Planning](#)

## **Evaluate System Requirements**

This section summarizes the ITIL best practices to determine your deployment requirements as it applies to Orchestrator. The following table shows the sequence of evaluation criteria.

<b>Task</b>	<b>Information</b>
1: Define the scope of the project.	<a href="#">Define scope of work</a>
2: Identify the tasks you plan to automate.	<a href="#">Identify tasks</a>
3: Identify the system workloads for Orchestrator and the tasks you plan to automate.	<a href="#">Define individual workloads</a>
4: Estimate the number of running jobs per hour.	<a href="#">Determine total jobs running</a>

Task	Information
5: Identify the integration packs required for your environment.	<a href="#">Identify required integration packs</a>
6: Determine security requirements.	<a href="#">Determine the security model</a>
7: Determine the number and placement of runbook servers.	<a href="#">Design runbook server requirements</a>
8: Determine the requirements for fault tolerance.	<a href="#">Fault tolerance</a>
9: Identify additional resources required for your deployment.	<a href="#">Resource requirements</a>
10: Identify network traffic and potential bottlenecks.	<a href="#">Network</a>
11: Identify your service and operations requirements.	<a href="#">Service and operations requirements</a>
12: Determine the level of integration with other System Center products.	<a href="#">Integration with System Center</a>
13: Determine authoring requirements.	<a href="#">Authoring</a>
14: Design your Orchestrator test environment.	<a href="#">Test environment</a>
15: Design your Orchestrator pre-productions environment.	<a href="#">Pre-production environment</a>

### Define scope of work

As part of planning the size of your deployment, begin by identifying your business requirements. This process should define the processes you want to automate by using Orchestrator, the reporting requirements for your organization, and departments impacted by this installation. Identify all applications, services, servers, and manual processes associated with the tasks you want to perform. Prioritize these requirements based on their business impact to prioritize the deployment tasks effectively.

### Identify tasks

What processes do you plan to automate? Map the processes you intend to automate to the individual steps involved. This level of detail simplifies the task of authoring runbooks. You should identify business-critical processes as requiring more validation effort before relying on the runbook in a production environment.

### **Define individual workloads**

For the processes you automate, determine how frequently you intend them to run. A runbook that is started one time per day uses significantly fewer resources than a continuously running runbook that is monitoring a system process. Consider both the workload on the Orchestrator system and the automated process. A server that previously responded to manually input requests can behave much differently when the request input occurs by automation.

Consider how much logging of Published Data is required in each of your runbooks. As logging increases, network traffic and load on the server that is hosting the Orchestrator database increases.

### **Determine total jobs running**

When you have individual workloads defined, calculate the total number of jobs that could be running at any point in time. Your system design should take a maximum workload into account. The number and placement of your runbook servers in addition to the resources of the processes you are automating have to be sized to accommodate the largest number of running runbooks.

### **Identify required integration packs**

Devices and applications that are not produced by Microsoft are automated through integration packs. Determine the integration packs required for your automated processes. Each software and hardware product typically requires its own integration pack. If there is no commercially available integration pack, can you create script level automation? Do you have to create custom integration packs for full automation?

### **Determine the security model**

Security model planning should include determining if you require your Runbooks servers and resources to be located in more than one Active Directory forest. Is there a cross-domain trust? Are there Operations Manager gateways that require certificates? Review the current security requirements for your environment to identify permission and certificate requirements.

### **Design runbook server requirements**

Do you plan to locate runbook servers across wide area network (WAN) links and trust boundaries? If so, you must determine gateway server placement in relationship to the Orchestrator database and runbook servers. While a running management server is not required to start runbooks or save runbook data, an Orchestrator database is required for all active runbook servers.

### **Fault tolerance**

Determine the level of fault tolerance for your Orchestrator deployment. Depending on your requirements, you can design your Orchestrator environment to be highly available in the case of a single failure.

### **Resource requirements**

Determine the requirements for your Orchestrator deployment, and any additional load that increased requirements on processes impacted by automation create. Do you have adequate

runbook servers for the number of runbooks that can be running at a given time? Is the Orchestrator database the appropriate size to handle all requests and log Published Data?

### **Service and operations requirements**

Identify all requirements for your environment. Include any data consolidation strategies and requirements for cross-management group, data-retention, data-warehouse size, or fault-tolerance.

### **Network**

Determine if additional bandwidth is required to support the increased traffic the runbook servers and the Orchestrator database generate. Do you have to change any network port settings to accommodate the Orchestrator web service?

### **Integration with System Center**

Orchestrator fully supports all System Center products such as Service Manager or Operations Manager. Identify existing System Center products in your environment to determine if additional management servers or gateways are required.

### **Authoring**

Determine where and how authoring of runbooks is carried out. Authoring of runbooks typically occurs on computers isolated from production. However, your business requirements might include the requirement to author runbooks when they were not planned.

### **Test environment**

If you are authoring in isolation from your production environment, identify the necessary resources to build and test new runbooks.

### **Pre-production environment**

It is prudent to deploy high impact runbooks in a pre-production environment before introducing the runbook into a production environment. Pre-production environments should closely approximate the full-scale production environment.

### **See Also**

[Scale Planning](#)

## **Deployment Recommendations**

The following guidelines provide options in an Orchestrator deployment to improve high availability and performance.

### **Management server**

An Orchestrator deployment is limited to one management server. A management server does not have to be available for runbook servers or runbooks to function. If the management server is not available, you cannot connect the Runbook Designer to publish runbooks or start, monitor, or stop runbooks. You can still start, monitor, and stop runbooks with the Orchestration console.

### **Orchestrator database**

For high availability, you can deploy the Orchestrator database on a Microsoft SQL Server cluster with a minimum of two nodes.

### **Orchestrator web service**

The Orchestrator web service must be installed on a server that is running Internet Information Services (IIS). The Orchestrator web service does not have to be available for runbook servers or runbooks to function. If the Orchestrator web service is not available, you cannot run the Orchestration console to start, monitor, or stop runbooks. You can install the web service on multiple IIS servers configured for load balancing to provide high availability and additional capacity.

### **Runbook servers**

For high availability, you should have at least two runbook servers. If the primary runbook server for a runbook is unavailable, the runbook can run on another server. Runbook servers are not designed to run on a computer configured as a cluster node.

For more information about specifying the runbook servers for a runbook, see the **Using Runbooks in System Center 2012 - Orchestrator Release Candidate**.

### **Runbooks**

By default, runbook servers can run 50 runbooks simultaneously. The physical computer resources and the complexity of the runbook limit the actual number of runbooks that a runbook server can manage.

For the process to modify the number of runbooks that can run simultaneously, see **How to Configure Runbook Throttling**.

### **See Also**

**Using Runbooks in System Center 2012 - Orchestrator Release Candidate**

## **Install Orchestrator**

This section provides details about how to install System Center 2012 - Orchestrator on a single server, as an individual feature, and as a highly available deployment.

For information about how to install Orchestrator at the command prompt and details about the available command line arguments, see the section [Install with the Orchestrator Command Line Install Tool](#).

### **Important**

If you do not want to use the **System Center 2012 - Orchestrator Setup Wizard** to install Orchestrator features because Server Message Block (SMB) is not permitted through your firewall or you have concerns about SMB security, you can manually install runbook servers and integration packs with the Orchestrator command line install tool.



For more information about the tool, see the topic [Install with the Orchestrator Command Line Install Tool](#).

## Install Orchestrator

- [How to Install Orchestrator on a Single Computer](#)  
Provides detailed information about how to install Orchestrator on a single computer.
- [Install Individual Orchestrator Features](#)  
Provides detailed information about how to install each Orchestrator feature.
- [Install with the Orchestrator Command Line Install Tool](#)  
Provides options for installing Orchestrator from the command line.
- [Use Sysprep to Deploy Orchestrator](#)  
Provides details for installing Orchestrator with a Sysprep image.

## Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Deployment Overview](#)
- [Plan Your Orchestrator Deployment](#)
- [Perform Post-Installation Tasks](#)
- [Troubleshoot Your Orchestrator Installation](#)

## How to Install Orchestrator on a Single Computer

Use the following steps to install all System Center 2012 - Orchestrator features on a single computer.

### To install Orchestrator on a single computer

1. To start the System Center 2012 - Orchestrator Setup Wizard on the server where you want to install Orchestrator, double-click **SetupOrchestrator.exe**.



#### **Important**

Before you begin setup, close any open programs and ensure that there are no pending restarts on the computer. For example, if you have installed a server role by using Service Manager or have applied a security update, you might have to restart the computer, and then log on to the computer with the same user account to finish the installation of the server role or the security update.



#### **Note**

If User Account Control is enabled, then you will be prompted to verify that you want to allow the setup program to run. This is because it requires administrative

access to make changes to the system.

2. On the main setup page, click **Install**.

 **Warning**

If Microsoft .NET Framework 3.5 Service Pack 1 is not installed on your computer, a dialog box appears asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with the installation.

3. On the **Product registration** page, provide the name and company for the product registration, and then click **Next**.

 **Note**

For this evaluation release, a product key is not required.

4. On the **Please read this license agreement** page, review and accept the Microsoft Software License Terms, and then click **Next**.
5. On the **Select features to install** page, verify that all features are selected, and then click **Next**.

 **Note**

You can choose to remove individual features. The management server is mandatory and is selected by default. The check boxes for the other features can be cleared as required.

 **Tip**

If you want to install only an individual feature after installing a management server, use the information in [Install Individual Orchestrator Features](#).

6. Your computer is checked for required hardware and software. If your computer meets all of the requirements, the **All prerequisites are installed** page appears. Click **Next** and proceed to the next step.

If a prerequisite is not met, a page displays information about the prerequisite that has not been met and how to resolve the issue. Follow these steps to resolve the failed prerequisite check:

- a. Review the items that did not pass the prerequisite check. For some requirements, such as Microsoft .NET Framework 4, you can use the link provided in the Setup Wizard to install the missing requirement. The Setup Wizard can install or configure other prerequisites, such as the Internet Information Services (IIS) role.

 **Warning**

If you enable prerequisites during setup, such as Microsoft .NET Framework 4, your computer can require a restart. If you restart your computer, you must run setup again from the beginning.

- b. After you resolve the missing prerequisites, click **Verify prerequisites again**.
7. On the **Configure the service account** page, enter the user name and password for the Orchestrator Management Service account. Click **Test** to verify the account credentials. If the credentials are accepted, click **Next**.

 **Important**

The Orchestrator Management Service account must be created before this step. For more information about the Orchestrator Management Service account, see [Orchestrator Management Service account](#) in [Orchestrator Security Planning](#).

8. On the **Configure the database server** page, enter the name of the server and the name of the instance and port number of the Microsoft SQL Server that you want to use for Orchestrator. You can also specify whether to use Windows Authentication or SQL Server Authentication, and whether to create a new database or use an existing database.
9. Click **Test Database Connection** to verify the account credentials. If the credentials are accepted, click **Next**.
10. On the **Configure the database** page, select an existing database or specify the name of a new database, and then click **Next**.
11. On the **Configure Orchestrator management group** page, accept the default configuration or enter the name of the user group to manage Orchestrator permissions, and then click **Next**.

 **Note**

For more information about the Orchestrator users group, see [Orchestrator Users Group](#).

12. On the **Configure the port for the web service** page, verify the port numbers for the Orchestrator web service and the Orchestration console, and then click **Next**.

 **Note**

For more information about the TCP ports, see [TCP Port Requirements](#).

13. On the **Select the installation location** page, verify the installation location for Orchestrator, and then click **Next**.
14. On the **Microsoft Update** page, optionally indicate whether you want to use the Microsoft Update services to check for updates, and then click **Next**.

 **Note**

If you have previously accepted Microsoft Update on this computer, this page is skipped.

15. On the **Help improve Microsoft System Center Orchestrator** page, optionally indicate whether you want to participate in the **Customer Experience Improvement Program** or **Error Reporting**, and then click **Next**.
16. Review the **Installation summary** page, and then click **Install**.  
The **Installing features** page appears and displays the installation progress.
17. On the **Setup completed successfully** page, optionally indicate whether you want to start the Runbook Designer, and then click **Close** to complete the installation.

 **To install the Service Management Automation web service**

1. Follow the steps that are detailed in [Web Service Installation](#)

▶ **To enable network discovery for the Runbook Designer**

1. On the desktop of the computer that is running Windows Server, click **Start**, click **Control Panel**, click **Network and Internet**, click **Network and Sharing Center**, click **Choose Home group and Sharing Options**, and then click **Change advanced sharing settings**.
2. For the **Domain** profile, if needed, click the **Arrow** icon to expand the section options.
3. Select **Turn on network discovery**, and then click **Save changes**.  
If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

## See Also

[Install Individual Orchestrator Features](#)

[Orchestrator Security Planning](#)

[TCP Port Requirements](#)

## Install Individual Orchestrator Features

This section provides information about how to install each of the Orchestrator features. You can use this information to install features on individual computers or to add additional servers or features to your Orchestrator deployment.

### How to install individual Orchestrator features

- [How to Install a Management Server for System Center 2012 - Orchestrator](#)
- [How to Install a Runbook Server for System Center 2012 - Orchestrator](#)
- [How to Install the Orchestrator Web Service](#)
- [How to Install the Runbook Designer for System Center 2012 - Orchestrator](#)

### Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Install Orchestrator](#)
- [How to Install Orchestrator on a Single Computer](#)

## How to Install a Management Server for System Center 2012 - Orchestrator

Use the following steps to install an System Center 2012 - Orchestrator management server.

▶ **To install an Orchestrator management server**

1. On the server where you want to install Orchestrator, start the **System Center 2012 - Orchestrator Setup Wizard**.

To start the **System Center 2012 - Orchestrator Setup Wizard**, on your product media or network share, double-click **SetupOrchestrator.exe**.

 **Important**

Before you begin setup, close any open programs and ensure that there are no pending restarts on the computer. For example, if you have installed a server role by using Service Manager or have applied a security update, you might have to restart the computer, and then log on to the computer with the same user account to finish the installation of the server role or the security update.

 **Note**

If User Account Control is enabled, then you will be prompted to verify that you want to allow the setup program to run. This is because it requires administrative access to make changes to the system.

2. On the main page of the **System Center 2012 - Orchestrator Setup Wizard**, click **Install**.

 **Warning**

If Microsoft .NET Framework 3.5 Service Pack 1 is not installed on your computer, a dialog box appears asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with the installation.

3. On the **Product registration** page, provide the name and company for the product registration, and then click **Next**.

 **Note**

For this evaluation release, a product key is not required.

4. On the **Please read this license agreement** page, review and accept the Microsoft Software License Terms, and then click **Next**.
5. On the **Select features to install** page, ensure that **Management Server** is the only feature selected, and then click **Next**.
6. Your computer is checked for required hardware and software. If your computer meets all of the requirements, the **All prerequisites are installed** page appears. Click **Next** and proceed to the next step.

If a prerequisite is not met, a page displays information about the prerequisite that has not been met and how to resolve the issue. Use the following steps to resolve the failed prerequisite check:

- a. Review the items that did not pass the prerequisite check. For some requirements, such as Microsoft .NET Framework 4, you can use the link provided in the Setup Wizard to install the missing requirement. The Setup Wizard can install or configure other prerequisites, such as the Internet Information Services (IIS) role.

 **Warning**

If you enable prerequisites during setup, such as Microsoft .NET Framework 4, your computer can require a restart. If you restart your computer, you must run setup again from the beginning.

- b. After you resolve the missing prerequisites, click **Verify prerequisites again**.
- c. Click **Next** to continue.
7. On the **Configure the service account** page, enter the user name and password for the Orchestrator service account. Click **Test** to verify the account credentials. If the credentials are accepted, then click **Next**.
8. On the **Configure the database server** page, enter the name of the server and the name of the instance of Microsoft SQL Server that you want to use for Orchestrator. You can also specify whether to use Windows Authentication or SQL Server Authentication, and whether to create a new database or use an existing database. Click **Test Database Connection** to verify the account credentials. If the credentials are accepted, click **Next**.
9. On the **Configure the database** page, select a database or create a new database, and then click **Next**.
10. On the **Configure Orchestrator management group** page, accept the default configuration or enter the name of the Active Directory user group to manage Orchestrator, and then click **Next**.
11. On the **Select the installation location** page, verify the installation location for Orchestrator, and then click **Next**.
12. On the **Microsoft Update** page, optionally indicate whether you want to use the Microsoft Update services to check for updates, and then click **Next**.
13. On the **Help improve Microsoft System Center Orchestrator** page, optionally indicate whether you want to participate in the **Customer Experience Improvement Program** or **Error Reporting**, and then click **Next**.
14. Review the **Installation summary** page, and then click **Install**.  
The **Installing features** page appears and displays the installation progress.
15. On the **Setup completed successfully** page, optionally indicate whether you want to start Runbook Designer, and then click **Close** to complete the installation.

### See Also

[Install Individual Orchestrator Features](#)

## How to Install a Runbook Server for System Center 2012 - Orchestrator

Use the following steps to install an System Center 2012 - Orchestrator runbook server.

### ► To install an Orchestrator runbook server

1. On the server where you want to install an Orchestrator runbook server, start the System Center 2012 - Orchestrator Setup Wizard.  
To start the **System Center 2012 - Orchestrator Setup Wizard**, on your product media or network share, double-click **SetupOrchestrator.exe**.

**Note**

Before you begin setup, close any open programs and ensure that there are no pending restarts on the computer. For example, if you have installed a server role by using Service Manager or have applied a security update, you might have to restart the computer, and then log on to the computer with the same user account to finish the installation of the server role or the security update.

2. On the main setup page, under **Standalone installations**, click **Runbook server**.

**Warning**

If Microsoft .NET Framework 3.5 Service Pack 1 is not installed on your computer, a dialog box appears asking whether you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with the installation.

3. On the **Product registration** page, provide the name and company for the product registration, and then click **Next**.

**Note**

For this evaluation release, a product key is not required.

4. On the **Please read this license agreement** page, review and accept the Microsoft Software License Terms, and then click **Next**.
5. Your computer is checked for required hardware and software. If your computer meets all of the requirements, the **All prerequisites are installed** page appears. Click **Next** and proceed to the next step.

If a prerequisite is not met, a page displays information about the prerequisite that has not been met and how to resolve the issue. Use the following steps to resolve the failed prerequisite check:

- a. Review the items that did not pass the prerequisite check. For some requirements, such as Microsoft .NET Framework 4, you can use the link provided in the Setup Wizard to install the missing requirement. The Setup Wizard can install or configure other prerequisites, such as the Internet Information Services (IIS) role.

**Warning**

If you enable prerequisites during setup, such as Microsoft .NET Framework 4, your computer can require a restart. If you restart your computer, you must run setup again from the beginning.

- b. After you resolve the missing prerequisites, click **Verify prerequisites again**.
- c. Click **Next** to continue.
6. On the **Configure the service account** page, enter the user name and password for the Orchestrator service account. Click **Test** to verify the account credentials. If the credentials are accepted, click **Next**.
7. On the **Configure the database server** page, enter the name of the database server associated with your Orchestrator management server. You can also specify whether to use Windows Authentication or SQL Server Authentication, and whether to create a new database or use an existing database. Click **Test Database Connection** to verify the

- account credentials. If the credentials are accepted, click **Next**.
8. On the **Configure the database** page, select the Orchestrator database for your deployment, and then click **Next**.
  9. On the **Select the installation location** page, verify the installation location for Orchestrator, and then click **Next**.
  10. On the **Microsoft Update** page, optionally indicate whether you want to use the Microsoft Update services to check for updates, and then click **Next**.
  11. On the **Help improve Microsoft System Center Orchestrator** page, optionally indicate whether you want to participate in the **Customer Experience Improvement Program** or **Error Reporting**, and then click **Next**.
  12. Review the **Installation summary** page, and then click **Install**.  
The **Installing features** page appears and displays the installation progress.
  13. On the **Setup completed successfully** page, optionally indicate whether you want to start the Runbook Designer, and then click **Close** to complete the installation.

### See Also

[Install Individual Orchestrator Features](#)

## How to Install the Orchestrator Web Service

Use the following steps to install the System Center 2012 - Orchestrator web service.

### ► To install the Orchestrator web service

1. On the server where you want to install the Orchestrator web service, start the **System Center 2012 - Orchestrator Setup Wizard**.  
To start the **System Center 2012 - Orchestrator Setup Wizard**, on your product media or network share, double-click **SetupOrchestrator.exe**.



#### Note

Before you begin the installation of the Orchestrator web service, close any open programs and ensure that there are no pending restarts on the computer. For example, if you have installed a server role by using Service Manager or have applied a security update, you might have to restart the computer, and then log on to the computer with the same user account to finish the installation of the server role or the security update.

2. On the main **System Center 2012 - Orchestrator Setup Wizard** page, click **Install**.



#### Warning

If Microsoft .NET Framework 3.5 Service Pack 1 is not installed on your computer, a dialog box appears asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with the installation.

3. On the **Product registration** page, provide the name and company for the product registration, and then click **Next**.





### Note

For this evaluation release, a product key is not required.

4. On the **Please read this license agreement** page, review and accept the Microsoft Software License Terms, and then click **Next**.
5. Your computer is checked for required hardware and software. If your computer meets all of the requirements, the **All prerequisites are installed** page appears. Click **Next** and proceed to the next step.

If a prerequisite is not met, a page displays information about the prerequisite that has not been met and how to resolve the issue. Use the following steps to resolve the failed prerequisite check:

- a. Review the items that did not pass the prerequisite check. For some requirements, such as Microsoft .NET Framework 4, you can use the link provided in the Setup Wizard to install the missing requirement. The Setup Wizard can install or configure other prerequisites, such as the Internet Information Services (IIS) role.



### Warning

If you enable prerequisites during setup, such as Microsoft .NET Framework 4, your computer can require a restart. If you restart your computer, you must run setup again from the beginning.

- b. After you resolve the missing prerequisites, click **Verify prerequisites again**.
- c. Click **Next** to continue.
6. On the **Configure the service account** page, enter the user name and password for the Orchestrator service account. Click **Test** to verify the account credentials. If the credentials are accepted, click **Next**.
7. On the **Configure the database server** page, enter the name of the database server associated with your Orchestrator management server. You can also specify whether to use Windows Authentication or SQL Server Authentication, and whether to create a new database or use an existing database. Click **Test Database Connection** to verify the account credentials. If the credentials are accepted, click **Next**.
8. On the **Configure the database** page, select the Orchestrator database for your deployment, and then click **Next**.
9. On the **Configure the port for the web service** page, verify the port numbers for the Orchestrator web service and the Orchestration console, and then click **Next**.
10. On the **Select the installation location** page, verify the installation location for Orchestrator, and then click **Next**.
11. On the **Microsoft Update** page, optionally indicate whether you want to use the Microsoft Update services to check for updates, and then click **Next**.
12. On the **Help improve Microsoft System Center Orchestrator** page, optionally indicate whether you want to participate in the **Customer Experience Improvement Program** or **Error Reporting**, and then click **Next**.
13. Review the **Installation summary** page, and then click **Install**.

The **Installing features** page appears and displays the installation progress.

14. On the **Setup completed successfully** page, optionally indicate whether you want to start the Runbook Designer, and then click **Close** to complete the installation.

### See Also

[Install Individual Orchestrator Features](#)

## How to Install the Runbook Designer for System Center 2012 - Orchestrator

Use the following steps to install the System Center 2012 - Orchestrator Runbook Designer on a single computer.

### ▶ To install the Orchestrator Runbook Designer on a single computer

1. On the server where you want to install the Orchestrator Runbook Designer, start the **System Center 2012 - Orchestrator Setup Wizard**.

To start the **System Center 2012 - Orchestrator Setup Wizard**, on your product media or network share, double-click **SetupOrchestrator.exe**.



#### Note

Before you begin the install of the Runbook Designer, close any open programs and ensure that there are no pending restarts on the computer. For example, if you have installed a server role by using Service Manager or have applied a security update, you might have to restart the computer, and then log on to the computer with the same user account to finish the installation of the server role or the security update.

2. On the main **System Center 2012 - Orchestrator Setup Wizard** page, click **Runbook Designer**.



#### Warning

If Microsoft .NET Framework 3.5 Service Pack 1 is not installed on your computer, a dialog box appears asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with the installation.

3. Your computer is checked for required hardware and software. If your computer meets all of the requirements, proceed to the next step.

If a prerequisite is not met, a page displays information about the prerequisite that has not been met and how to resolve the issue. Use the following steps to resolve the failed prerequisite check:

- a. Review the items that did not pass the prerequisite check. For some requirements, such as Microsoft .NET Framework 4, you can use the link provided in the Setup Wizard to install the missing requirement. The Setup Wizard can install or configure other prerequisites, such as the Internet Information Services (IIS) role.
- b. After you resolve the missing prerequisites, click **Verify prerequisites again**.
- c. Click **Next** to continue.

4. On the **Select the installation location** page, verify the installation location for

Orchestrator, and then click **Next**.

5. Review the **Installation summary** page, and then click **Install**.

The **Installing features** page appears and displays the installation progress.

6. On the **Setup completed successfully** page, optionally indicate whether you want to start the Runbook Designer, and then click **Close** to complete the installation.

#### ▶ **To connect a Runbook Designer to a management server**

1. In the Runbook Designer, select the **Connect to a server** icon in the navigation pane under the **Connections** pane.



#### **Note**

If the Runbook Designer is connected to another management server, the **Connect to a server** icon is disabled. Click the **Disconnect** icon before you connect to a different management server.

2. In the **System Center Orchestrator 2012 Connection** dialog box, enter the name of the server that hosts your Orchestrator management server, and then click **OK**.

#### ▶ **To enable network discovery**

1. On the desktop of your computer running Windows server, click **Start**, click **Control Panel**, click **Network and Internet**, click **Network and Sharing Center**, click **Choose Home group and Sharing Options**, and then click **Change advanced sharing settings**.
2. To change the **Domain** profile, if needed, click the **Arrow** icon to expand the section options and make any necessary changes.
3. Select **Turn on network discovery**, and then click **Save changes**.

If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

#### **See Also**

[Install Individual Orchestrator Features](#)

## **Install with the Orchestrator Command Line Install Tool**

To install Orchestrator at a command prompt, use the SetupOrchestrator.exe executable program with the command-line options in the following table.

<b>Option</b>	<b>Description</b>
/Silent	Installation is performed without displaying a dialog box.
/Uninstall	Product is uninstalled. This option is performed silently.

Option	Description
/Key:[Product Key]	Specifies the product key. If no product key is specified, Orchestrator is installed as an evaluation edition.
/ServiceUserName:[User Name]	Specifies the user account for the Orchestrator Management Service. This value is required if you are installing Management Server, Runbook Server, or web services.
/ServicePassword:[Password]	Specifies the password for the user account for the Orchestrator Management Service. This value is required if you are installing Management Server, Runbook Server, or web services.
/Components:[Feature 1, Feature 2,...]	Specifies the features to install. Possible values are ManagementServer, RunbookServer, RunbookDesigner, WebComponents, and All.
/InstallDir:[Path]	Specifies the path to install Orchestrator. If no path is specified, C:\Program Files (x86)\Microsoft System Center 2012\Orchestrator is used.
/DbServer:[Computer[\Instance]]	Specifies the computer name and instance of the database server. This value is required if you are installing Management Server, Runbook Server, or web services.
/DbUser:[User Name]	Specifies the user account to access the database server. This value is only required for SQL Authentication. If Windows Authentication is used, no value should be specified.
/DbPassword:[Password]	Specifies the password for the user account to access the database server. This value is only required for SQL Authentication. If Windows Authentication is used, then no value should be specified.
/DbNameNew:[Database Name]	Specifies the database name if a new database is being created. Cannot be used with DbNameExisting.
/DbNameExisting:[Database Name]	Specifies the database name if an existing database is being used. Cannot be used with

Option	Description
	DbNameNew.
/WebServicePort:[Port]	Specifies the port to use for the web service. Required if web services are installed.
/WebConsolePort:[Port]	Specifies the port to use for the Orchestrator console. Required if web services are installed.
/OrchestratorUsersGroup:[Group SID]	Specifies the SID of the domain or local group that will be granted access to Management server. If no value is specified, the default local group is used.
/OrchestratorRemote	Specifies that remote access should be granted to the Runbook Designer.
/UseMicrosoftUpdate:[0 1]	Specifies whether to opt in for Microsoft Update. A value of 1 will opt in. A value of 0 does not change the current opt in status of the computer.
/SendCEIPReports:[0 1]	Specifies that Orchestrator should send CEIP (Customer Experience Improvement Program) reports to Microsoft. A value of 1 opts in. A value of 0 does not change the current opt-in status of the computer.
/EnableErrorReporting:[value]	Specifies that Orchestrator should send program error reports to Microsoft. Possible values are always, queued, and never.

## See Also

[Install Orchestrator](#)

## Use Sysprep to Deploy Orchestrator

You can deploy Orchestrator using Sysprep. This enables you to deploy any component in Orchestrator in a distributed environment in an automatic process.

For Orchestrator components you can create a Sysprep image by performing the following steps:

1. Prepare the Windows 2008 R2 image
2. Create the Orchestrator answer file for sysprep
3. Install Orchestrator using sysprep.

## Prepare the Windows 2008 R2 image

Use the following steps to prepare the Windows 2008 R2 image.

### ▶ To prepare the Windows 2008 R2 image

1. Install Windows Server 2008 R2.
2. Install .NET Framework 4 from <http://go.microsoft.com/fwlink/?LinkId=246814>. (This is only required for the web feature components of Orchestrator.)

## Create the Orchestrator answer file for sysprep

Before you can use the Sysprep tool to install Orchestrator on Windows Server 2008 R2, install Orchestrator as part of the Sysprep process using an answer file.

See [Sample Orchestrator.xml file](#) for sample unattend.xml file. You can customize this sample file and import it into the Windows System Image Manager.

### ▶ To create the answer file

1. Create the Orchestrator.xml unattend file using the sample provided.
2. Copy the file to %systemdrive%\windows\system32\sysprep.
3. Create the Orchestrator batch file that will install the Orchestrator components on this computer. An example of this file is available in [Sample Orchestrator.xml file](#). This is referred to in the Orchestrator.xml file. See [Install with the Orchestrator Command Line Install Tool](#) for the available command line options that can be used to install Orchestrator.
4. Run the following command:

```
sysprep /generalize /oobe /shutdown  
/unattend:%systemdrive%\windows\system32\sysprep\Orchestrator  
.xml
```

## Install Orchestrator using sysprep

You now have a Windows 2008 R2 Sysprep image that you can use to automatically deploy Orchestrator in the environment.

For information on creating a SQL Sysprep image for use with Orchestrator, refer to <http://go.microsoft.com/fwlink/?LinkId=246815>.

## Sample Orchestrator.xml file

This is a sample Orchestrator.xml to be used for deploying Orchestrator with sysprep. Customize this using the Windows System Image Manager (available in the Windows Automated Installation Kit, at <http://go.microsoft.com/fwlink/?LinkId=246813>).

```
<?xml version="1.0" encoding="utf-8"?>  
<unattend xmlns="urn:schemas-microsoft-com:unattend">
```

```

    <settings pass="oobeSystem">
        <component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
            <AutoLogon>
                <Password>
                    <Value>password</Value>
                    <PlainText>>true</PlainText>
                </Password>
                <LogonCount>1</LogonCount>
                <Enabled>>true</Enabled>
                <Username>Administrator</Username>
            </AutoLogon>
            <FirstLogonCommands>
                <SynchronousCommand wcm:action="add">
                    <CommandLine>cmd /c %systemdrive%\sco\install.bat</CommandLine>
                    <Order>1</Order>
                    <RequiresUserInput>>false</RequiresUserInput>
                </SynchronousCommand>
            </FirstLogonCommands>
        </component>
    </settings>
    <cpu:offlineImage
cpu:source="wim:c:/windowsenterprise/extracted/sources/install.wim#Windows Server 2008 R2
SERVERENTERPRISE" xmlns:cpu="urn:schemas-microsoft-com:cpu" />
</unattend>

```

This is a sample install.bat file that is referenced in the Orchestrator.xml unattend file for the FirstLogonCommand. Create this batch file in the %systemdrive%\sco directory along with the Orchestrator setup files. This file can be customized by using the command line install tool. For more information, see [Install with the Orchestrator Command Line Install Tool](#).

```

%systemdrive%\sco\setup\setup.exe /Silent /ServiceUserName:%computername%\administrator
/ServicePassword:password /Components:All /DbServer:%computername% /DbPort:1433
/DbNameNew:OrchestratorSysPrep /WebConsolePort:82 /WebServicePort:81 /OrchestratorRemote
/UseMicrosoftUpdate:1 /SendCEIPReports:1 /EnableErrorReporting:always

```

# Perform Post-Installation Tasks

This section describes the tasks you can perform after a successful installation of System Center 2012 - Orchestrator.

## Post-installation tasks

- [How to Install an Integration Pack](#)  
Describes how to register and deploy Orchestrator integration packs.
- [How to Install GnuPG](#)  
Describes how to install GnuPG.
- [Migrate Opalis Policies to Orchestrator](#)  
Describes how to migrate Opalis Policies to Orchestrator runbooks.
- [How to Configure the Orchestrator Web Service to use HTTPS](#)  
Describes how to secure the Orchestrator web service by using HTTPS.
- **How to Uninstall and Unregister an Integration Pack**  
Describes how to remove integration packs from Orchestrator.

## Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Deployment Overview](#)
- [Plan Your Orchestrator Deployment](#)
- [Install Orchestrator](#)
- [Troubleshoot Your Orchestrator Installation](#)

## How to Install an Integration Pack

System Center 2012 - Orchestrator includes a set of standard activities that are automatically installed with Orchestrator. You can expand functionality and ability of Orchestrator to integrate platforms and products by Microsoft and other companies by installing integration packs. Each integration pack contains activities that provide unique functions. Microsoft provides integration packs for all of the System Center products, a number of other Microsoft products, and technologies and products from other companies.

Integration packs are available from the [Microsoft Download Center](#). Each integration pack has a guide that provides installation instructions, known issues, and reference information for the activities in that integration pack. To review the current integration pack guides, see [Integration Packs for System Center 2012 – Orchestrator](#) in the TechNet Library.



The following procedures contain general instructions that apply to most integration packs. See the relevant integration pack guide for system requirements and any special installation instructions for that integration pack.

 **Important**

System Center 2012 - Orchestrator supports integration packs designed for System Center 2012 - Orchestrator. Integrations packs for Opalis or pre-release versions of System Center 2012 - Orchestrator are not supported.

 **Important**

Orchestrator does not support a downgrade of integration packs. If you have an integration pack that is currently registered or previously registered in Orchestrator, installation fails if you attempt to install an earlier version of the same integration pack. You should test integration packs and upgraded integration packs in a test environment before you implement them in a production environment. If you require a downgrade of an integration pack in a production environment, contact Microsoft Customer Support for assistance.

## Registering and deploying an integration pack

After you download the integration pack, you register the integration pack file with the Orchestrator management server, and then deploy it to runbook servers and computers that have the Runbook Designer installed. For more information about how to install a specific integration pack, see the guide for that integration pack.

When you install an upgrade of an integration pack, you must first uninstall any earlier version of the integration pack from all runbook servers and Runbook Designers. You then register and deploy the upgrade of the integration pack. If you do not uninstall the previous version of the integration pack prior to registering and deploying the upgrade version, the upgrade version will fail.

### To register an integration pack

1. On the management server, copy the **.OIP** file for the integration pack to a local hard drive or network share.

 **Tip**

Confirm that the file is not set to **Read Only** to prevent unregistering the integration pack at a later date.

2. Start the **Deployment Manager**.
3. In the navigation pane of the Deployment Manager, expand **Orchestrator Management Server**, right-click **Integration Packs** to select **Register IP with the Management Server**. The **Integration Pack Registration Wizard** opens.
4. Click **Next**.
5. In the **Select Integration Packs or Hotfixes** dialog box, click **Add**.

6. Locate the **.OIP** file that you copied locally from step 1, click **Open**, and then click **Next**.
7. In the **Completing the Integration Pack Wizard** dialog box, click **Finish**.
8. On the **End User Agreement** dialog box, read the Microsoft Software License Terms, and then click **Accept**.

The **Log Entries** pane displays a confirmation message when the integration pack is successfully registered.

#### **To deploy an integration pack**

1. In the navigation pane of **Deployment Manager**, right-click **Integration Packs**, click **Deploy IP to Action Server or Client**.
2. Select the integration pack that you want to deploy, and then click **Next**.
3. Enter the name of the runbook server or computers with the Runbook Designer installed, on which you want to deploy the integration pack, click **Add**, and then click **Next**.
4. Continue to add additional runbook servers and computers running the Runbook Designer, on which you want to deploy the integration pack. Click **Next**.
5. In the **Installation Options** dialog box, configure the following settings.
6. To choose a time to deploy the integration pack, select the **Schedule installation** check box, and then select the time and date from the **Perform installation** list.
7. Click one of the following:
  - **Stop all running runbooks before installing the integration pack** to stop all running runbooks before deploying the integration pack.
  - **Install the Integration Packs without stopping the running Runbooks** to install the integration pack without stopping any running runbooks.
8. Click **Next**.
9. In the **Completing Integration Pack Deployment Wizard** dialog box, click **Finish**.
10. When the integration pack is deployed, the **Log Entries** dialog box displays a confirmation message.

#### **Warning**

If you did not configure a deployment schedule, the integration pack deploys immediately to the computers that you specified. If you configured a deployment schedule, verify that the deployment occurred by verifying the event logs after the scheduled time has passed.

#### **To upgrade an integration pack**

1. On all computers that have a runbook server or Runbook Designer installed, uninstall any earlier version of the integration pack. You can achieve this by one of following steps: Register and deploy the upgraded integration pack as described above in To register an integration pack and To deploy an integration pack.
  - Log on into each computer and uninstall the integration pack from **Programs and Features** in Control Panel.

- On the management server, start the Deployment Manager, and then right click on the deployed integration pack for each Runbook Server or Runbook Designer computer and click **Uninstall Integration Pack or Hotfix**.
2. Register and deploy the upgraded integration pack as described above in “To register an integration pack” and “Register and deploy the upgraded integration pack as described above in To register an integration pack and [To deploy an integration pack](#).
  3. Deploy the integration pack upgrade as described above in [To deploy an integration pack](#).

## See Also

[Perform Post-Installation Tasks](#)

## How to Install GnuPG

GnuPG is an open source program used by the standard activities **PGP Encrypt File** and **PGP Decrypt File** to encrypt and decrypt files. The following procedure describes how to install this executable program and associated file on a runbook server or computer that is running the Runbook Designer.

### To install GnuPG

1. Download **gpg.exe** and **iconv.dll**, version 1.4.10 or later, from [GnuPG](#).
2. Save **gpg.exe** and **iconv.dll** to the <System drive>\Program Files (x86)\Common Files\Microsoft System Center 2012\Orchestrator\Extensions\Support\Encryption folder on each runbook server and computer that is running the Runbook Designer.

## See Also

[Perform Post-Installation Tasks](#)

## Migrate Opalis Policies to Orchestrator

You can migrate Policies developed for Opalis Integration Server 6.3 to System Center 2012 - Orchestrator. These migrated Policies are converted to runbooks, and might require additional authoring to function correctly. If you are using an earlier release than Opalis Integration Server 6.3, you must upgrade to version Opalis Integration Server 6.3 before you can migrate your Policies to Orchestrator.

This section describes the tasks you perform to migrate Opalis Policies to System Center 2012 - Orchestrator.

### Opalis Policy migration

- [Policy Migration Overview](#)

Describes the steps to successfully migrate your Opalis Policies.

- [Planning your Opalis Policy Migration](#)  
Describes issues to consider before you migrate your Opalis Policies.
- [How to Migrate Opalis Policies to Orchestrator](#)  
Describes how to migrate your Opalis Policies to Orchestrator.
- [Modify Migrated Orchestrator Runbooks](#)  
Describes required modifications for newly migrated Orchestrator runbooks.
- [How to Test Migrated Runbooks](#)  
Describes how to test your newly migrated Orchestrator runbooks.

### Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Perform Post-Installation Tasks](#)
- [How to Install an Integration Pack](#)
- [How to Install GnuPG](#)
- **How to Change the Orchestrator database**
- **How to change the Orchestrator Users Group**

### Policy Migration Overview

Use the following guide to migrate Policies from Opalis Integration Server 6.3 to Orchestrator.

Task	Information
1. Plan your Opalis Policy Migration.	<a href="#">Planning your Opalis Policy Migration</a>
2. Migrate your Opalis Policies and import them into Orchestrator.	<a href="#">How to Migrate Opalis Policies to Orchestrator</a>
3. Update your newly imported runbooks.	<a href="#">Modify Migrated Orchestrator Runbooks</a>
4. Test your new runbooks with Orchestrator.	<a href="#">How to Test Migrated Runbooks</a>

#### See Also

[Migrate Opalis Policies to Orchestrator](#)

### Planning your Opalis Policy Migration

The following sections provide important details when you migrate Opalis 6.3 Policies to System Center 2012 - Orchestrator.

Topic	Information
Summary of supported migration paths for Opalis Policies.	<a href="#">Supported Opalis Policy Migration Paths</a>
System requirements for migrating Opalis Policies to Orchestrator.	<a href="#">System Requirements</a>
Modify Opalis Policies that contain special characters.	<a href="#">Modify Opalis Policies that Contain Special Characters</a>

**See Also**

[Migrate Opalis Policies to Orchestrator](#)

**Supported Opalis Policy Migration Paths**

The following table summarizes the valid migration paths of Opalis Policies to System Center 2012 - Orchestrator.

Product	Upgrade path
Opalis Robot, all versions	Not supported.
Opalis Integration Server, all versions 5.2 and earlier	Not supported.
Opalis Integration Server 5.3, 5.4, 5.45, 5.5, 5.51, 5.52, 5.6, 5.6.1, 5.6.2, 6.0, or 6.2	Upgrade the earlier version of Opalis to Opalis Integration Server 6.3 and then migrate an Opalis Integration Server 6.3 Policy to Orchestrator.
Opalis Integration Server 6.3	Export Policies from Opalis 6.3 and import them into Orchestrator as runbooks.

For information about how to upgrade earlier versions of Opalis Integration Server to Opalis Integration Server 6.3, see [Opalis Integration Server 6.3](#).

**See Also**

[Migrate Opalis Policies to Orchestrator](#)

**System Requirements**

The operating systems supported for Orchestrator differ from the supported operating systems for Opalis Integration Server 6.3. Although both products run on Windows Server 2008 R2, they cannot be installed on the same system. There is no common database support for both products.

Product	Supported operating systems and software
Opalis Integration Server 6.3	Windows Server 2003 (32-bit) Service Pack 2 Windows Server 2003 R2 (32-bit) Service Pack 2 Windows Server 2008 (32-bit or 64-bit) Windows Server 2008 R2 Microsoft SQL Server 2005 SQL Server 2008 Oracle Server versions 9.2, 10.x, and 11
System Center 2012 - Orchestrator	Windows Server 2008 R2 SQL Server 2008 R2

**See Also**

[Migrate Opalis Policies to Orchestrator](#)

**Modify Opalis Policies that Contain Special Characters**

Occasionally Opalis Policies contain special characters. These characters are in objects and links between objects in Opalis Policies. You must remove these characters from Opalis Policies before they are migrated to Orchestrator. The following Microsoft SQL Server query runs against the Opalis database to locate Policies that contain special characters. The results provide information about the objects and links where special characters appear.

When a **Name** or **Description** field is located that contains these special characters, select the field and use CTRL+A to select its entire contents. Delete the field contents, and then replace the contents with supported characters.

```

SELECT
    Policies.Name,
    Objects.Name,
    Objects.Description
FROM
    Objects join
    Policies
    on Objects.ParentID=Policies.UniqueID
where
    ASCII(Objects.Name) < 32
    or ASCII(CAST(Objects.Description as nvarchar(max))) < 32 and
    Policies.Deleted is NULL

```

## See Also

[Migrate Opalis Policies to Orchestrator](#)

## How to Migrate Opalis Policies to Orchestrator

You can migrate existing Opalis Integration Server 6.3 Policies to System Center 2012 - Orchestrator. You have to export the Policies from Opalis Integration Server 6.3 and then import them into Orchestrator, which converts them into runbooks.

### ► To export Opalis Policies

1. Identify the Opalis Integration Server 6.3 Policies that you want to migrate to Orchestrator. Export the Policies you want and any required global settings.
2. In the Opalis Integration Server 6.3 Client, click **Actions**, and then click **Export**.



#### Tip

If exports take a long time to complete, they will take a long time to import. Consider breaking up an export into several smaller exports by selecting groups of Policies in the Opalis Integration Server 6.3 Client.

### ► To import Opalis Policies into Orchestrator

1. Copy the export file to the computer where Orchestrator Runbook Designer is installed.
2. In the Runbook Designer, click **Actions**, and then click **Import**. Select the exported Opalis file as the source for the import.
3. The **Import** dialog box provides a box for a password. When you import Orchestrator runbooks, leave the **Password** box blank, and then click **Finish**.

## See Also

[Perform Post-Installation Tasks](#)

## Modify Migrated Orchestrator Runbooks

Opalis Policies and Orchestrator runbooks do not share all settings or features. Migrated runbooks must be modified so that the runbook functions correctly in Orchestrator. For each migrated runbook, you should update the runbook to meet current requirements.

This topic provides information about how to update migrated Orchestrator runbooks.

### Opalis Policy Mode setting

Opalis Integration Server 6.3 provides two modes for Policies that defined the behavior of the publish and subscribe data bus. To access this property, right-clicking a **Policy** tab in the Opalis Integration Server 6.3 Client to select **Properties**. The **Policy Mode** setting is located on the **Run Behavior** tab. If the **Run in pipeline mode** box is not selected, the workflow is configured for “legacy” mode.

Legacy mode was retained in Opalis Integration Server 6.3 to provide backwards compatibility with older versions of Opalis software. In Opalis Integration Server 6.3, the default policy mode for new workflows is “pipeline.”

Orchestrator does not provide a runbook mode setting. The **Policy Mode** property of an Opalis Policy is now the **Job Concurrency** property in Orchestrator. Runbooks in Orchestrator use a data model compatible with Opalis Integration Server 6.3 pipeline mode.

You can import Opalis Integration Server 6.3 Policies that used legacy mode successfully into Orchestrator. However, the legacy mode is not compatible with Orchestrator. You can identify legacy mode runbooks by looking at the toolbar of the imported runbook. If the runbook is **Checked In**, the runbook was an Opalis Integration Server 6.3 pipeline workflow. If the runbook is **Checked Out**, the Opalis Integration Server 6.3 workflow was a legacy workflow.

The following table summarizes the Opalis Integration Server 6.3 workflow mode settings and show how these workflows are treated when they are migrated to Orchestrator runbooks.

Opalis policy mode	Migrated runbook property
Legacy	Runbooks show <b>Checked Out</b> after being imported and have to be checked in to update the runbook.
Pipeline mode	Runbooks show <b>Checked In</b> after being imported.

### Unsupported structures

When you check in a runbook that was a legacy Policy in Opalis, the Runbook Designer shows a warning if the runbook contains a structure that is not valid. You must resolve these warnings before the runbook functions correctly.



#### Note

The check-in succeeds even if a warning is produced. Check out the runbook to correct the structure that is not valid.

### Multiple starting points

Runbooks can only contain one activity as a starting point. If the migrated runbook contains multiple starting activities, check-in produces a warning.

Update the runbook to contain a single starting activity.

### Cycles

Runbooks cannot contain smart links that originate with one runbook activity and reference an earlier runbook activity. These runbook structures are called cycles. Cycles are supported in Opalis Integration Server 6.3 legacy mode. Orchestrator does not support runbooks that contain cycles. If you check in a runbook that contains a cycle, you receive a warning.

Update the runbook so it does not contain a cycle.



### Opalis ROI setting

Opalis Integration Server 6.3 provided a Policy property to track return on investment (ROI). To can view this runbook property, right-click a **Policy** tab in the Opalis Integration Server Client to select **Properties**. The ROI settings for a given runbook are located on the **ROI** tab.

The **ROI** is not supported in Orchestrator. Orchestrator ignores these settings if they are present in imported Opalis Integration Server 6.3 workflows.

### Opalis legacy objects

Opalis Integration Server 6.3 provides workflow objects known as legacy objects. These objects support older versions of Opalis software for backwards compatibility. Orchestrator does not provide support for legacy objects. In the Runbook Designer, references to these legacy objects in imported runbooks are marked with an activity icon that contains a question mark (?).

Orchestrator provides equivalent standard activities for the legacy objects. Update migrated runbooks to remove the legacy object and replace it with an Orchestrator equivalent. The following table lists a suitable replacement for Opalis Integration Server 6.3 legacy objects.

Opalis legacy object	Orchestrator activity or resource
Manage Text File	Orchestrator <b>Text File Management</b> category ( <b>Append Line</b> , <b>Delete Line</b> , <b>Find Text</b> , <b>Get Lines</b> , <b>Insert Line</b> , <b>Read Line</b> , and <b>Search and Replace Text</b> activities)
Create Folder	Create Folder
Delete Folder	Delete Folder
Copy File	Copy File
Delete File	Delete File
Move File	Move File
Rename File	Rename File
Get File Status	Get File Status
Monitor File	Monitor File
Monitor Folder	Monitor Folder
Filter Email	Run .NET Script or Orchestrator Integration Toolkit
Process Email	Run .NET Script or Orchestrator Integration Toolkit
Read Email	Run .NET Script or Orchestrator Integration Toolkit

Opalis legacy object	Orchestrator activity or resource
Filter Exchange Email	<a href="#">Community Integration Pack</a>
Process Exchange Email	<a href="#">Community Integration Pack</a>
Read Exchange Email	<a href="#">Community Integration Pack</a>

### Opalis Policy objects not supported in Orchestrator

There are a small number of Opalis Integration Server Policy objects that do not have an equivalent Orchestrator runbook activity. The Runbook Designer marks these references to unsupported objects with a question mark (?). The following table lists the unsupported Policy objects.

Opalis object	Details
Send Page	Infrequently used and out-of-date.
Purge Event Log	Infrequently used and out-of-date.
Send Pop-Up	Unsupported.
Monitor Event Log Capacity.	Infrequently used and out-of-date. Replaced by functionality found in System Center 2012 – Operations Manager.
Monitor Performance	Infrequently used and out-of-date. Replaced by functionality found in Operations Manager.
Disconnect Dial-Up	Infrequently used and out-of-date.
Get Dial-Up Status	Infrequently used and out-of-date.
Wait	Only meaningful in Opalis Integration Server 6.3 legacy mode runbooks. Junction is the closest Orchestrator activity.

### Opalis Policies that use missing objects

Run the following SQL Server query against either the Opalis data store or the Orchestrator database to identify the Opalis Policies that contain objects that are no longer available in Orchestrator. This query returns both the Opalis Policy name and the name of the object in the Policy. Any Policy identified by this query must be updated after it has been imported into Orchestrator to remove the reference to the deprecated object.

```
Select
    policies.[Name] as [Policy Name],
    objects.[Name] as [Object Name]
```

From

```
[Objects] objects join
[Policies] policies
on objects.[ParentID]=policies.[UniqueID]
```

Where

```
objects.objecttype = '2081B459-88D2-464A-9F3D-27D2B7A64C5E' or
objects.objecttype = '6F0FA888-1969-4010-95BC-C0468FA6E8A0' or
objects.objecttype = '8740DB49-5EE2-4398-9AD1-21315B8D2536' or
objects.objecttype = '19253CC6-2A14-432A-B4D8-5C3F778B69B0' or
objects.objecttype = '9AB62470-8541-44BD-BC2A-5C3409C56CAA' or
objects.objecttype = '292941F8-6BA7-4EC2-9BC0-3B5F96AB9790' or
objects.objecttype = '98AF4CBD-E30E-4890-9D26-404FE24727D7' or
objects.objecttype = '2409285A-9F7E-4E04-BFB9-A617C2E5FA61' or
objects.objecttype = 'B40FDFBD-6E5F-44F0-9AA6-6469B0A35710' or
objects.objecttype = '9DAF8E78-25EB-425F-A5EF-338C2940B409' or
objects.objecttype = 'B5381CDD-8498-4603-884D-1800699462AC' or
objects.objecttype = 'FCA29108-14F3-429A-ADD4-BE24EA5E4A3E' or
objects.objecttype = '7FB85E1D-D3C5-41DA-ACF4-E1A8396A9DA7' or
objects.objecttype = '3CCE9C71-51F0-4595-927F-61D84F2F1B5D' or
objects.objecttype = '96769C11-11F5-4645-B213-9EC7A3F244DB' or
objects.objecttype = '6FED5A55-A652-455B-88E2-9992E7C97E9A' or
objects.objecttype = '9C1DF967-5A50-4C4E-9906-C331208A3801' or
objects.objecttype = 'B40FDFBD-6E5F-44F0-9AA6-6469B0A35710' or
objects.objecttype = '829A951B-AAE9-4FBF-A6FD-92FA697EEA91' or
objects.objecttype = '1728D617-ACA9-4C96-ADD1-0E0B61104A9E' or
objects.objecttype = 'F3D1E70B-D389-49AD-A002-D332604BE87A' or
objects.objecttype = '2D907D60-9C25-4A1C-B950-A31EB9C9DB5F' or
objects.objecttype = '6A083024-C7B3-474F-A53F-075CD2F2AC0F' or
objects.objecttype = '4E6481A1-6233-4C82-879F-D0A0EDCF2802' or
objects.objecttype = 'BC49578F-171B-4776-86E2-664A5377B178'
```

## See Also

[Migrate Opalis Policies to Orchestrator](#)

## How to Test Migrated Runbooks

After you migrate and update your migrated runbooks, test the migrated runbooks to verify that they function correctly. You test runbooks with the Runbook Tester, located in the Runbook Designer. To perform testing successfully, your imported runbook must satisfy the following criteria:

- The runbook does not produce any warnings when checked in.
- The runbook does not use any legacy or missing Opalis Integration Server 6.3 Policy objects.
- The runbook does not contain an **Invoke Runbook** activity that has to run as part of testing.

Observe the runtime characteristics of the runbook. In most cases, the behavior is unchanged from the behavior in Opalis Integration Server 6.3. If there are differences in behavior, these are typically associated with differences in behavior between legacy mode and pipeline mode in Opalis Integration Server 6.3.

### See Also

[Migrate Opalis Policies to Orchestrator](#)

## How to Configure the Orchestrator Web Service to use HTTPS

Use the following steps to configure Secure Sockets Layer (SSL) for the System Center 2012 - Orchestrator web service and Orchestration console.

### ► To configure the Orchestrator web service to use Secure Sockets Layer (SSL)

1. Request and install a certificate on the computer where you installed the Orchestrator web service. For guidance about requesting and installing a certificate, see [How to implement SSL in IIS](#) on the Microsoft Support website.
2. Configure SSL on the machine that hosts the web service and Orchestration console. The default port for the web service is port 81, and the default port for the Orchestration console is port 82. You should configure the ports as appropriate for your installation. You can configure the bindings by performing the following steps:
  - a. Open **Internet Information Services (IIS) Manager**.
  - b. In the **Connections** pane, expand the Orchestrator web server, expand **Sites**, and then click **Microsoft System Center 2012 Orchestrator Web Service**.
  - c. In the **Actions** pane, click **Bindings**.
  - d. In the **Site Bindings** dialog box, click **Add**.
  - e. In the **Add Site Binding** dialog box, in the **Type** box, select **https** and select your **SSL certificate**.
  - f. Specify the **Port** to use. The default of 443 is recommended.
  - g. Click **OK**.
  - h. Click **Close**.
3. In the **Microsoft System Center Orchestrator 2012 Orchestration Web Service** pane, under **IIS**, double-click **SSL settings**.

4. In the **SSL Settings** pane, select **Require SSL**.
5. Click **Apply**.
6. Repeat the procedure for **Microsoft System Center 2012 Orchestrator Orchestration Console** using a different port. Port 444 is recommended.

For more information about securing Internet Information Services (IIS) 7, see <http://go.microsoft.com/fwlink/p/?LinkId=231416>.

### ► To update the Orchestration console web.config file

1. On your Orchestrator web server, locate the **web.config** file at **C:\Program Files (x86)\Microsoft System Center 2012\Orchestrator\Orchestration Console .**
2. Open **web.config** in an editor.
3. Locate the service URI key, and update the key to connect to the web service through HTTPS. For example: change `<add key="ScoServiceUri" value="http://<domain>:81/Orchestrator2012/Orchestrator.svc"/>` to `<add key="ScoServiceUri" value="https://<domain>:443/Orchestrator2012/Orchestrator.svc"/>`.



#### Note

If you used a port for the web service other than 443, then use that port number.

## See Also

[Perform Post-Installation Tasks](#)

# Troubleshoot Your Orchestrator Installation

The latest troubleshooting information for System Center 2012 - Orchestrator is available in the release notes at **Release Notes for Orchestrator**. The following information provides additional instructions and caveats that you can use during installation to resolve problems you might experience.

## Orchestrator log files

If you experience problems during installation, installation log files are located in the folder **C:\Users\%USERNAME%\AppData\Local\SCO\LOGS**.

If you experience problems when you are running Orchestrator, the product log files are located in the folder **C:\ProgramData\Microsoft System Center 2012\Orchestrator\**.

## Windows Firewall

When you deploy additional Runbook Designer applications to your environment, you might see a failed installation message. To correctly install the Runbook Designer, enable the following firewall rules as they apply to your operating system and deployment configuration.

## Windows Firewall with Advanced Security for Windows Server 2012 R2

By default, **Windows Firewall with Advanced Security** is enabled on all Windows Server 2008 R2 computers, and blocks all incoming traffic unless it is a response to a request by the host, or it is specifically allowed. You can explicitly allow traffic by specifying a port number, application name, service name, or other criteria by configuring Windows Firewall with Advanced Security settings.

If you are running Windows Server 2012 R2, enable the following rules to allow all Monitor Event activities to function correctly:

- Windows Management Instrumentation (Async-In)
- Windows Management Instrumentation (DCOM-In)
- Windows Management Instrumentation (WMI-In)

### Automated deployment

When a runbook server or Runbook Designer is installed behind a firewall, specific firewall rules are required between the remote computers that are used to deploy the runbook server and Runbook Designer. An additional rule is required for the remote connection between the Runbook Designer and the runbook server to allow the Orchestrator management service to accept remote connections. If you are using the **Monitor WMI** task, the runbook server requires a special firewall rule on the computer that uses PolicyModule.exe.

Enable the following firewall rules on your computer:

### Firewall rule between the Runbook Designer and the Orchestrator management server

Operating system	Firewall rule
64-bit	%ProgramFiles (x86)%\Microsoft System Center 2012 R2\Orchestrator\Management Server\OrchestratorManagementService.exe
32-bit	%ProgramFiles%\Microsoft System Center 2012 R2\Orchestrator\Management Server\OrchestratorManagementService.exe

### Firewall rules between remote computers

Operating system	Firewall rules
Windows Server 2008 R2	<ul style="list-style-type: none"><li>• File and Printer Sharing</li><li>• Windows Management Instrumentation (WMI)</li><li>• Program rule for OrchestratorRemotingService to accept remote connections. This rule must be enabled through the Advanced Firewall mode:<ul style="list-style-type: none"><li>• %SystemRoot%\SysWOW64\OrchestratorRemotingService.exe (for a 64-bit operating system)</li></ul></li></ul>

Operating system	Firewall rules
	<ul style="list-style-type: none"> <li>• %SystemRoot%\System32\OrchestratorRemotingService.exe (for a 32-bit operating system)</li> </ul>

#### Firewall rules between the runbook server and the computer that uses PolicyModule.exe

Operating system	Firewall rule
64-bit	%ProgramFiles (x86)%\Microsoft System Center 2012 R2\Orchestrator\Runbook Server\PolicyModule.exe
32-bit	%ProgramFiles\Microsoft System Center 2012 R2\Orchestrator\Runbook Server\PolicyModule.exe

For more information about adding firewall rules, see [Add or Edit a Firewall Rule](#).

### RunbookService fails to start after computer reboot

When you reboot your runbook server, the RunbookService attempts to connect to the orchestration database. If the database is not available, the RunbookService fails. The event log message is **This computer was unable to communicate with the computer providing the server..** Typically, this can occur when the SQL server and the runbook server are installed on the same computer.

To solve this problem, you can manually start the RunbookService, or configure the RunbookService to make multiple attempts during startup to connect to database before failing.

### Cannot restart runbook service if you uninstall with an account without administrator permissions

If you attempt to uninstall Orchestrator while logged in with an account that is a member of OrchestratorSystemGroup but is not an administrator, uninstall removes all accounts from OrchestratorSystemGroup. If you stop the runbook service and attempt to restart the service, the services fails because the user account does not have the correct permissions to retrieve the orchestration database connection. An account that is an administrator or a member of the OrchestratorSystemGroup is required to retrieve the orchestration database connection.

To solve this problem, an administrator can add the user back to OrchestratorSystemGroup.

### HTTP errors when starting the Orchestration console

If you get HTTP errors when starting the Orchestration console, try the following mitigations:

- **HTTP error 404.3 – Not Found:** Ensure that both .NET Framework 4.5 and Windows Communication Foundation (WCF) HTTP Activation are installed. You can find the instructions in [Single-Computer Requirements for System Center 2012 R2 Orchestrator](#).
- **HTTP error 404.17 – Not Found:** Ensure that Windows Communication Foundation (WCF) HTTP Activation is installed. You can find the instructions in [Single-Computer Requirements for System Center 2012 R2 Orchestrator](#).

## Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- [Deploying System Center 2012 - Orchestrator](#)
- [Deployment Overview](#)
- [Plan Your Orchestrator Deployment](#)
- [Install Orchestrator](#)
- [Perform Post-Installation Tasks](#)