System Center Orchestrator 2012 Deployment Guide

Microsoft Corporation

Published: September 2011

Feedback

Send suggestions and comments about this document to orchestratordocs@microsoft.com.

Copyright

Contents

System Center Orchestrator 2012 Deployment Guide

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

System Center Orchestrator 2012 deployment topics

- Deployment Overview

  A brief overview of the steps to deploy Orchestrator.
- Plan your Orchestrator Deployment

  Planning guidelines and best practices for your Orchestrator deployment.
- Install System Center Orchestrator

  Step-by-step instructions to install Orchestrator.
- Perform Post-installation Tasks

  Required and optional post-installation tasks.

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- **System Center Orchestrator 2012 Integration Packs**

- **System Center Orchestrator 2012 Getting Started Guide**
- **System Center Orchestrator 2012 Runbook Activity Reference**

Deployment Overview

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

Use the following steps to install Orchestrator.

Task	Information
Step 1: Plan your deployment	Plan your Orchestrator Deployment
Step 2: Review the system prerequisites	System Requirements
Step 3: Install Orchestrator	Install System Center Orchestrator
Step 4: Perform post-installation tasks	Perform Post-installation Tasks

Note
This release supports only System Center Orchestrator 2012 compatible databases. You cannot use Opalis 6.3 or System Center Orchestrator 2012 beta version databases with this product.

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Plan your Orchestrator Deployment
- Install System Center Orchestrator
- Perform Post-installation Tasks

Plan your Orchestrator Deployment

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

Planning Your Deployment

- System Requirements
  Hardware, operating system, and software requirements for Orchestrator.
- Orchestrator Security Planning
  Service accounts and security groups for Orchestrator.
- TCP Port Requirements

TCP Port and web service planning for Orchestrator.

- Scale Planning

  Scale planning for Orchestrator.

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Deployment Overview
- Install System Center Orchestrator
- Perform Post-installation Tasks

System Requirements

The following sections describe the system requirements for System Center Orchestrator 2012 depending your particular configuration and choice of features to install.

System Requirements topics

- Single-Computer Requirements

  This topic describes the minimum hardware and software requirements of a single computer running all Orchestrator features.

- Individual Feature Requirements

  This topic 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**
- System Center Orchestrator 2012 Deployment Guide
- Plan your Orchestrator Deployment
- Orchestrator Security Planning
- TCP Port Requirements
- Scale Planning

Single-Computer Requirements

This section describes the minimum hardware and software configuration required for a full installation of System Center Orchestrator 2012 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 2.1GHz+ 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, 32-bit

Software

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

- Microsoft SQL Server 2008 R2

  Note
  Management servers and Runbook servers installed on the same computer must use the same database. The Management server must run on a 32-bit operating system. You can use a database that is running on a 64-bit operating system if the database is running is on a separate computer from the Management server.
- Microsoft Internet Information Services (IIS) – Orchestrator Setup enables IIS if it is not enabled.
- Microsoft .NET Framework 3.5 SP1 - 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:

- Domain-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**
- System Center Orchestrator 2012 Deployment Guide

- 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 System Center Orchestrator 2012 features.

Individual Feature Requirements

- Management Server Requirements
- Runbook Server Requirements
- Orchestrator Web Service Requirements
- Runbook Designer Requirements

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Plan your Orchestrator Deployment
- Single-Computer Requirements

Management Server Requirements

This topic describes the hardware and software requirements for installation of the System Center Orchestrator 2012 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 2.1GHz+ 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, 32-bit

Software

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

- Microsoft SQL Server 2008 R2 - This can either be installed locally on the Management server or on a separate dedicated database server.

  Note
  Management servers and Runbook servers installed on the same computer must use the same database. The Management server must run on a 32-bit operating system. You can use a database that is running on a 64-bit operating system if the database is running is on a separate computer from the Management server.

The target computer requires the following software to install the Orchestrator Management server:

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

Runbook Server Requirements

This topic describes the hardware and software requirements for installation of the System Center Orchestrator 2012 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 2.1GHz+ 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, 32-bit or 64-bit

Software

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

- A functional Orchestrator Management server and database.

The target computer requires the following software to install the Orchestrator Runbook server:

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

Orchestrator Web Service Requirements

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 2.1GHz+ 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, 32-bit or 64-bit

Software

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

- A functional Orchestrator Management server and database.

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

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

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

Runbook Designer Requirements

This topic describes the hardware and software requirements for an installation of the System Center Orchestrator 2012 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 2.1GHz+ 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, 32-bit or 64-bit 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 target computer requires the following software to install the Orchestrator Runbook Designer:

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

Orchestrator Security Planning

This topic describes the service account and user account requirements for your System Center Orchestrator 2012 deployment. You should review this topic and create the required accounts and groups before starting the Orchestrator installation.

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 on each account are provided below.

Server	Service
Management server	Orchestrator Management Service
Runbook Server	Orchestrator Runbook Service Orchestrator Runbook Server Monitor 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. This is the same account used by the Runbook Service to access system resources. The Orchestrator Management Service is responsible for maintaining the Orchestrator 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. However, this configuration may not allow access to other network resources. If the database is located on another server, then the account must be in Active Directory so it can be granted access to the database server.

This service account does not have to be an Administrator or a domain Administrator account, but it should be a member of the Administrators group on the computer where the Management Server Service and Runbook Service is installed.

The service account for the Management server service must have the following permissions:

- Permission to logon to the Management server as a service. This right is automatically granted during the installation process.
- Member of the Microsoft.SystemCenter.Orchestrator.Admins role in the Orchestrator database. The account is automatically added to this role during the installation process.

Orchestrator Runbook Server Monitor service account

The Orchestrator Management Service 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. On the Management server, the Orchestrator Runbook Service will use the same account as the Orchestrator Runbook Service. If you install additional Runbook servers, you can specify a different service account. The service is responsible for running runbooks and for communicating with the Orchestrator database.

By default, all activities in a runbook will run under the service account of the Runbook server they are running on. Some activities can specify different credentials to be used for individual actions as required. Because runbook activities often access resources on other computers, the account used for the Orchestrator Runbook Service should be an Active Directory 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 logon to the Management server as a service. This right is automatically granted during the installation process.
- Depending on the resources that the activities in your runbooks will access, the service account may require additional rights 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 Runbook server

You specify the Orchestrator Users group during the Orchestrator installation process. Because the Orchestrator web services use the same group for authorization, then 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, then the group can be a local group on the Management server.

The decision of which to use will depend on where you want to manage the group's users. Typically using an Active Directory group will provide 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 on setting permissions for individual runbooks, refer to **Runbook Permissions** in the System Center Orchestrator 2012 Runbook Designer Guide.

Database security

Security to the Orchestrator database is implemented through Database Roles in SQL Server 2008. The table below lists the roles that are created in the Orchestrator 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.

Role	Description	Members	Permissions	Objects
Microsoft.SystemCenter.Orchestrator.Runtime	Provides the services on each Runbook server with access information about runbooks. They are not required to make changes to the runbooks, so they are denied write	Orchestrator Runbook service account Runbook Server Monitor service account	Deny Write	POLICIES table
			Deny Write	OBJECTS table
			Deny Write	Integration Pack specific tables
			Grant Read/Write	All tables, views, and stored procedures not otherwise

Role	Description	Members	Permissions	Objects
	access to the tables that hold this data.			specified
Microsoft.SystemCenter.Orchestrator.Admins	Provides the service on the Management server with read/write access to tables it requires to changes global settings and to create and modify runbooks.	Management server service account	Grant Create	Tables
			Grant Read/Write	All tables, views, and stored procedures not otherwise specified
Microsoft.SystemCenter.Orchestrator.Operators	Provides users with only the requirement to view and run runbooks with minimal access to the database objects required for this functionality.	Orchestration Console Users Users of Web Services	Grant Read/Write	Views and stored procedures specific to Web Services.

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Plan your Orchestrator Deployment
- System Requirements
- TCP Port Requirements
- Scale Planning

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. You must also ensure that the incoming ports are accessible through Windows Firewall. The Orchestrator setup process will not open these ports for you.

Source	Target	Default Port	Configurable	Notes
Runbook Designer	Management server	125, 1024-65535	Yes	The Runbook Designer communicates with the Management server over DCOM. By default, DCOM communicates over port 135 and dynamically allocates a port between 1024-65535. For information on configuring DCOM for a specific port range, see Configuring Microsoft Distributed Transaction Coordinator (DTC) to work through a firewall
Management server Runbook server Web service	Orchestrator database	1433	Yes	Specified during SQL Server 2008 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 targets depending on	Refer to documentation for individual activity in appropriate Integration Pack Guide. See the **System**		

Source	Target	Default Port	Configurable	Notes
	activity	**Center Orchestrator 2012 Integration Packs** topic for information on individual integration packs.		

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Plan your Orchestrator Deployment
- System Requirements
- Orchestrator Security Planning
- Scale Planning

Scale Planning

This section describes planning considerations for designing a large-scale deployment of System Center Orchestrator 2012. When planning your system requirements, you need to take in to consideration how you intend 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

  Description of Orchestrator features and how their behaviors affect system performance.
- Evaluate System Requirements

  Guidance on evaluating your deployment objectives.
- Deployment Recommendations

  Recommendations on the number of systems to install in your Orchestrator deployment.

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- 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 emphasis is identifying processes that occur during runtime, within the web service, and during authoring. While many authoring activities occur outside of a production environment, it is a consideration if ad hoc requests by a Orchestrator Administrator is supported.

Runbooks

Despite the variance in their design and complexity, runbooks have a simple structure. They perform three operations: run activities, manage published data, and perform branch logic. The following sections provide more details on 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 of Orchestrator. For example, the Invoke Web Service standard 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 comparing activities that run similar platform code. Domain code is dependent on latency issues external to Orchestrator. There is potentially great variation in domain code. To understand the domain code dependencies and their impact on runbook performance, it is important to test performance of individual activities before determining production environment requirements.

Published data

Runbooks in Orchestrator allow sharing of data between activities. Every activity consumes published data created by earlier runbook activities. How an activity uses the published data is dependent on the domain code. All runbook activities publish a minimum set of runtime parameters called Common Published Data. Domain code can, but is not required to, publish data. The published data created by the domain code is called Activity Specific Published Data. The data produced by an activity 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 data store is a resource intensive activity. Runbook performance is dependent on the amount of data published by each activity and the performance and resiliency of the computer hosting the data store. As part of planning your performance requirements, take into consideration the amount of published data your runbooks require as well as the performance of the computer hosting your data store.

Branching

Runbook activities create a branch if an activity requires data to pass simultaneously 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 is

dependent 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, take into consideration the number of branches you plan to include in a runbook. Runbooks with large numbers of branches require more processing power on the Runbook servers than runbooks containing no branches.

Operator Experience

The operator experience occurs on the Orchestration console and the Orchestrator web service. The Orchestration console is a Silverlight web application that requires Orchestrator web service to connect to the Orchestrator data store. The Orchestration console and the Orchestrator web service are dependent on the performance of the Orchestrator data store as well as the IIS server hosting the Orchestrator web service.

Service Manager connector

The Orchestrator web service supports the Service Manager connector. Service Manager targets IT customers serving approximately 50,000 users. Service Manager request-management scenarios assume each user submits one request per month. This produces a request volume of 2,500 requests per day (200 requests/hour or approximately 3 every minutes.) Service Manager uses the Orchestrator web service to update the status of Activity work items, 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.

Evaluate System Requirements

This section summarizes the ITIL best practices to determine your deployment requirements as it applies to Orchestrator. The sequence of evaluation criteria is as follow:

Task	Information
1: Define the scope of the project.	**Define scope of work**
2: Identify the tasks you plan to automate.	**Identify tasks**
3: Identify the system workloads for Orchestrator and the tasks you plan to automate.	**Define workloads**
4: Estimate the number of running jobs per hour.	**Determine the number of jobs running**
5: Identify the integration packs required for your environment.	**Identify required integration packs**
6: Determine security requirements.	**Determine the agent security model**

Task	Information
7: Determine the number and placement of Runbook servers.	**Design Runbook server requirements**
8: Determine the fault tolerance requirements.	**Fault tolerance**
9: Identify additional resources required for your deployment	**Resource requirements**
10: Identify network traffic and potential bottlenecks.	**Network**
11: Identify your service and operations requirements.	**Service and operations requirements**
12: Determine level of integration with other System Center products.	**Integration with System Center**
13: Determine authoring requirements.	**Authoring**
14: Design your Orchestrator test environment.	**Test environment**
15: Design your Orchestrator pre-productions environment.	**Pre-deployment environment**

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 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 in order 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. Prioritize these processes based on their business impact. 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 it to run. A runbook that is launched once 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 as well as the automated process. A server that previously responded to manually input requests can behave much differently when the request is input 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 hosting the data store increases.

Determine total jobs running

Once 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 into account a maximum workload. The number and placement of your Runbook servers in addition to the resources of the processes you are automating need to be sized to accommodate the largest number of running runbooks.

Identify required integration packs

Third-party devices and third-party applications 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? Will you need 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 WAN links and trust boundaries? If so, you must determine gateway server placement in relationship to the Orchestrator data store and Runbook servers. While a running Management server is not required to launch runbooks or save runbook data, an Orchestrator data store 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, as well as any additional load created by increased requirements on processes impacted by automation. Do you have adequate Runbook servers for the number of runbooks that can be running at a given time? Is the Orchestrator data store 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, cross-management group requirements, data-retention requirements, data-warehouse size requirements, or fault-tolerance requirements.

Network

Determine if additional bandwidth is required to support the increased traffic generated by the Runbook servers and the Orchestrator data store. Do you need 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 may include the need to author runbooks in an ad hoc manner.

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.

Deployment Recommendations

The following guidelines provide options 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 will not be able to 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 SQL Server cluster with a minimum of two-nodes.

Orchestrator web service

The Orchestrator web service must be installed on a server running 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 will not be able to 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, then it can run on another server. Runbook servers are not designed to run on a computer configured as a cluster node.

For more information on specifying the Runbook servers for a runbook, see the **System Center Orchestrator 2012 Runbook Designer Guide**.

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 a Runbook server can manage.

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

Install System Center Orchestrator

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

Install Orchestrator

- How to Install Orchestrator on a Single Computer

  This topic provides detailed instructions on how to install Orchestrator on a single computer.
- Install Individual Orchestrator Features

  This topic provides detailed instructions on how to install each Orchestrator feature.

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Deployment Overview
- Plan your Orchestrator Deployment
- Perform Post-installation Tasks

How to Install Orchestrator on a Single Computer

Follow the steps below to install all System Center Orchestrator 2012 features on a single computer.

To install Orchestrator on a single computer

1. On the server where you want to install Orchestrator, start the System Center Orchestrator 2012 Setup Wizard by double-clicking **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 Server 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, click **Install**.

   Warning
   If .NET Framework 3.5 SP1 is not installed on your computer, you will see a dialog asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with install.

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 other features can be deselected as needed.

   Tip
   If you want to install only an individual feature after installing a Management server, use the instructions found 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, then click **Next**.

Important
The Orchestrator Management Service account must be created before this step. For more information on the Orchestrator Management Service account, see Orchestrator Management Service account in the Security Planning topic.

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, then 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 on the Orchestrator users group, see Orchestrator Security Planning.

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 on 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 opted-in for Microsoft Update on this machine, 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 install progress.
17. On the **Setup completed successfully** page, optionally indicate whether you want to start Runbook Designer, and then click **Close** to complete the installation.

Install Individual Orchestrator Features

This section provides information on 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
- How to Install a Runbook Server
- How to Install the Orchestrator web service
- How to Install the Runbook Designer

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Install System Center Orchestrator
- How to Install Orchestrator on a Single Computer

How to Install a Management Server

Follow the steps below to install a System Center Orchestrator 2012 Management server.

To install a Orchestrator Management server

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

   To start the System Center Orchestrator 2012 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 Server 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, click **Install**.

   > **Warning**
   > If .NET Framework 3.5 SP1 is not installed on your computer, you will see a dialog asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with install.

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. 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**.
   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, then 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 install 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.

How to Install a Runbook Server

Follow the steps below to install an System Center Orchestrator 2012 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 Orchestrator 2012 Setup Wizard.

   To start the System Center Orchestrator 2012 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 Server 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 .NET Framework 3.5 SP1 is not installed on your computer, you will see a dialog asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with install.

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. 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**.
   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, then 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, then 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 install progress.

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

How to Install the Orchestrator web service

Follow the steps below to install the System Center Orchestrator 2012 web service.

To install the Orchestrator web services

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

   To start the System Center Orchestrator 2012 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 Server 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, click **Install**.

   Warning
   If .NET Framework 3.5 SP1 is not installed on your computer, you will see a dialog asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with install.

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. 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**.

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

How to Install the Runbook Designer

Follow the steps below to install the System Center Orchestrator 2012 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 Desigern, start the System Center Orchestrator 2012 Setup Wizard.

   To start the System Center Orchestrator 2012 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 Server 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, click **Runbook Designer**.

   Warning
   If .NET Framework 3.5 SP1 is not installed on your computer, you will see a dialog asking if you want to install .NET Framework 3.5 SP1. Click **Yes** to proceed with install.

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. 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.
   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 install progress.

6. On the **Setup completed successfully** page, optionally indicate whether you want to start 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 found on the left side of the window, below **Connections**.

Note
If the Runbook Designer is connected to another Management server, the **Connect to a server** icon is disabled. Select the **Disconnect** icon before connecting 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**.

Perform Post-installation Tasks

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

Post-installation tasks

- How To Install an Integration Pack

  Instruction on how to register and deploy Orchestrator integration packs.
- How to Install GnuGP

  Steps on how to install GnuPG.
- Migrate Opalis Policies to Orchestrator

  Instructions on how to migrate Opalis Policies to Orchestrator.
- How to Change the Orchestrator database

  Instructions on how to change the location of the Orchestrator database.
- How to Change the Orchestrator Users Group

  Instructions on how to remove and add members to the Orchestrator Users Group.
- How to Configure Runbook Throttling

  Instructions on how to use the Runbook Server Runbook Throttling utility to change the maximum number of runbooks that can run on a Runbook server.

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Deployment Overview
- Plan your Orchestrator Deployment
- Install System Center Orchestrator

How To Install an Integration Pack

System Center Orchestrator 2012 includes a set of standard activities that are automatically installed with Orchestrator. You can expand Orchestrator's functionality and ability to integrate

with other Microsoft and third-party platforms and products by installing integration packs. Integration packs contain additional activities that each provide a unique function. Microsoft provides integration packs for all of the System Center products, as well as a number of other Microsoft products and technologies and other third party products.

Integration packs are available from the Microsoft Download Center http://www.microsoft.com/download/en/search.aspx?q=System%20Center%20Orchestrator%202012%20Integration%20Pack. Each integration pack has a guide that provides installation instructions, known issues, and provides reference information for the activities in that integration pack. You can review the current integration pack guides at the System Center Orchestrator 2012 Integration Pack library.

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

Installing 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 with Runbook Designer installed. For more information about how to install a specific integration pack, see the integration pack guide.

To register the 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** as this can prevent unregistering the integration pack at a later date.
2. Start the **Deployment Manager**.
3. In the left pane of the Deployment Manager, expand **Orchestrator Management Server**, right-click **Integration Packs**, and then click **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**.

   On the **End User Agreement** dialog box, read the agreement, and then click **Accept**.

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

To deploy the integration pack

1. In the left 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 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 Runbook Designer, on which you want to deploy the integration pack. Click **Next**.
5. In the **Installation Options** dialog box,
6. To choose a time to deploy the integration pack, select **Schedule installation** check box, and then select the time and date from the **Perform installation** list box.
7. Select one of the following:
   a. **Stop all running runbooks before installing the integration pack** to stop all running runbooks before deploying the integration pack.
   b. **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 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.

How to Install GnuGP

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

Migrate Opalis Policies to Orchestrator

You can migrate Policies developed for Opalis Integration Server 6.3 to System Center Orchestrator 2012. These migrated Policies are converted to runbooks, and may require additional authoring to function properly. If you are using an release of Opalis Integration Server older than 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 Orchestrator 2012.

Opalis Policy Migration

- Policy Migration Overview

  A list of steps to follow to successfully migrate your Opalis Policies.
- Planning your Opalis Policy Migration

  Issues to consider before you migrate your Opalis Polices.
- How to Migrate Opalis Policies to Orchestrator

  A step-by-step procedure on how to migrate your Opalis Policies.
- Modify Migrated Orchestrator Runbooks

  Required modifications for newly migrated runbooks.
- How to Test Migrated Runbooks

  A step-by-step procedure on how to test your newly migrated runbooks.

Other resources for this product

- TechNet Library main page for **System Center Orchestrator 2012**
- System Center Orchestrator 2012 Deployment Guide
- Perform Post-installation Tasks
- How To Install an Integration Pack
- How to Install GnuGP
- 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.	Planning your Opalis Policy Migration
2. Migrate your Opalis Policies and import them into Orchestrator.	How to Migrate Opalis Policies to Orchestrator

Task	Information
3. Update your newly imported runbooks.	Modify Migrated Orchestrator Runbooks
4. Test your new runbooks with Orchestrator.	**Test Migrated Runbooks**

Planning your Opalis Policy Migration

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

Topic	Information
Summary of supported migration paths for Opalis Policies.	Supported Opalis Policy Migration Paths
System requirements for migrating Opalis Policies to Orchestrator.	System Requrements
Prepare Opalis policies that contain special characters.	Modfiy Opalis Policies that Contain Special Characters

Supported Opalis Policy Migration Paths

The table below summaries the valid migration paths of Opalis Policies to System Center Orchestrator 2012.

Product	Upgrade Path
Opalis Robot, all versions	Not supported
Opalis Integration Server, all versions prior to 5.3	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 system to Opalis Integration Server 6.3 and then perform an Opalis Integration Server 6.3 Policy migration.
Opalis Integration Server 6.3	Export Policies from Opalis 6.3 and import them in to Orchestrator as runbooks.

For information on how to upgrade earlier versions of Opalis Integration Server to Opalis Integration Server 6.3, go to Migrating Opalis Runbooks to System Center Orchestrator.

System Requrements

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 SQL Server 2005 SQL Server 2008 Oracle Server versions 9.2, 10.x, and 11
System Center Orchestrator 2012	Windows Server 2008 R2 SQL Server 2008 R2

Modfiy Opalis Policies that Contain Special Characters

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

Once a Name or Description field is located that contains these special characters, select the field and use CTRL-A to highlight 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
```

How to Migrate Opalis Policies to Orchestrator

You can migrate existing Opalis Integration Server 6.3 Policies into
System Center Orchestrator 2012. You accomplish by exporting the Policies from Opalis Integration Server 6.3 and them by importing 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 workflows you want and any required global settings.
2. In the Opalis Integration Server 6.3 Client, click **Actions**, and then click **Export**.

To import Opalis Policies in to 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 field for a password. When importing Orchestrator runbooks, leave the password field blank, and then click **Finish**.

Modify Migrated Orchestrator Runbooks

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

This topic provides information on 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. You can access this property by right-clicking a Policy tab in the Opalis Integration Server 6.3 Client and clicking **Properties**. The Policy Mode setting is located on the **Run Behavior** tab. If the **Run in pipeline mode** box is not checked, then 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.

Opalis Integration Server 6.3 Policies that used legacy mode will successfully import 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**, then the runbook was an Opalis Integration Server 6.3 pipeline workflow. If the runbook is **Checked Out**, then the Opalis Integration Server 6.3 workflow was a legacy workflow.

Below is a summary of Opalis Integration Server 6.3 workflow mode settings and how these workflows are treated when migrated to Orchestrator runbooks.

Opalis Policy Mode	Migrated Runbook Property
Legacy	Runbooks are **Checked Out** after being imported and need to be checked in to update the runbook.
Pipeline mode	Runbooks are **Checked In** after being imported.

Unsupported structures

When you check in a Runbooks 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 properly.

Note
The check in will succeed even if a warning is produced. Check out the runbook to correct the invalid structure.

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 will 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). You can view this runbook property by right-clicking a Policy tab in the Opalis Integration Server Client, and then clicking **Properties**. The ROI settings for a given runbook are located in 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 object 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. See the following table to identify a suitable replacement for Opalis Integration Server 6.3 legacy objects.

Opalis Legacy Object	Orchestrator Activity or Resource
Manage Text File	Orchestrator Text File Management category (Append Line, Delete Line, Find Text, Get Lines, Insert Line, Read Line, and Search and Replace Text 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

Opalis Legacy Object	Orchestrator Activity or Resource
	Toolkit
Filter Exchange Email	Community Integration Pack
Process Exchange Email	Community Integration Pack
Read Exchange Email	Community Integration Pack

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 (?). See the following table for 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 Operations Manager.
Monitor Performance	Infrequently used and out of date. Replaced by functionality found in System Center 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 runbook activity.

Opalis Policies that use missing objects

Run the following SQL query against either the Opalis database or the Orchestrator data store to identify the Opalis Policies that contain objects that are no longer available in Orchestrator. This query returns both the Opalis Policy name as well as 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'
```

Identifying Opalis Policies that use special characters

Occasionally Opalis Policies fail to import into Orchestrator because they contain special characters that can only be entered through copy/paste or keyboard combinations. These characters are in objects as well as links between objects in Opalis Policies. You must edit these Policies in Opalis to remove these special characters before they are migrated to Orchestrator. The SQL Server query below is designed to run against the Opalis database. It will help locate workflows that contain special characters. The results provide clues as to the objects and links where these characters appear.

Once a Name or Description field is located that contains these special characters, select the field and use CTRL-A to highlight 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
```

How to Test Migrated Runbooks

After you migrate and update your migrated runbooks, test the migrated runbooks to verify they function properly. You test runbooks with the Runbook Tester, located in the Runbook Designer. In order to be successful during testing, 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 needs 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.

How to Change the Orchestrator database

You may need to change the location of the Orchestrator database after installation. This might be to separate the Management server and database server, move the database to a larger server or a cluster, or just reconfigure based on required changes in your environment. You can use standard SQL Server methods to move the existing database to another server, but then must configure the Orchestrator features to connect to the new server. You must perform this configuration for the Management server, the web service supporting the Orchestration console, and each Runbook server as described in the following procedures.

Management server and Runbook servers

You can use the Data Store Configuration utility to change the connection settings used by the Management server and Runbook servers installed in your environment. The settings for these servers are stored in an encrypted file called **settings.dat**. If you change your data store settings, such as the port, user account access, or computer name, you must re-run the Database Configuration Utility on the Management server and each Runbook server.

To change the database settings for the Management server and Runbook servers

1. From the Management server, select **Start -> All Programs -> Microsoft System Center 2012 -> Orchestrator - > Data Store Configuration**.
2. In the **Server** box, enter the name of the server hosting the database using the format **<server>\<instance>,<port>**. You can click the ellipsis button **(...)** to select the computer. You do not need to include the instance if the Orchestrator database is installed on the default instance. You do not need to include the port if SQL Server is usually installed on the default port 1433.

   If the Orchestrator database is installed on an instance called MyInstance on a computer named MySQLServer that is configured on port 12345, then enter **MySQLServer\MyInstance,12345**.

   If the Orchestrator database is installed on an instance called MyInstance on a computer named MySQLServer that is configured on port 1433, then enter **MySQLServer\MyInstance**.

   If the Orchestrator database is installed on the default instance on a computer named MySQLServer that is configured on port 1433, then enter **MySQLServer**.
3. Select the authentication method to use to connect to the SQL Server:
   - **Windows Authentication** Connect to the SQL Server using Windows authentication.
   - **SQL Authentication** Connect to the SQL Server using a SQL Server user account. Type the **User Name** and **Password** of the SQL Server user account. This account must have rights to create, write, and own a database as well as create, update, and delete rows in the database.
4. Click **Next**.
5. In the **Data Store** pane, select **Use an existing database**.

6. In the **Name** dropdown list box, select the database.
7. Click **Finish**.

Web Service

The web service supporting the Orchestration console does not use the settings.dat file. To change the database settings for the web service, you need to modify the web.config file on the IIS server. You can use **IIS Manager** to modify the file but must first decrypt it using the **aspnet_regiis.exe** tool.

To change the database settings for the Orchestrator web service

1. Logon with administrative privileges to the computer with the Orchestration console installed.
2. Open a Command Prompt with Administrator privileges.
3. Run the following command to decrypt the **web.config** file:

   C:\Windows\Microsoft.NET\Framework\v4.0.30319\aspnet_regiis.exe -pdf "connectionStrings" "C:\Program Files (x86)\Microsoft System Center 2012\Orchestrator\Web Service"
4. Start the IIS Manager by selecting **Start**, **Administrative Tools**, **Internet Information Services (IIS) Manager**.
5. Expand the **Sites** node and select **Microsoft System Center 2012 Orchestrator Web Service**.
6. In the Features View, double-click **Connection Strings**.
7. In the Connections String pane, double-click **OrchestratorContext**.
8. In the **Custom** box, scroll down to the portion of the string that includes the server name (Data Source) and database name (Initial Catalog). Modify these values as required.
9. Click **OK** to close the dialog box.
10. Close **IIS Manager**.
11. Run the following command to encrypt the web.config file:

    C:\Windows\Microsoft.NET\Framework\v4.0.30319\aspnet_regiis.exe -pef "connectionStrings" "C:\Program Files (x86)\Microsoft System Center 2012\Orchestrator\Web Service"

How to Change the Orchestrator Users Group

You may need to change the Orchestrator Users group after installation because of changes in your environment. For example, you may use a local group during installation and later require a change to a domain account.

PermissionsConfig Utility

You can change the Orchestrator Users group using the PermissionsConfig utility which is located on the Management server in <InstallDir>\Management Server. The usage of this utility is as follows:

PermissionsConfig –OrchestratorUsersGroup *GroupName* **–OrchestratorUser** *UserName* **-remote**

You can get an explanation of the parameters for the PermissionsConfig tool by typing:

```
PermissionsConfig –help
```

The parameters are explained in the following table:

Parameter	Details
OrchestratorUsersGroup	The name of the group to use for Orchestrator permissions.
OrchestratorUser	If this parameter is specified with a user name, then the user is given immediate access to Orchestrator whether or not they are a member of the specified group. This is to prevent the requirement for the user to log off and on if the group has just been created.
Remote	Indicates that the Designer can be run from a computer other than the Management server.

For example, to change the Orchestrator users group to a group named Orchestrator Users in a domain called Contoso, use the following command:

```
PermissionsConfig –OrchestratorUsersGroup "Contoso\Orchestrator Users" -remote
```

See Also

Orchestrator Security Planning

How to Configure Runbook Throttling

By default, each Runbook server is configured to simultaneously run a maximum of 50 runbooks. You can change this number using the Runbook Server Runbook Throttling utility. In most cases, you can keep this default setting, but you should consider the resource requirements of the runbooks on a particular server when consider whether to change it. If the server has a number of runbooks with high resource requirements, you may have the runbook server run fewer simultaneously. If they are simple runbooks with minimal requirements, then you may consider increasing the number of simultaneous runbooks.

To configure the maximum number of runbooks that a runbook server will process

1. Start Command Prompt on the Management server.
2. Navigate to <System Drive>:\Program Files (x86)\Microsoft System Center 2012\Orchestrator\Management Server.
3. Type one of the following commands:
   - To apply the change to one runbook server:

     ```
     aspt <RunbookServerName> <MaximumRunningRunbooks>.
     ```

     For example, to set the maximum number of runbooks that RunbookServer1 will run to 40:

     ```
     aspt RunbookServer1 40
     ```

   - To apply the change to all runbook servers:

     ```
     aspt * <MaximumRunningRunbooks>.
     ```

     For example, to set the maximum number of runbooks that all runbook servers will run to 40:

     ```
     aspt * 40
     ```

4. Restart the Runbook server service.

How to Configure the PermissionConfig.exe Tool

Procedure Title

1.

Procedure Title

1.

Section Heading

Insert section body here.

Procedure Title

1.