



# Monitoring and Operating a Private Cloud



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70-246

Orin Thomas

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Orin Thomas

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# Introduction

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The 70-246 exam deals with advanced topics that require candidates to have an excellent working knowledge of both Windows Server 2012 R2 and the products in the System Center 2012 R2 suite. Much of the exam comprises topics that even experienced systems administrators may rarely encounter unless they work with Virtual Machine Manager, Orchestrator, Service Manager, Data Protection Manager, and Operations Manager on a day-to-day basis. To be successful in taking this exam, a candidate not only needs to know how each of these products works when used by itself, but how the products in the System Center suite work together when used to monitor and operate a private cloud.

Candidates for this exam are Information Technology (IT) Professionals who want to validate their advanced Windows Server 2012 R2 operating system and System Center 2012 R2 management skills, configuration skills and knowledge. To pass this exam, candidates require a strong understanding of how to configure data process automation, deploy resource monitoring, configure and maintain service management, as well as managing configuration and protection for private cloud deployments. To pass, candidates require a thorough theoretical understanding as well as meaningful practical experience implementing the technologies involved.

This book covers every exam objective, but it does not cover every exam question. Only the Microsoft exam team has access to the exam questions themselves and Microsoft regularly adds new questions to the exam, making it impossible to cover specific questions. You should consider this book a supplement to your relevant real-world experience and other study materials. If you encounter a topic in this book that you do not feel completely comfortable with, use the links you'll find in text to find more information and take the time to research and study the topic. Great information is available on MSDN, TechNet, and in blogs and forums.

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Note that this Exam Ref is based on publically available information about the exam and the author’s experience. To safeguard the integrity of the exam, authors do not have access to the live exam.





# Configure data center process automation

There is a joke that I heard at the Microsoft Management Summit a few years back on the subject of datacenter automation. When asked how many people would work at a new datacenter, the designer replied, “Only two, a security guard and his dog. And the job of the dog is to bite the security guard if he tries to touch anything.” The point that the presenter was trying to make is that the modern datacenter is so highly automated that it requires few actual physical staff to keep things running. Another benefit of automation is that complex repetitive tasks are handled by pre-configured workflows. Automating a complex process provides you with repeatable results. When you perform complex processes manually, there is always the chance that things will go off the rails should you get distracted. In this chapter you’ll learn about data center process automation using System Center 2012 R2 and Windows Server 2012 R2.

**IMPORTANT**

***Have you read page xv?***

It contains valuable information regarding the skills you need to pass the exam.

## Objectives in this chapter:

- Objective 1.1: Implement workflows
- Objective 1.2: Implement service offerings

## Objective 1.1: Implement workflows

---

Part of an effective private cloud deployment means automating any task that is repeatable using the tools at your disposal. In terms of the 70-246 exam, this means using products in the System Center 2012 R2 suite. In this section, you’ll learn how you can leverage the System Center suite to create complex automation for your organization’s private cloud.

**This section covers the following topics:**

- Implementing runbook automation
- Automating remediation of incidents
- Change and activity management workflows

# Implementing runbook automation

With runbook automation you can automate complicated workflows. Runbooks represent a set of procedures that a server administrator performs on a regular basis. Originally, runbooks were actual physical books. These books contained documentation that described to the server administrator how to perform specific procedures. Today runbooks are software parts that, when triggered, actually perform the procedures with little or minimal direct input from the server administrator. Runbook automation is important in Microsoft private cloud environments because it allows you to automate complex tasks. The System Center product that you use to create runbook automation is System Center 2012 R2 Orchestrator.

## Orchestrator

Unlike Windows PowerShell, which requires you to write scripts using an editor like Windows PowerShell ISE, Orchestrator allows you to build automation using a drag and drop interface called the Runbook Designer. Orchestrator can still call Windows PowerShell scripts, but it also integrates with many other products, including products within the System Center suite through integration packs. An integration pack is a collection of product-specific tasks that you can trigger through Orchestrator. You can download integration packs from the Internet, import them using the System Center 2012 R2 Orchestrator Deployment Manager as shown in Figure 1-1, and then deploy them to your runbook servers.

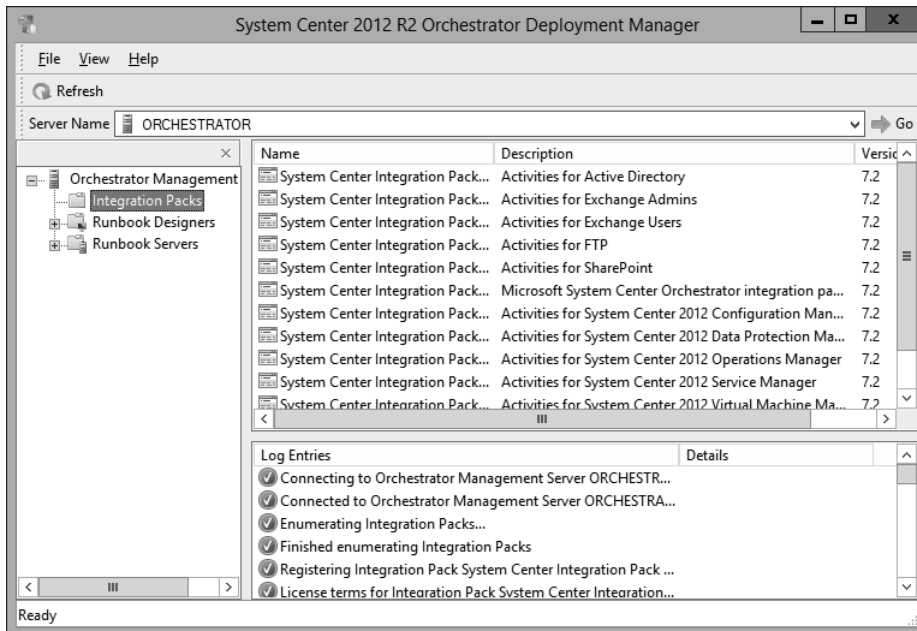


FIGURE 1-1 Orchestrator integration packs

An Orchestrator deployment consists of the following parts:

- **Management server** This server manages the runbook servers. You use the management server to distribute integration packs to runbook servers and runbook designers. The management server also manages communication between the runbook designers, runbook servers, and the orchestration database. There is only one management server in an Orchestrator deployment
- **Runbook server** This server runs Orchestrator runbooks. Each runbook server can run up to 50 runbooks concurrently. You can alter this number using the Runbook Server Runbook Throttling tools, but should monitor the runbook server's resource requirements. You can have multiple runbook servers in an Orchestrator deployment, with no maximum limit to the number of runbook servers specified in the Orchestrator documentation.
- **Runbook Designer** This designer allows you to build and test runbooks. The interface allows you to build runbooks by dragging and connecting activities that are available in integration packs. The Runbook Designer is shown in Figure 1-2.

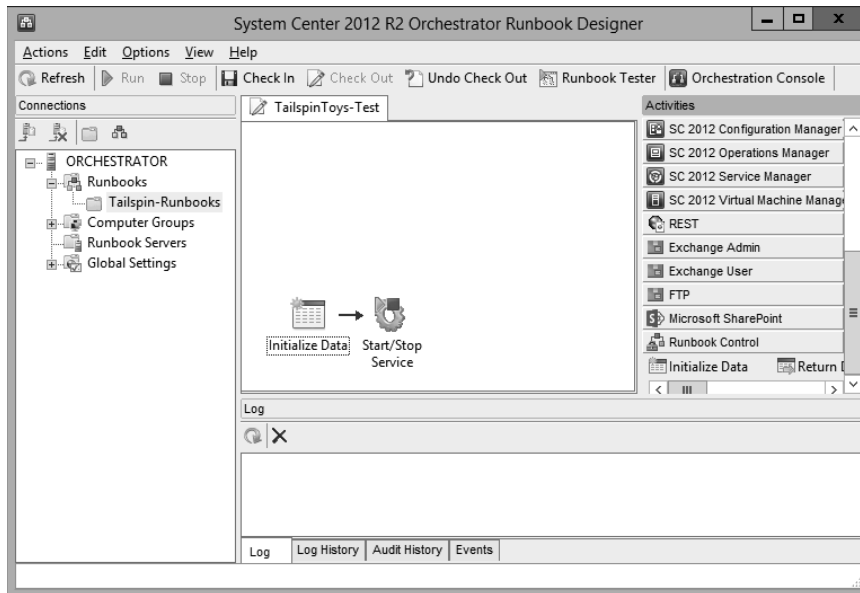


FIGURE 1-2 Runbook Designer

- **Orchestration database** Hosted on a Microsoft SQL Server instance, the orchestration database stores configuration data, policies, and log information.
- **Orchestration console** A web interface that users can use to list, control, and view runbooks.

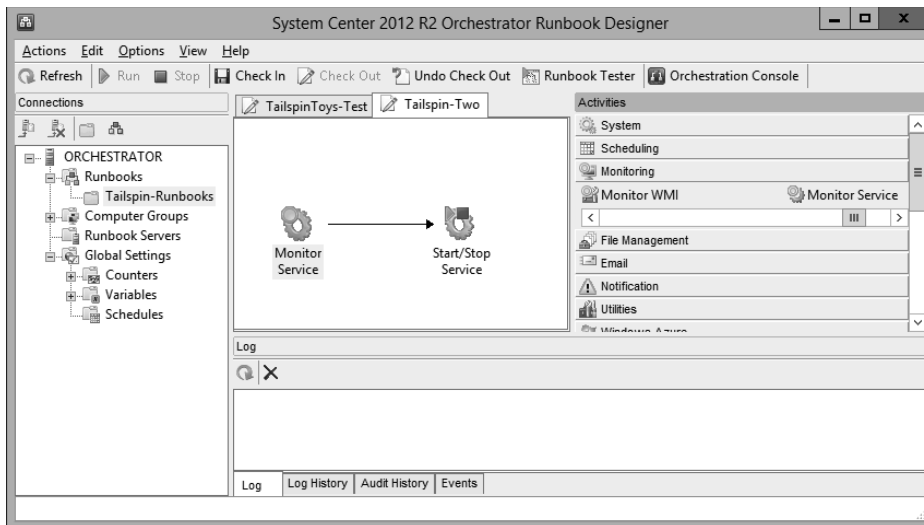
- **Orchestrator Web Service** This web service allows custom applications, third-party tools, and other System Center items such as Service Manager, to connect to Orchestrator and to interact with runbooks.
- **Deployment Manager** The Deployment Manager allows you to deploy integration packs, Runbook Designers, and runbook servers. You use the Deployment Manager to import and deploy integration packs that you've downloaded from the Internet.

#### **MORE INFO ORCHESTRATOR**

You can learn more about Orchestrator at <http://technet.microsoft.com/en-us/library/hh237242.aspx>.

## Runbooks

Runbooks are collections of linked activities that perform a procedure. You build runbooks in Orchestrator by dragging activities from integration packs to the designer workspace. For example, the runbook shown in Figure 1-3 uses two activities. The first activity, named Monitor Service, checks the state of a specific service on a specific computer and triggers if the service is in a specific state (started, stopped, or paused). The second activity, named Start/Stop Service, allows you to start, stop, pause, or restart a service. When the runbook is deployed, it will be triggered when the monitored service is in the state specified in the Monitor Service activity. After being triggered, the runbook will perform the task defined in the Start/Stop Service activity.



**FIGURE 1-3** Simple runbook

This example is very basic. When creating Orchestrator runbooks to perform sophisticated automation tasks, you are likely to use multiple activities and include conditional branches,

loops, and error handling tasks. Each integration pack that you import into Orchestrator increases the number of activities that you can include in your runbooks.

Keep the following in mind when creating Orchestrator runbooks:

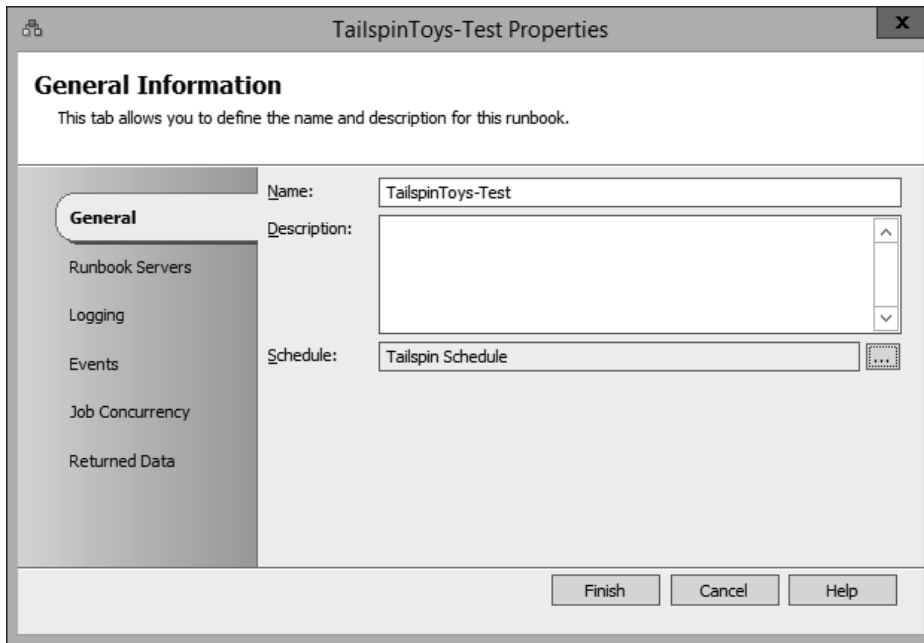
- Provide meaningful names for activities. You can rename activities after you drag them to the designer workspace. By renaming activities with descriptive names, then you can quickly understand what tasks a runbook is designed to accomplish. For example, with the runbook in the example above, you might rename the Monitor Service activity “Is the VMM Service Stopped” and the Start/Stop Service activity “Start the VMM Service.”
- Minimize the number of activities that are performed in a runbook. You can call runbooks from within runbooks. This modular approach to creating runbooks will simplify the process of troubleshooting them.
- Configure runbooks to write logs to external files rather than to the orchestration database.

Orchestrator runbooks run according to configured schedules. You create each run separately, and then assign the schedule to the runbook. You create runbook schedules in the Schedules node, under Global Settings, in the Runbook Designer as shown in Figure 1-4. Creating a runbook schedule involves assigning a name to the schedule, specifying what days of the week or days of the month the schedule applies to, and specifying which hours the schedule applies to.

The screenshot shows a 'New Schedule' dialog box. The title bar reads 'New Schedule'. Below the title bar is a section titled 'Schedule Details' with a subtitle 'This tab allows you to define when this schedule applies.' On the left is a sidebar with three tabs: 'General', 'Details', and 'Exceptions'. The 'Details' tab is selected. The main area contains the following options: 'Days of week:' with a radio button and checkboxes for Sun, Mon, Tue, Wed, Thu, Fri, and Sat; 'Occurrence:' with checkboxes for First, Second, Third, Fourth, and Last; 'Days of month:' with a radio button and an empty text input field; and 'Hours...' with a dotted border. At the bottom are three buttons: 'Finish', 'Cancel', and 'Help'.

FIGURE 1-4 Runbook schedule

Once you've created the schedule, you can apply it to a runbook. You do this by selecting the schedule on the General tab of the runbook's properties, as shown in Figure 1-5.



**FIGURE 1-5** Apply runbook schedule

You check out a runbook to make changes to the runbook. When you check in a runbook, the runbook will be deployed to runbook servers. Checked-in runbooks will also synchronize to Service Manager if you have configured a connector between Service Manager and Orchestrator.

#### **MORE INFO ORCHESTRATOR RUNBOOKS**

You can learn more about creating Orchestrator runbooks at <http://technet.microsoft.com/en-us/library/hh403790.aspx>.

## Automating remediation of incidents

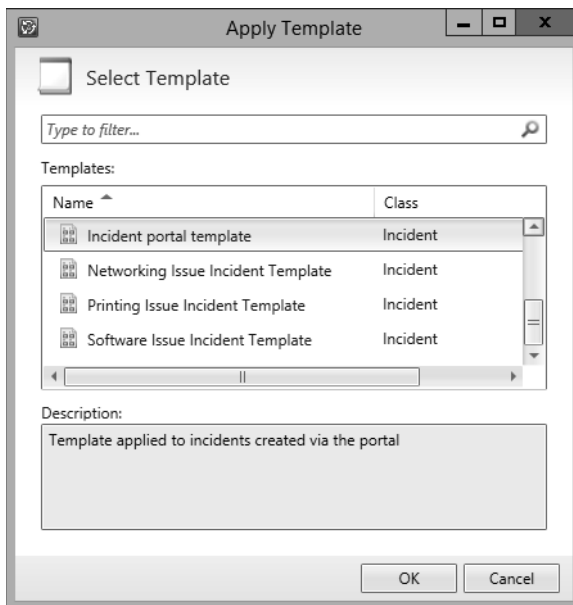
As anyone who has worked on a service desk can tell you, there are certain types of problems that users report to the service desk, or which occur in the infrastructure which are easily remediated by performing a specific set of actions. For example, a service might fail, just needing a manual restart. Using the capabilities of the System Center suite, it's possible to detect these commonly occurring problems and automatically perform the steps required to remediate them without requiring direct manual intervention by members of the IT team.

## Incidents

Service Manager incidents, which you might call trouble tickets or service desk jobs in non-Service Manager environments, describe an issue with some aspect of the server, client, network, or software infrastructure that requires resolution. In the context of the 70-246 exam, a Service Manager incident would describe an issue with some aspect of the private cloud deployment that requires resolution by the IT team.

You can create an incident manually using the Service Manager console by performing the following steps:

1. In the Configuration Items workspace of the Service Manager console, select the Computer or User for which you want to manually create the incident.
2. In the Tasks pane, click Create Related Incident.
3. In the Tasks pane of the Incident, click Apply Template. Depending on the issue, you can select one of the default templates shown in Figure 1-6. The default templates are as follows:
  - Default Incident Template
  - Generic Incident Request
  - Hardware Issue Incident Template
  - High Priority Incident Template
  - Networking Issue Incident Template
  - Printing Issue Incident Template
  - Software Issue Incident Template



**FIGURE 1-6** Incident templates



4. Click OK and the New Incident dialog box opens. The selection of the template causes certain fields of the incident to be automatically populated. For example, choosing the Networking Issue Incident Template causes the Classification category of the incident to be set to Networking Problems as shown in Figure 1-7.

The screenshot shows a 'New Incident' dialog box for 'Incident IR5'. The 'General' tab is selected, displaying 'Incident Information'. The 'Affected user' field is empty. The 'Title' field is empty. The 'Description' field is empty. The 'Classification category' is set to 'Networking Problems'. The 'Source' is set to 'Console'. The 'Impact' is set to 'Medium', 'Urgency' is set to 'Medium', and 'Priority' is set to '9'. The 'Support group' is set to 'Tier 1'. The 'Assigned to' and 'Primary owner' fields are empty. The 'Escalated' checkbox is unchecked. The 'Tasks' pane on the right lists various actions such as 'Apply Template', 'Assign', 'Change Incident Status', 'Convert or Revert to Parent', 'Create Change Request', 'Create Problem', 'Create Release Record', 'Create Service Request', 'Escalate or Transfer', 'Link or Unlink to Parent', 'Link Problem', 'Link to New Parent Incident', 'Ping Related Computer', 'Print', 'Remote Desktop', 'Request User Input', 'Search for Knowledge Articles', and 'Set First Response or Comment'. The 'General' pane at the bottom right has a 'Refresh' button.

FIGURE 1-7 Networking incident

5. After selecting an incident template, you should provide the following additional information and then click OK:
  - **Affected User** This is the user who reported the incident.
  - **Title** Allows you to provide a name for the incident.
  - **Description** A description of the incident.
  - Other information as necessary based on the incident itself. Some information will automatically be included with the template.
6. On the Activities tab of the New Incident dialog box, you can add activities such as Manual Activities or Runbook Automation Activities that are related to the incident.
7. On the Related Items tab, you can add Work Items, Configuration Items, Knowledge Articles, and Attached Files.
8. On the Resolution tab, you provide information about how the incident was resolved, how much time it took, and specify a resolution category.

9. The Service Level tab allows you to view service level information.
10. The History tab allows you to view the history of the incident.

You can also automate the Service Manager email messages sent by users indirectly by having the users submit a form through the Service Manager Self-Service Portal, or by configuring the Operations Manager Alert connector to automatically generate incidents based on Operations Manager alerts.

#### **MORE INFO MANAGING INCIDENTS**

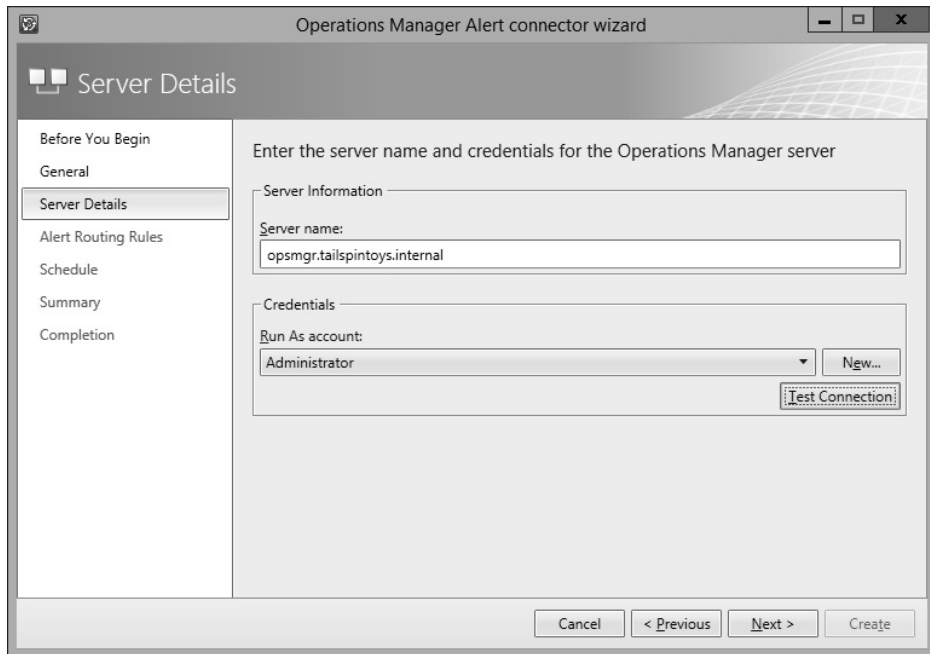
You can learn more about managing incidents at <http://technet.microsoft.com/en-us/library/hh519697.aspx>.

## **Automatic incident creation**

The Operations Manager alert connector for Service Manager allows you to automatically create Service Manager incidents based on Operations Manager alerts. An Operations Manager alert is created in Operations Manager when an object that Operations Manager monitors experiences a change that is deemed worthy of attention, such as a hardware or software failure occurring on a monitored server. There are two types of Operations Manager connectors for Service Manager: the alert connector, and the configuration item (CI) connector. The CI connector imports objects that Operations Manager has discovered into the Service Manager database. Alert connectors bring alert information into Service Manager.

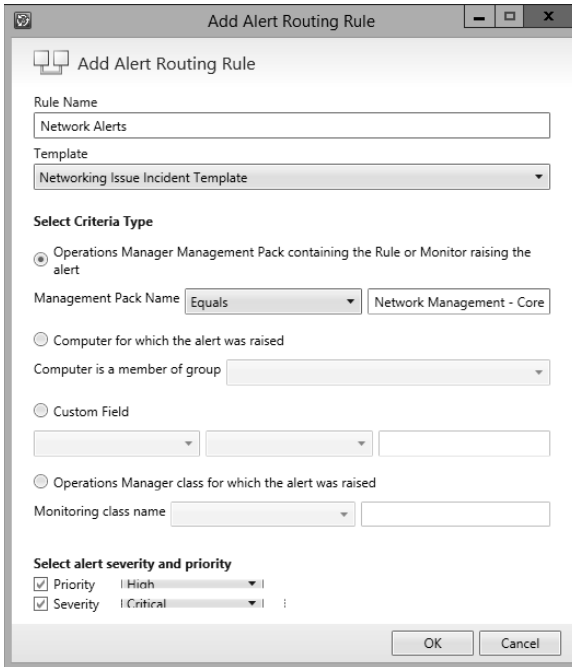
To create the alert connector, perform the following steps:

1. In the Administration workspace of the Server Manager console, click Connectors.
2. On the Tasks pane, click Create Connector, and then click Operations Manager Alert Connector.
3. On the General page of the Operations Manager Alert Connector Wizard, provide a name for the alert connector.
4. On the Server Details page, shown in Figure 1-8, specify the name of the Operations Manager server and a Run As account that has permission to connect to Operations Manager. Ensure that you use the Test Connection button to verify that the account works and has appropriate permissions.



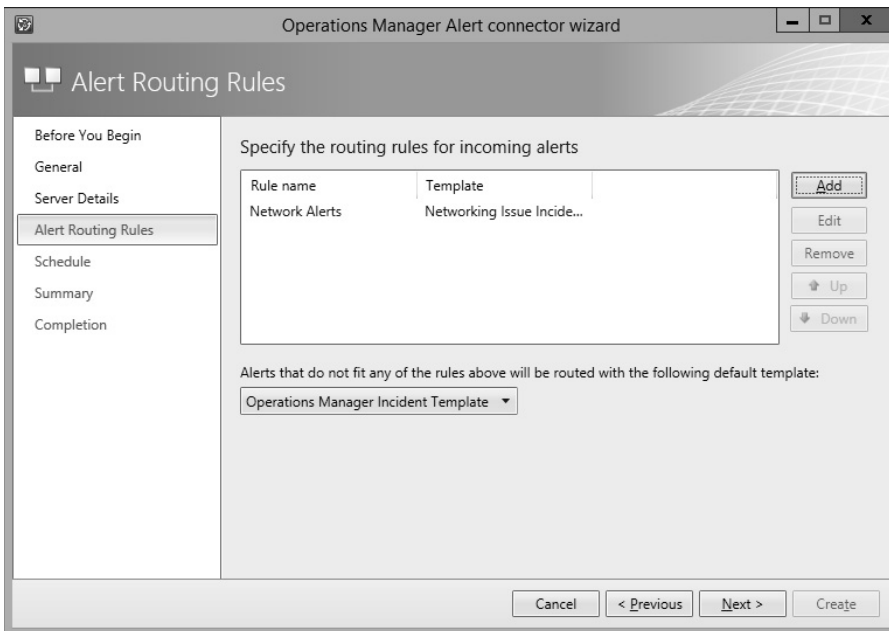
**FIGURE 1-8** Alert connector configuration

5. On the Alert Routing Rules page, click Add to add an alert routing rule. An alert routing rule allows you to specify which Service Manager incident template will be used to create an incident based on an Operations Manager alert.
6. In the Add Alert Routing Rule dialog box, shown in Figure 1-9, provide the following information:
  - **Rule Name** The name of the alert routing rule.
  - **Template** The Service Manager incident template that will be used when creating the Service Manager incident.
  - **Criteria Type** Here you can select the conditions that trigger the alert routing rule. You can choose between the alert being generated by a specific Operations Manager management pack, being generated by a specific computer or security group, a custom field, or an Operations Manager monitoring class.
  - **Select Alert Severity And Priority** Allows you to specify the alert priorities and severities that will trigger the alert routing rule.



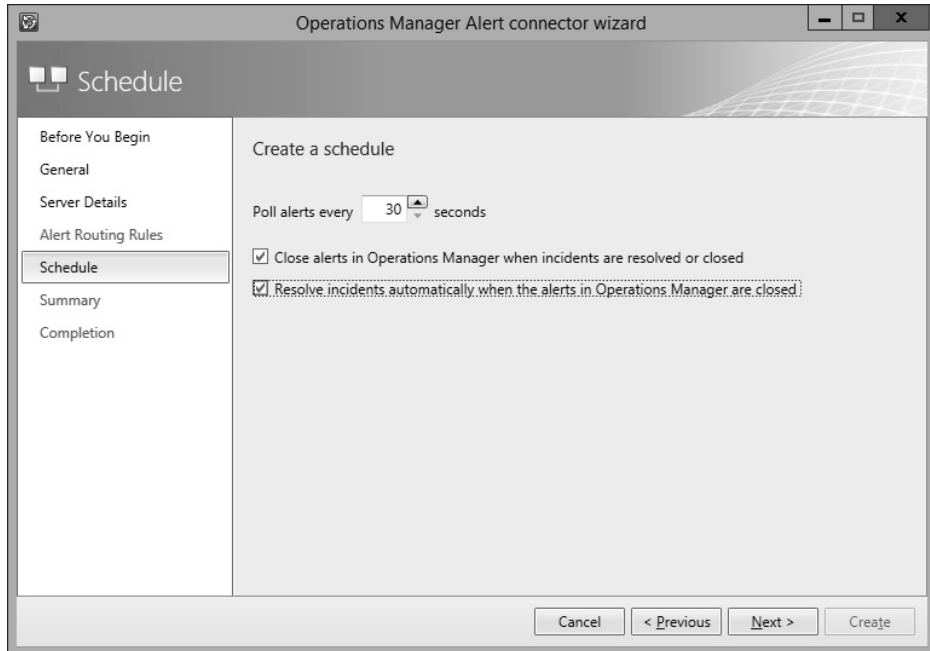
**FIGURE 1-9** Alert routing rule

7. As Figure 1-10 shows, alerts that don't match any of your configured rules will automatically be created as incidents using the Operations Manager Incident Template.



**FIGURE 1-10** Routing rules

- On the Schedule page, select the frequency at which Service Manager will query the Operations Manager server for alerts. You can also configure the connector so that alerts within Operations Manager will be closed when the incident that relates to the alert is resolved or closed in Service Manager. You can also configure Service Manager to automatically mark incidents as Resolved if the incident that triggered the alert in Operations Manager is closed. Figure 1-11 shows these settings.

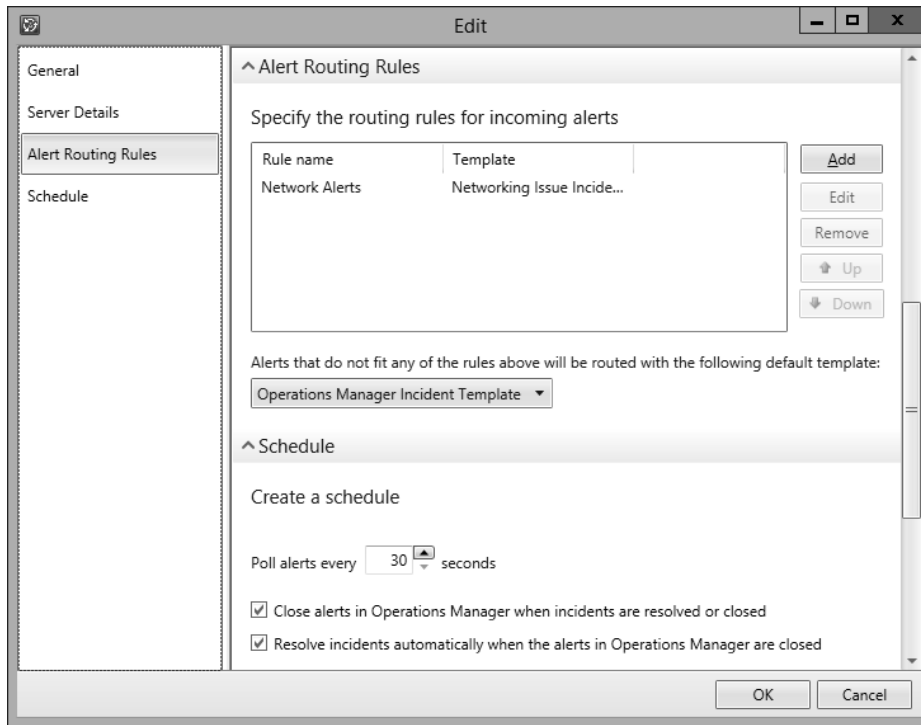


**FIGURE 1-11** Schedule settings

- On the Summary page, review the connector setup, and then create the connector. Once the connector is created, you can modify the alert routing rules by editing the properties of the connector as shown in Figure 1-12.

**MORE INFO OPERATIONS MANAGER CONNECTOR FOR SERVICE MANAGER**

You can learn more about the Operations Manager Connector for Service Manager at <http://technet.microsoft.com/en-us/library/hh524325.aspx>.



**FIGURE 1-12** Connector properties

## Integrating Orchestrator with Operations Manager and Service Manager

You can configure Orchestrator to integrate with Operations Manager by configuring a connection to the Operations Manager server from the Orchestrator Management server. When you do this, you can monitor and collect information from Operations Manager alerts, which you can use when building Orchestrator runbooks. To integrate Orchestrator with Operations Manager, first install the Operations Manager integration pack. You can download this integration pack from Microsoft's website. You'll also need to install the Operations Manager console on the server that hosts the Runbook Designer and verify that you can use it to make a connection to the Operations Manager server.

Once you've performed that step, you configure a connection from the Orchestrator Management server to the Operations Manager Management Group by performing the following steps:

1. In the Runbook Designer's Options menu, click SC 2012 Operations Manager.
2. On the Connections tab of the SC 2012 Operations Manager dialog box, click Add.

3. In the Connection dialog box, shown in Figure 1-13, type the name of the connection, the IP address or FQDN of the Operations Manager server, and then provide the credentials of an account that has access to the Operations Manager server.

The screenshot shows a 'Connection' dialog box with the following fields and values:

- Name: TailspinToys Ops Mgr
- Server: opsmgr.tailspintoys.internal
- Credentials:
  - Domain: tailspintoys
  - User name: administrator
  - Password: [masked]
- Monitoring Intervals:
  - Polling: 10 seconds
  - Reconnect: 10 seconds

Buttons at the bottom: Test Connection, Ok, Cancel.

FIGURE 1-13 Connection configuration

4. On the SC 2012 Operations Manager dialog box, shown in Figure 1-14, click Finish.

The screenshot shows the 'SC 2012 Operations Manager' dialog box with the following details:

- Title: SC 2012 Operations Manager
- Section: Microsoft System Center Operations Manager Connections
- Subtitle: Configure the connections for the Microsoft System Center Operations Manager objects
- Tab: Connections
- Table:

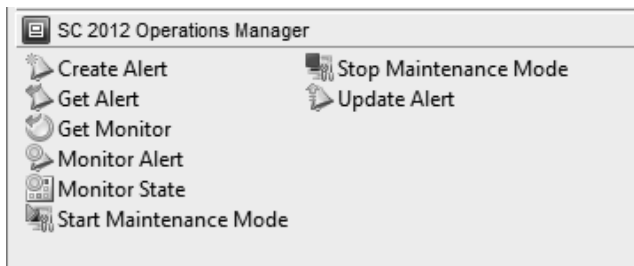
Connection	Domain	Server
TailspinToys Ops Mgr	tailspintoys	opsmgr.tailspint...

Buttons: Add..., Edit..., Remove, Finish, Cancel, Help.

FIGURE 1-14 Operations Manager connections

Once you have configured the connection, you'll be able to use the activities that are included in the Operations Manager integration pack when building Orchestrator runbooks. These activities are shown in Figure 1-15, and have the following functionality:

- **Create Alert** This activity allows you to create an alert in Operations Manager.
- **Get Alert** This activity allows you to extract data from an Operations Manager alert. Use this activity as the basis of creating runbooks that create incidents in Service Manager by extracting relevant information from alerts and using that information when creating incidents.
- **Get Monitor** Use this activity to collect monitoring data. You can take the data extracted from this activity and use it to populate incidents in Service Manager.
- **Monitor Alert** Use this activity to watch for specific new or updated Operations Manager alerts. You might use this when configuring a runbook to have additional steps taken when specific alerts are raised in Operations Manager during runbook initiation.
- **Monitor State** Use this activity to monitor and run when an object managed by Operations Manager has its state changed to Warning or Critical. You might use this when configuring a runbook to have additional steps taken when the state of specific Operations Manager monitored objects changes during runbook initiation.
- **Start Maintenance Mode** This activity allows you to put an Operations Manager managed object into maintenance mode. Maintenance mode is a special state that suppresses alerting. For example, you would put a server into maintenance mode when applying software updates so that Operations Manager alerts aren't generated by the software update process.
- **Stop Maintenance Mode** This activity allows you to take an Operations Manager managed object out of maintenance mode, so that Operations Manager alerts are no longer suppressed.
- **Update Alert** Use this activity to update an Operations Manager alert with data. For example, you could update an Operations Manager alert with information provided in a Service Manager incident.



**FIGURE 1-15** Operations Manager activities



You configure integration between Orchestrator and Service Manager by performing the following steps:

1. Ensure that the Service Manager integration pack is installed on the management server.
2. Click SC 2012 Service Manager in the Options menu of the Orchestrator Runbook Designer console.
3. On the Connections tab of the SC 2012 Service Manager dialog box, click Add.
4. In the Connection dialog box, shown in Figure 1-16, provide the following information. Ensure that you click Test Connection to verify that the connection to the Service Manager server functions correctly.
  - **Name** Name of the connection to the Service Manager server
  - **Server** FQDN of the Service Manager server
  - **Credentials** Credentials of an account that has permission to access the Service Manager server

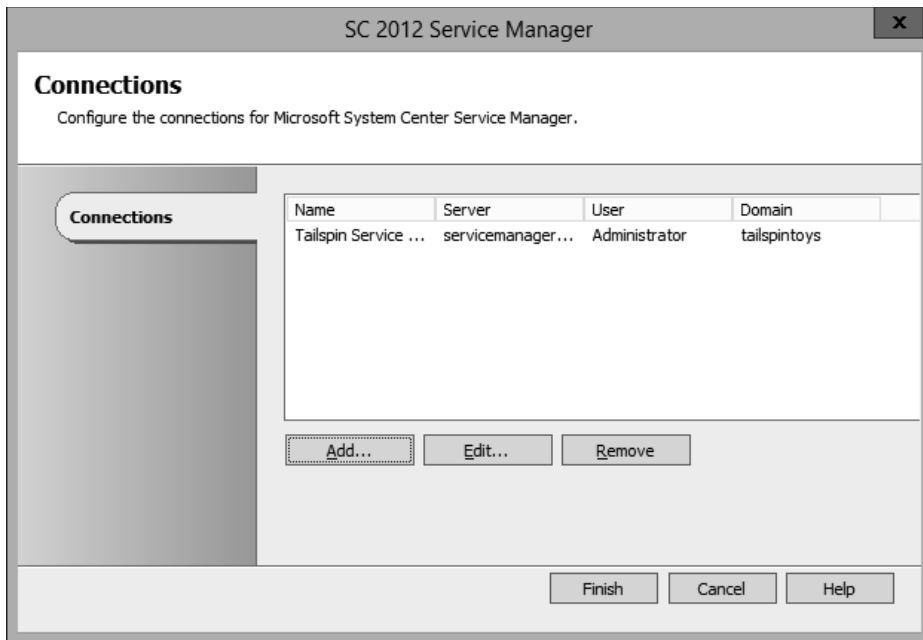
The screenshot shows a 'Connection' dialog box with the following fields and values:

- Name:** Tailspin Service Manager
- Server:** servicemanager.tailspintoys.internal
- Credentials:**
  - Domain:** tailspintoys
  - User name:** Administrator
  - Password:** [masked with dots]
- Monitoring Intervals:**
  - Polling:** 10 seconds
  - Reconnect:** 10 seconds

Buttons at the bottom: Test Connection, Ok, Cancel.

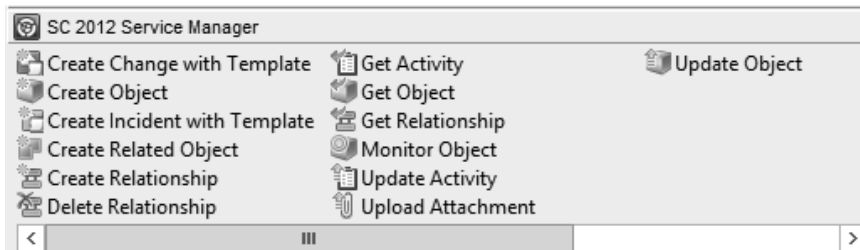
**FIGURE 1-16** Connection properties

5. On the SC 2012 Service Manager dialog box, shown in Figure 1-17, click Finish.



**FIGURE 1-17** Service Manager connection

Once the connection between the Orchestrator and Service Manager server is established, you can use the integration pack activities, shown in Figure 1-18, to build workflows.



**FIGURE 1-18** Service Manager integration pack activities

These activities allow you to do the following:

- **Create Change With Template** Use this activity to create a change record using an existing change template. When you use this activity, mandatory fields in the service manager change record need to be configured using Orchestrator when you use this activity.
- **Create Object** Use this activity to create a Service Manager object based on a defined class. For example, you could use this activity to create a Service Manager incident, change, or problem record.

- **Create Incident With Template** Use this activity to create a Service Manager incident based on an existing template. When you use this activity, mandatory fields in the Service Manager incident record need to be configured using Orchestrator.
- **Create Related Object** Use this activity to create new Service Manager objects that have relationships to existing Service Manager objects.
- **Create Relationship** Use this activity to create relationships between Service Manager elements. For example, you could use it to create a relationship between an incident and a computer or user. You can also use it to relate multiple incidents with a Service Manager problem record.
- **Delete Relationship** Use this activity to remove a relationship between Service Manager elements.
- **Get Activity** Use this activity to instruct Orchestrator runbook to collect activity records based on specific criteria.
- **Get Object** Use this activity to search for a Service Manager activity, incident, or change records based on specific criteria.
- **Get Relationship** Use this activity to have Orchestrator generate a list of objects from separate classes that are related by specific criteria.
- **Monitor Object** Use this activity to configure Orchestrator to find new and updated records based on specific criteria.
- **Update Activity** Use this activity to update Service Manager activity records.
- **Upload Attachment** Use this activity to upload a file to an existing Service Manager object. For example, you might use this activity to upload a log file so that it can be stored with the incident generated automatically by an Operations Manager alert.
- **Update Object** Use this activity to modify the values of a Service Manager object's properties.

## Automatic incident remediation

Automatic incident remediation involves applying a specific solution to a known problem. You can configure Orchestrator runbooks triggered by specific Operations Manager alerts. Using some of the Orchestrator activities detailed earlier in this chapter, you can take the data contained in the alert and use it to populate a new Service Manager incident. The Orchestrator runbook can then perform the tasks necessary to automatically remediate the incident. For example, the Orchestrator runbook could run an activity that restarts the service that caused the original Operations Manager alert. Once the Operations Manager alert has been dealt with, the Orchestrator runbook could then update the Service Manager incident, closing both the incident and the Operations Manager alert once the issue that caused the alert has been resolved.

#### **MORE INFO INCIDENT REMEDIATION**

You can learn more about incident remediation with Operations Manager and Orchestrator by consulting the following TechNet article at <http://social.technet.microsoft.com/wiki/contents/articles/12602.system-center-operations-manager-incident-remediation-with-system-center-orchestrator.aspx>.

## Change and activity management workflows

Workflows allow you to automate processes within Service Manager, making interactions with Service Manager more efficient. For example, you can configure workflows that will automatically close completed change requests, or configure workflows that will automatically notify Service Manager users when approvals are required. Using the Server Manager console, you can configure change management workflows that configure change request conditions and apply change request templates. You can also configure activity management workflows to configure activity management conditions and apply activity templates.

#### **MORE INFO CHANGE AND ACTIVITY MANAGEMENT**

You can learn more about change and activity management in Service Manager by consulting the following TechNet article at <http://technet.microsoft.com/en-us/library/hh495590.aspx>.

## Change request templates

Change request templates store a common set of settings, applying these settings to new change requests. For example, you can create a change request template related to adding a new database to a SQL Server instance that includes commonly used properties, minimizing the amount of information that a user is required to enter when requesting such a change.

To create a change request template, perform the following steps:

1. In the Library workspace of the Server Manager console, click Templates, and then in the Tasks pane, click Create Template.

2. On the Create Template dialog box, specify a name for the template. Select the Change Request Class as shown in Figure 1-19, and select a Management Pack in which to store the new template.

**Create Template**

Enter a name and description for the template

Name:  
Tailspin SQL Database Add Change Request

Description:

Class:  
Change Request Browse...

For example, to create an incident template, select the Incident class.

Select an unsealed management pack where the template will be saved.

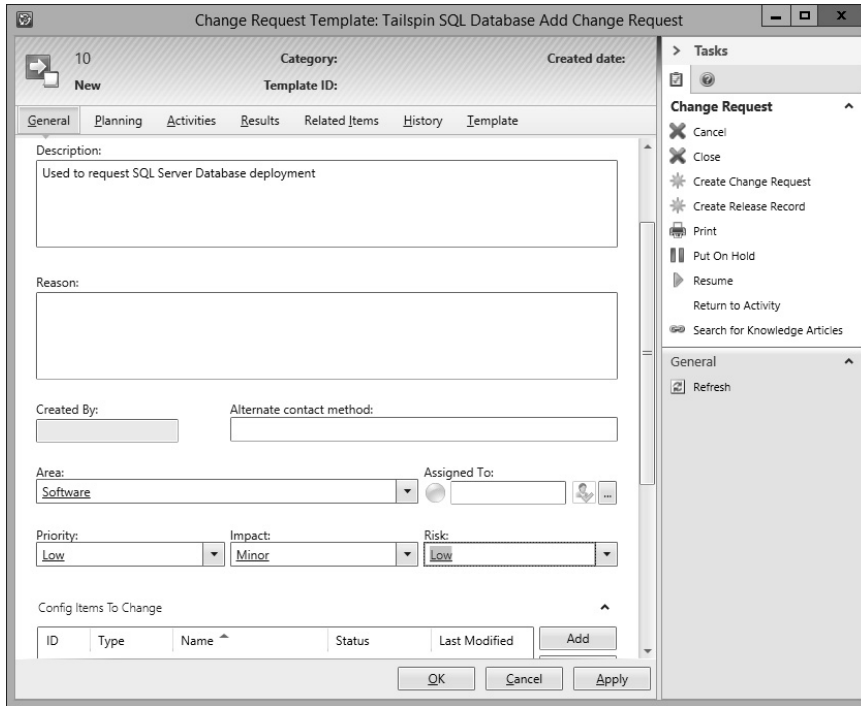
Management pack  
Service Manager Change Management Configuration Library  
Last modified: 5/17/2014 5:07:35 AM New...

When I click OK, open the template form.

OK Cancel

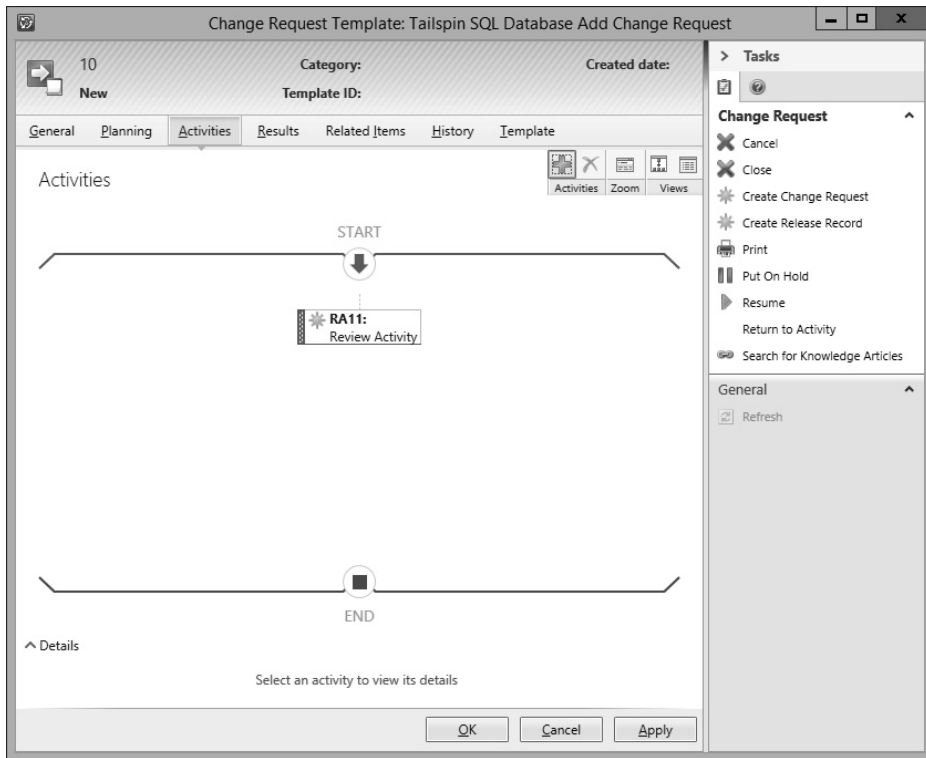
**FIGURE 1-19** Create change request template

3. When you click OK, the Change Request Template form will be displayed. In this form, provide information that will be pre-populated on a change request template. As shown in Figure 1-20, this can include the area of the organization that the template applies to, the priority the change request should be assigned by default, as well as default impact and risk values.



**FIGURE 1-20** Configure change request template

4. On the Activities tab, you can add activities to the template. These additions can include any configured activity including runbook automation activities. Usually with Change Requests, you'd add a Default Review Activity as shown in Figure 1-21, which would allow another user to review and authorize the change request.



**FIGURE 1-21** Change request template activities

**MORE INFO CHANGE REQUEST TEMPLATES**

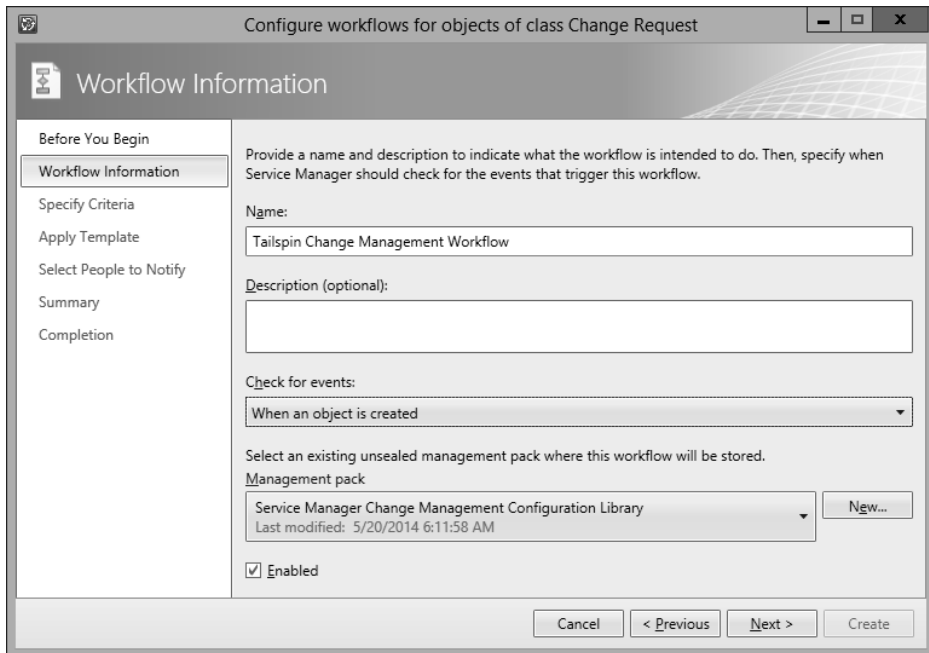
You can learn more about creating change request templates in Service Manager by consulting the following TechNet article at <http://technet.microsoft.com/en-us/library/hh495644.aspx>.

**Change management workflows**

You can use change management workflows to automate the process of dealing with change management requests. To create a change management workflow, perform the following steps:

1. In the Administration workspace or the Service Manager console, expand the Workflows node, and click Configuration.

2. In the Configuration pane, click Change Request Event Workflow Configuration, and in the Tasks pane, click Configure Workflow Rules.
3. In the Configure Workflows dialog box, click Add.
4. On the Workflow Information page of the Configure Workflows For Objects Of Class Change Request dialog box, shown in Figure 1-22, specify a name, whether the event that triggers the workflow is when an object is created, or updated, and a management pack in which to store the workflow.



**FIGURE 1-22** Workflow information

5. On the Specify Criteria page, ensure that Change Request is selected. In the list of available properties, select a criteria that will determine whether the change management workflow is applied. For example, in Figure 1-23, the change management workflow will be applied if the change request area is set to Security.



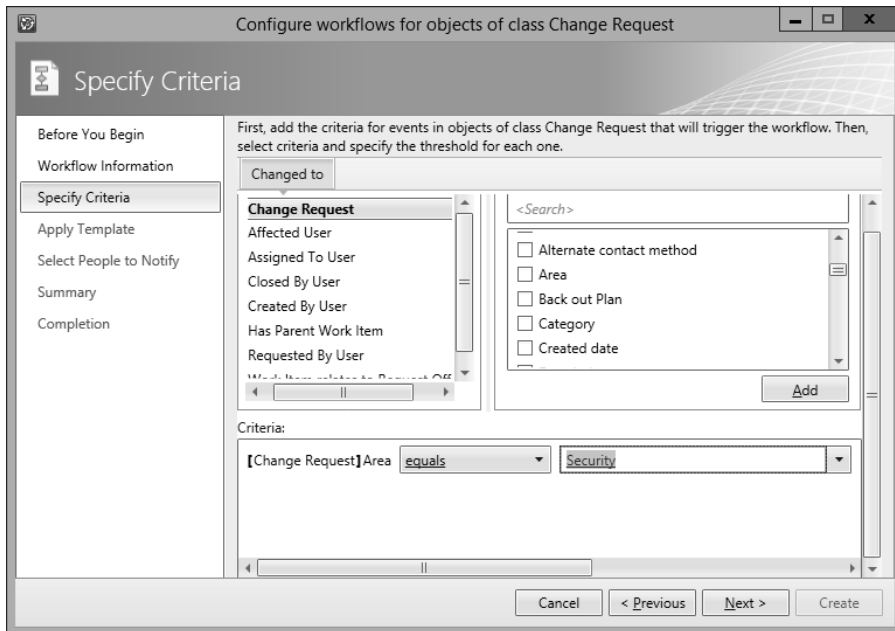


FIGURE 1-23 Workflow criteria

6. On the Apply Template page, click Apply The Selected Template. You can then choose one of the existing change management templates to apply. Figure 1-24 shows the Security Release Change Request template selected.

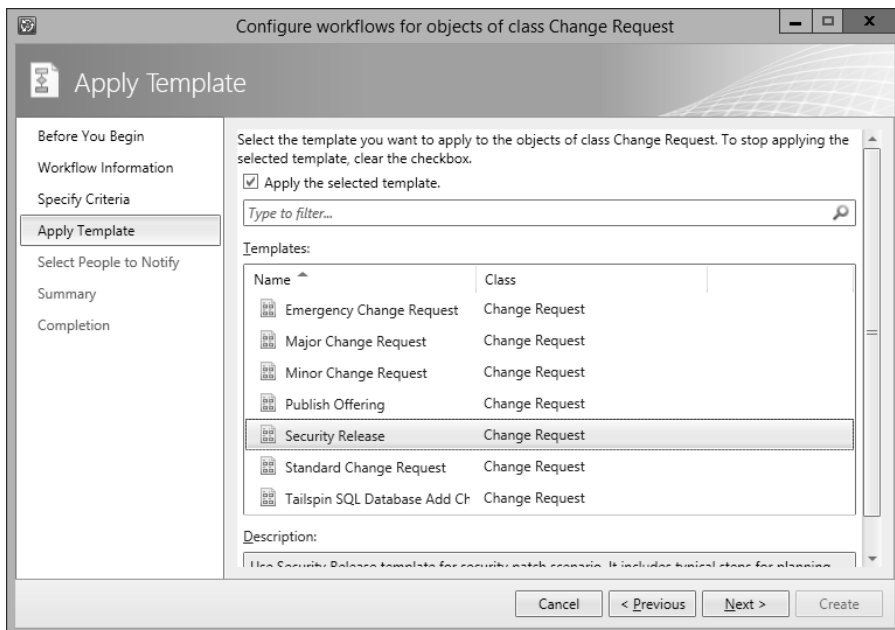


FIGURE 1-24 Apply template

7. On the Select People To Notify page, specify whether users should be notified when this change management workflow is triggered.
8. On the Summary page, review the settings, and click Create to create the change management workflow.

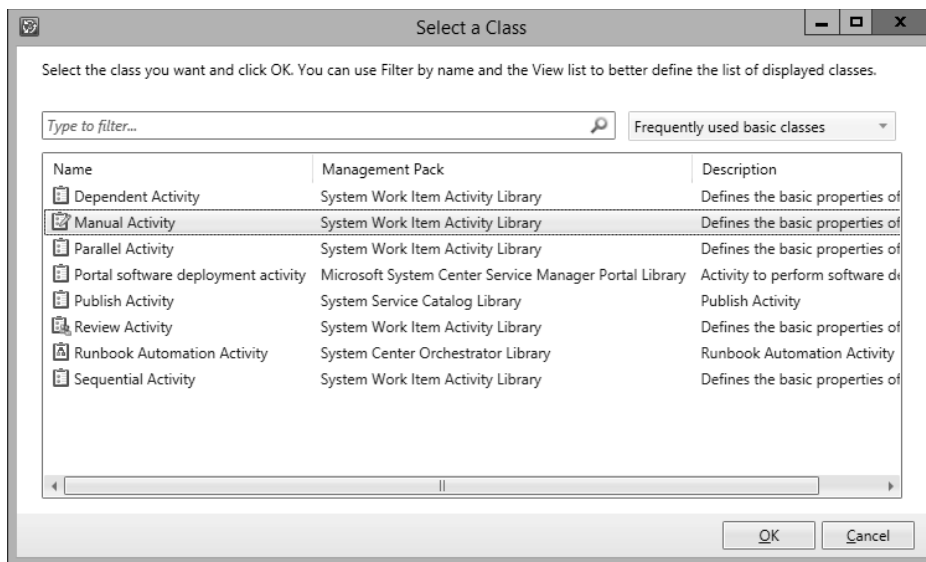
#### **MORE INFO CHANGE MANAGEMENT WORKFLOWS**

You can learn more about creating change management workflows in Service Manager by consulting the following TechNet article at <http://technet.microsoft.com/en-us/library/hh519653.aspx>.

## Activity management workflows

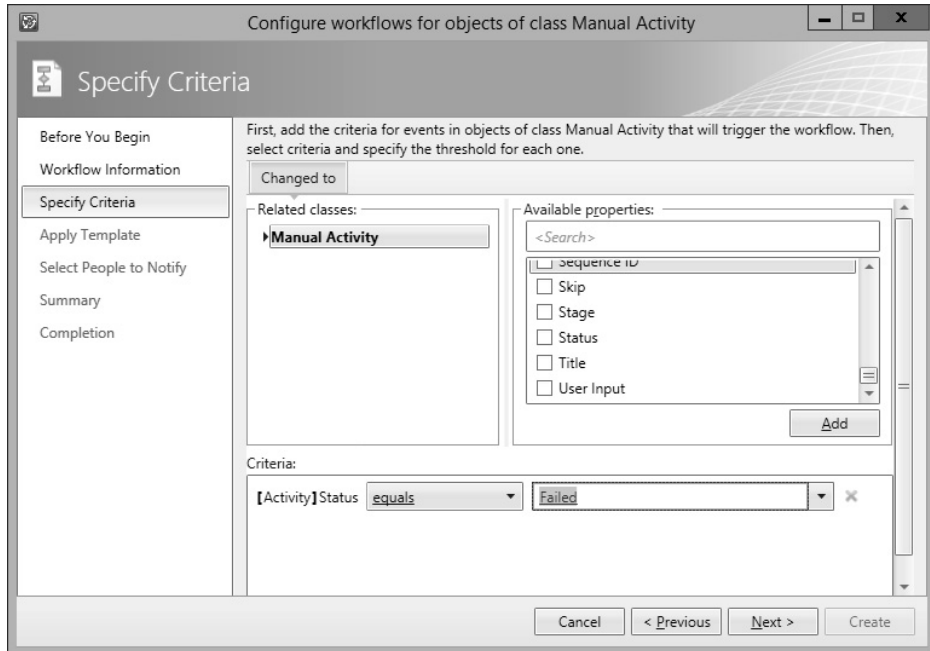
Activity management workflows allow you to automate the management of activities based on the properties of the activity. For example, you might create a workflow to assign all unsigned manual activities to a particular member of the IT staff. To create an activity management workflow, perform the following steps:

1. In the Administration workspace of the Server Manager console, click Configuration under the Workflows node.
2. In the Configuration pane, select the Activity Event Workflow node, and then click Configure Workflow Rules in the tasks pane.
3. On the Select A Class dialog box, shown in Figure 1-25, click the activity class to which you want the workflow to apply.



**FIGURE 1-25** Activity class

4. On the Configure Workflows dialog box, click Add.
5. On the Workflow Information page of the Configure Workflows For Objects Of Class, specify a name for the activity management workflow, a management pack to store the workflow, and whether the workflow will be triggered upon object creation or object modification.
6. On the Specify Criteria page, select a property and criteria that will trigger the workflow. For example, in Figure 1-26, the criteria is that the Activity Status equals Failed.



**FIGURE 1-26** Activity criteria

7. On the Apply Template page, you can choose to apply a template.
8. On the Select People To Notify, you can choose to notify specific people. When you choose to notify a person, you select who is to be notified and the message template.
9. On the Summary page, click Create.

#### **MORE INFO ACTIVITY WORKFLOWS**

You can learn more about creating activity management workflows in Service Manager by consulting the following TechNet article at <http://technet.microsoft.com/en-us/library/hh495617.aspx>.



### **EXAM TIP**

Remember that Operations Manager raises alerts, the cause of which can be resolved by running an Orchestrator runbook. Information about the alert and the resolution can be written to Service Manager by the Orchestrator runbook.



### **Thought experiment**

#### **Workflows at Tailspin Toys**

You are in the process of configuring a private cloud trial deployment at Tailspin Toys. One of the aims of the eventual deployment is to empower users by allowing them to submit their own change requests through a web portal, rather than having them submit change requests using a more traditional pen and paper method. In the final deployment you want to have any alert raised by Operations Manager also raised as an incident in Service Manager. For the trial, you will restrict this to alerts raised in Operations Manager that are related to monitored SQL Servers.

You have the following goals for the trial:

- You want to have incidents automatically raised based on Operations Manager alerts generated by SQL Server management packs.
- You want users to be able to submit change requests through the Service Manager self-service portal.
- You want to have all change requests that the IT staff set to completed, automatically closed by Service Manager.

With this information in mind, answer the following questions:

1. Which System Center products do you need to deploy to support this solution?
2. Which connectors must you configure to support this solution?
3. What type of workflow must you configure to accomplish your goal?

## Objective summary

- Orchestrator allows you to create runbook automation. You do this by linking activities from integration packs.
- You can configure Operations Manager to automatically create Service Manager incidents from alerts generated in Operations Manager.
- You can configure an Orchestrator runbook to create Service Manager incidents using the Service Manager integration pack.
- You can configure a Service Manager incident to trigger an Orchestrator runbook, which you can use to automatically resolve some types of issues.
- Change request templates store a common set of settings, applying these settings to new change requests.
- You can use change management workflows to automate the process of dealing with change management requests.

## Objective review

Answer the following questions to test your knowledge of the information in this objective. You can find the answers to these questions and explanations of why each answer choice is correct or incorrect in the “Answers” section at the end of this chapter.

1. You want to create a runbook in System Center 2012 R2 Orchestrator that creates Service Manager incidents in response to Operations Manager alerts. Your organization has one Operations Manager server, one Orchestrator server, and one Service Manager server. Which of the following steps should you take?
  - A. Configure a connection from the Operations Manager server to the Orchestrator server. Install the Orchestrator management pack on the Operations Manager server.
  - B. Configure a connection from the Orchestrator server to the Operations Manager server. Install the Operations Manager integration pack on to the Orchestrator server.
  - C. Configure a connection from the Orchestrator server to the Service Manager server. Install the Service Manager integration pack on to the Orchestrator server.
  - D. Configure the Operations Manager connector on the Service Manager server. Configure alert routing rules for the connector on the Service Manager server.
2. You want to have alerts from any of the SQL Server 2012 instances monitored by your organization’s Operations Manager deployment automatically assigned as Service Manager incidents to Barry the SQL Server administrator. All SQL Server alerts on the Operations Manager server are triggered by rules stored within a SQL Server 2012

management pack. Your organization has one Operations Manager server and one Service Manager server. You have not deployed any other System Center products. Which of the following steps would you take to accomplish this goal?

- A.** Configure the Operations Manager connector on the Service Manager server.
  - B.** Deploy the Operations Manager agent on the Service Manager server.
  - C.** Create an incident template for SQL Server events that assigns the incident to Barry. Create an Alert Routing rule for alerts generated by the SQL Server 2012 Management pack that applies this incident template.
  - D.** Create an Orchestrator runbook that creates an incident on the Service Manager server when an alert is raised on the Operations Manager server related to the SQL Server 2012 management pack.
- 3.** You want to configure Service Manager so that Barry the SQL Server Administrator is notified when a SQL Server related change request is entered into the Service Manager database. Which of the following would you configure in Service Manager to accomplish this goal?
- A.** Configure a change request workflow.
  - B.** Configure an incident event workflow.
  - C.** Configure an activity event workflow.
  - D.** Configure a desired configuration management event workflow.
- 4.** You are creating a new change request template in Service Manager. Which class should you select when creating the template?
- A.** Change Request
  - B.** Incident
  - C.** Problem
  - D.** Knowledge Article
- 5.** Which activity in the Operations Manager integration pack for Orchestrator do you use to extract data from an Operations Manager alert?
- A.** Create Alert
  - B.** Get Alert
  - C.** Monitor Alert
  - D.** Update Alert

## Objective 1.2: Implementing service offerings

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Another important aspect of private cloud automation is implementing as much self-service functionality for users as possible. Rather than having to always ring the service desk to log a job, self-service allows many routine IT requests to be initiated by the user through a web browser interface. In some cases, these requests can be resolved without requiring the direct intervention of a member of the IT team, and in others they can be resolved subject to approval.

### This objective covers how to:

- Creating custom workflows
- Self-Service Portal
- Service catalog
- Request offerings
- Service offerings
- Catalog item groups
- Orchestrator and Service Manager
- Using Orchestrator runbooks with Service Manager
- Self-service provisioning of virtual machines

## Creating custom workflows

Earlier in this chapter you learned how to configure change management and activity management workflows, functionality for which is built into Server Manager 2012 R2. You can create new custom workflows for Service Manager using the System Center 2012 - Service Manager Authoring Tool. By building custom workflows, you can further automate Service Manager processes. You can download the Service Manager Authoring Tool from Microsoft's website.

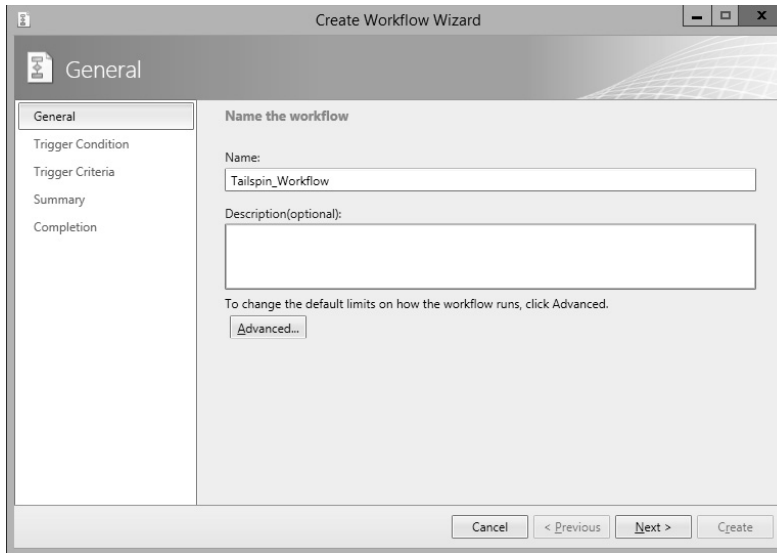
### **MORE INFO** CREATING CUSTOM WORKFLOWS

You can learn more about creating custom Service Manager workflows at <http://technet.microsoft.com/en-us/library/hh519585.aspx>.

To create a new workflow that runs on a scheduled basis, perform the following steps:

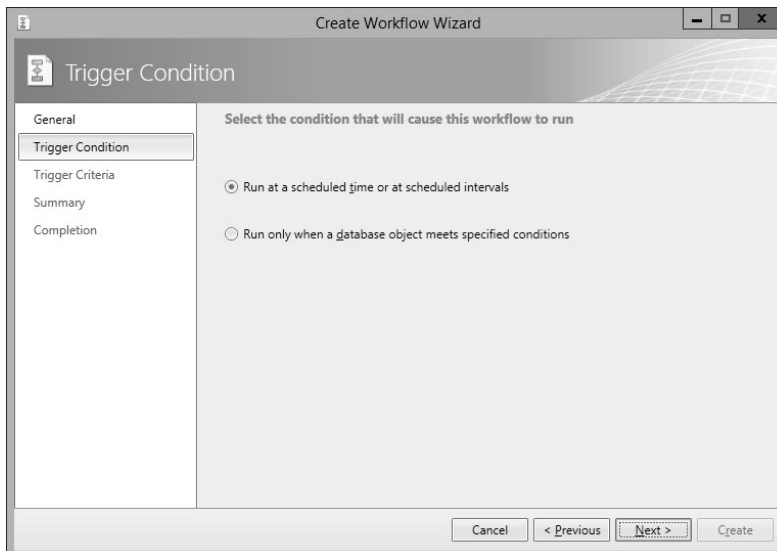
1. In the Service Manager Authoring Tool, select the management pack that will store the workflow or create a new management pack.

2. Right-click Workflows, and click Create. This will launch the Create Workflow Wizard as shown in Figure 1-27. Provide a name for the workflow. If you want to modify the default values for the workflow, retry intervals and time to run, click Advanced. The maximum time to run must be greater than 60 seconds and less than 24 hours.



**FIGURE 1-27** Create workflow

3. On the Trigger Condition page, select Run At A Scheduled Time Or At Scheduled Intervals as shown in Figure 1-28. You can also custom workflows to run in response to database object changes.

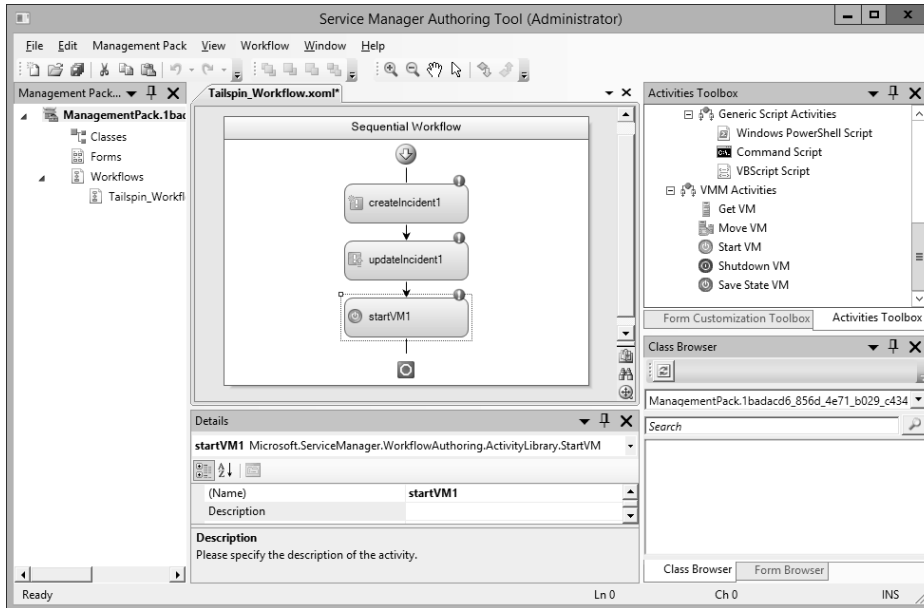


**FIGURE 1-28** Trigger condition



4. On the Trigger Criteria page, configure the schedule for running the custom workflow.
5. On the Summary page, click Create.

Once you've created the workflow, you can use the Service Manager Authoring Tool to edit the workflow. You do this by dropping and configuring activities in a manner similar to configuring an Orchestrator runbook. Figure 1-29 shows the Service Manager Authoring Tool.



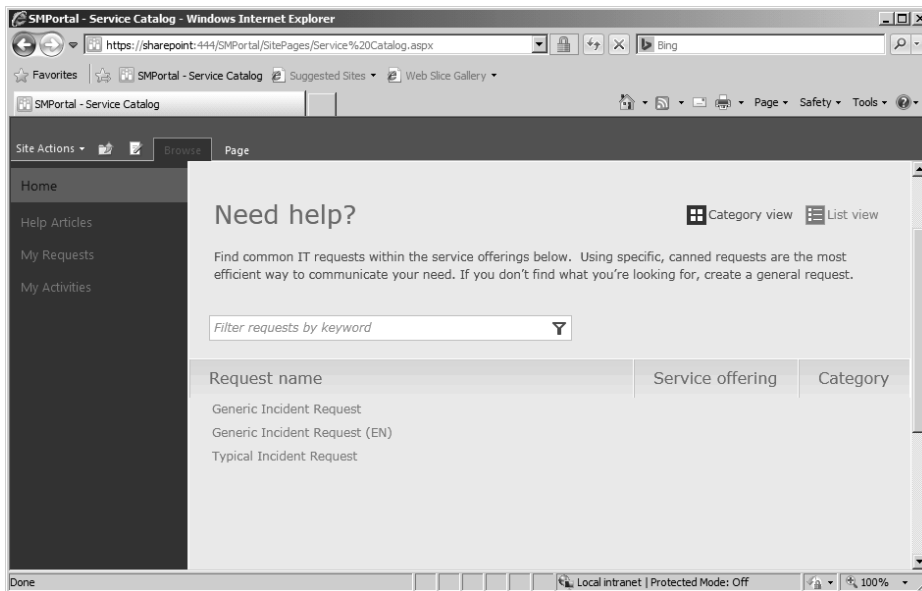
**FIGURE 1-29** Custom workflow authoring

To add a custom workflow to Service Manager, copy the workflow files, which will have the name of the management pack with the .xml and .dll file name extensions, to the Service Manager installation folder. In the Service Manager console, import the management pack from the Administration workspace. Once imported, you can use the workflow with Service Manager.

## Self-Service Portal

The Service Manager 2012 R2 Self-Service Portal is a SharePoint 2010 website that customers can use to submit requests for service offerings and request offerings using their web browser. The Self-Service Portal leverages Service Manager user roles, meaning that users will be presented with different request and service offerings depending on role membership. Us-

ers are able to submit requests and view the status of those requests using the portal. Figure 1-30 shows the Service Manager 2012 R2 Self-Service Portal.



**FIGURE 1-30** Self-Service Portal

When a user submits a request using the self-service website, the request is forwarded to the Service Manager server where the information submitted through the self-service website is processed. You can publish Service Manager requests and service offerings to the Self-Service Portal. Many organizations use the Self-Service Portal to allow users to submit their own incident tickets as an alternative to contacting the help desk.

This functionality is only the tip of the iceberg. If you integrate Service Manager with other System Center products, such as Operations Manager, Orchestrator, and Virtual Machine Manager, you can offer services that leverage these products through the Self-Service Portal. For example you could create a service offering that:

1. Allows users to request and deploy virtual machines through System Center Virtual Machine Manager, with the details of that request and subsequent deployment all logged within Service Manager.
2. Allows users to put SQL Server databases into protection, or perform self-service recovery by leveraging Service Manager integration with Data Protection Manager and Orchestrator.
3. Allows users to trigger Orchestrator runbooks. Since runbooks can be created to perform almost any task within your organization's Windows-based infrastructure, you can provide users with the ability, through the Self-Service Portal, to trigger any task for which you can build a runbook.

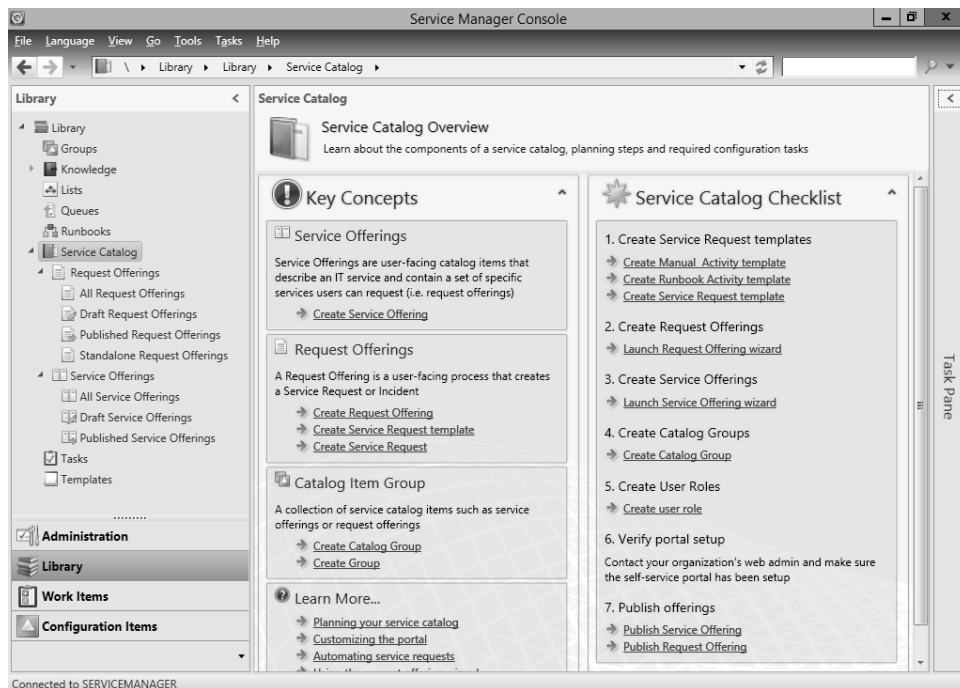
The Self-Service Portal can be hosted on a separate computer from the Service Manager server. One important thing to note is that you can only use SharePoint 2010 to host the Service Manager 2012 R2 RTM Self-service website. You cannot use SharePoint 2013 to host the Service Manager 2012 R2 RTM self-service website. This is important as you can deploy SharePoint 2010 on a computer running Windows Server 2008 R2, but cannot deploy it on computers running the Windows Server 2012 and Windows Server 2012 R2 operating systems. This means that you must deploy at least one computer running Windows Server 2008 R2 with SharePoint 2010 even if all of the other server operating systems in your environment are running Windows Server 2012 R2.

### **MORE INFO SELF-SERVICE PORTAL**

You can learn more about the Self-Service Portal at <http://technet.microsoft.com/en-us/library/hh914195.aspx>.

## Service catalog

The service catalog is a collection of Service Manager items, assistance, actions, or groupings of items, assistance, or actions. You make service catalog items available through the Self-Service Portal by publishing them either as request offerings or service offerings. Figure 1-31 shows the Service Catalog node of the Service Manager console.



**FIGURE 1-31** Service catalog

You use the Request Offerings node to create service catalog items that are available to users. Request offerings allow you to specify what information you want to prompt the users to provide and any knowledge articles that you've created within Service Manager that might be related to the request offering. Service offerings allow you to create service catalog items that assign categories to request offerings.

#### **MORE INFO SERVICE CATALOG**

You can learn more about the service catalog at <http://technet.microsoft.com/en-us/library/hh495564.aspx>.

## Request offerings

Request offerings are items or actions that you can make available to users through the service catalog. You usually collect request offerings in groups termed service offerings. You can publish service offerings and request offerings to the Self-Service Portal. To give users access to these service and request offerings, you need to assign them to Service Manager user roles that are associated with a catalog group that contains these items.

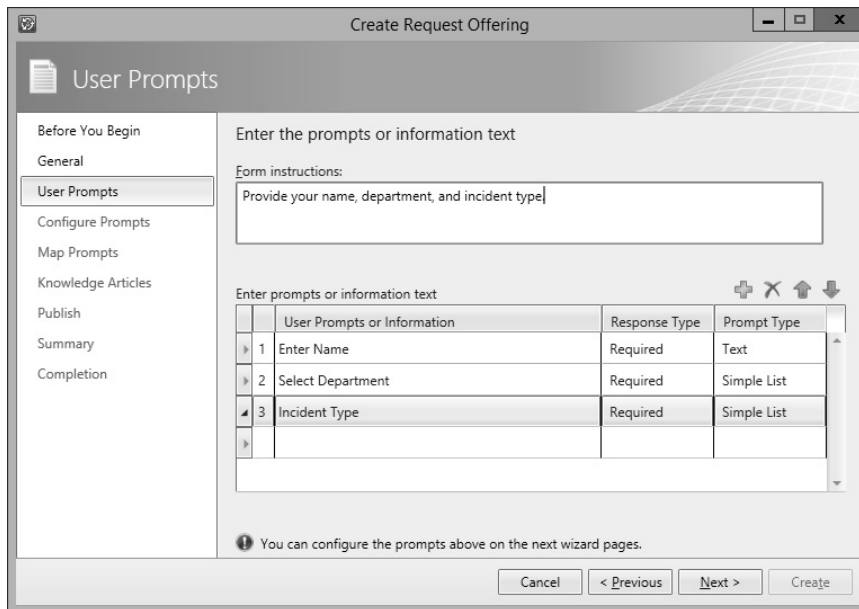
To create a request offering, perform the following steps:

1. In the Library workspace of the Service Manager console, expand the Service Catalog node, click the Request Offerings node, and in the Actions pane, click Create Request Offering.
2. On the Before You Begin page of the Create A Request Offering Wizard, click Next.
3. On the Create Request Offering page, shown in Figure 1-32, provide the following information:

The screenshot shows the 'Create Request Offering' wizard in the Service Manager console. The window title is 'Create Request Offering'. The 'General' tab is selected in the left-hand navigation pane. The main area is titled 'Specify the information for this offering' and contains several input fields: 'Title' (Typical Incident Request), 'Image (32 x 32):' with a 'Browse' button, 'Description, shown on the request offering page:' (Typical Incident Request), 'Template name:' (Default Service Request) with a 'Select template' dropdown, and 'Management pack:' (Service Catalog Generic Incident Request) with a 'New...' button. At the bottom, there are 'Cancel', '< Previous', 'Next >', and 'Create' buttons.

**FIGURE 1-32** Create request offering

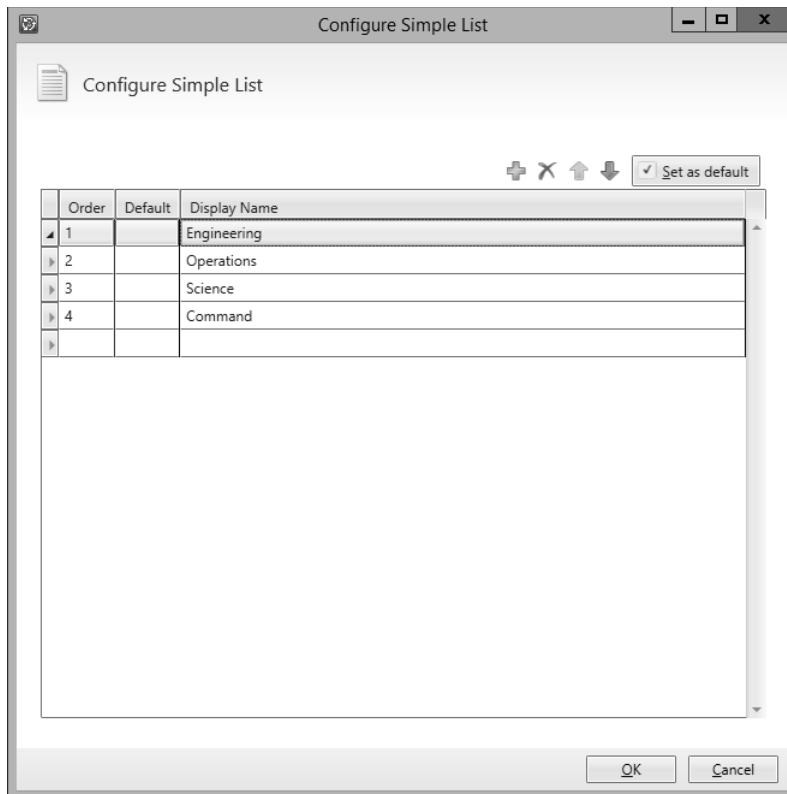
- **Title** Use this to specify the name of the request offering.
  - **Image** Allows you to associate an image with the request offering. This image will be present with the request offering in the Self-Service Portal.
  - **Description** Use this to provide a description of the request offering. This description will be present with the request offering in the Self-Service Portal.
  - **Template** Use this drop-down menu to select an existing service request template.
  - **Management Pack** Use this option to specify an unsealed management pack in which to store the request offering.
4. On the User Prompts page of the Create Request Offering Wizard, shown in Figure 1-33, provide prompts that users can respond to when accessing the request offering.



**FIGURE 1-33** Configure user prompts You can configure the following prompt types:

- Date
- Decimal
- File Attachment
- Integer
- MP Enumeration List
- Query Results
- Simple List
- Text
- True/False

5. On the Configure Prompts page, you specify additional required information to assist the user in providing information to the prompts. For example, if you specified one of the prompts as a simple list, you would create the list options that the user would be able to select from as shown in Figure 1-34.



**FIGURE 1-34** Configure lists

6. On the Map Prompts page, associate the prompts with the service request template. The prompts required will depend on the service request template.
7. On the Knowledge Articles page, you can specify knowledge articles that will appear with the request offering in the Self-Service Portal. This allows you to associate useful documentation with the service offering. For example, you might associate a knowledge article listing the top problems submitted as service requests by users and their solutions.

8. On the Publish page, shown in Figure 1-35, you can configure whether the Offering Status is Published, and the Offering Owner.

Figure 1-35 shows the 'Publish' settings for a request offering. The window title is 'Create Request Offering'. The left sidebar lists navigation options: 'Before You Begin', 'General', 'User Prompts', 'Configure Prompts', 'Map Prompts', 'Knowledge Articles', 'Publish' (selected), 'Summary', and 'Completion'. The main area contains the following fields:

- Offering status:** A dropdown menu set to 'Published'.
- Offering owner:** A radio button, a text box containing 'LSPINTOYS.drservice (drservice)', and a user selection icon.
- Published date:** A text box containing '5/17/2014 11:50:32 PM'.
- Published by:** An empty text box.
- Internal notes:** A large empty text area.

At the bottom are buttons for 'Cancel', '< Previous', 'Next >', and 'Create'.

**FIGURE 1-35** Publish settings

9. The Summary page provides summary information about the request offering. The completion page will confirm the creation of the request offering.

You can configure a request offering's status to either Draft or Published. A request offering assigned the draft status won't be available to the service catalog and cannot be requested by users. Setting a request offering's status to Published will make it appear in the catalog to users that have been granted access to the catalog item group that has the request offering as a member.

#### **MORE INFO REQUEST OFFERINGS**

You can learn more about creating request offerings at <http://technet.microsoft.com/en-us/library/hh519639.aspx>.

## Service offerings

Service offerings are collections of request offerings. A single request offering can be associated with multiple service offerings. Self-service users are only able to access service offerings and their associated request offerings if:

- Both the service offering and request offerings have their status set to Published.

- The end users are assigned to a user role associated with a catalog item group that contains the service offering and request offering catalog items.

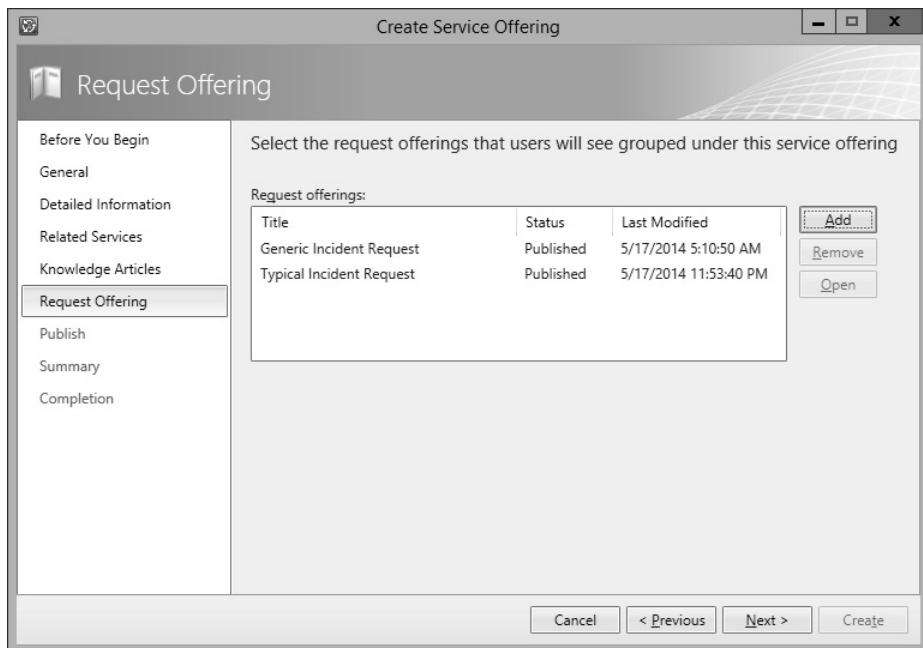
To create a service offering, perform the following steps:

1. Click Service Offerings in the Library workspace of the Service Manger console.
2. In the Tasks pane, click Create Service Offering.
3. On the General page of the Create Service Offering Wizard, shown in Figure 1-36, provide the following information:
  - **Title** The name of the service offering.
  - **Image** An image that will be associated with the service offering on the Self-Service Portal.
  - **Category** Allows you to specify a category to associate with the service offering. You can create your own custom categories.
  - **Language** Allows you to specify a language for the service offering.
  - **Overview** This short overview will be displayed on the Self-Service Portal home page.
  - **Description** This lengthier description will be available on the service offering's page in the Self-Service Portal.
  - **Management Pack** Allows you to specify the unsealed management pack in which the service offering will be stored.

**FIGURE 1-36** Create service offering



4. On the Detailed Information page, you can specify the following information:
  - Service level agreement information
  - Link for additional information
  - Cost information
  - Link for additional information
5. On the Related Service page you can specify business services associated with the service offering.
6. On the Knowledge Articles page, you can specify Service Manager knowledge articles associated with the service offering.
7. On the Request Offering page, shown in Figure 1-37, you specify the request offerings that self-service users will see grouped with this service offering.



**FIGURE 1-37** Create service offering

8. On the Publish page, select between assigning the service offering the Draft or Published status.
9. On the Summary page, review the information related to the service offering.

**MORE INFO SERVICE OFFERING**

You can learn more about creating service offerings at <http://technet.microsoft.com/en-us/library/hh519639.aspx>.

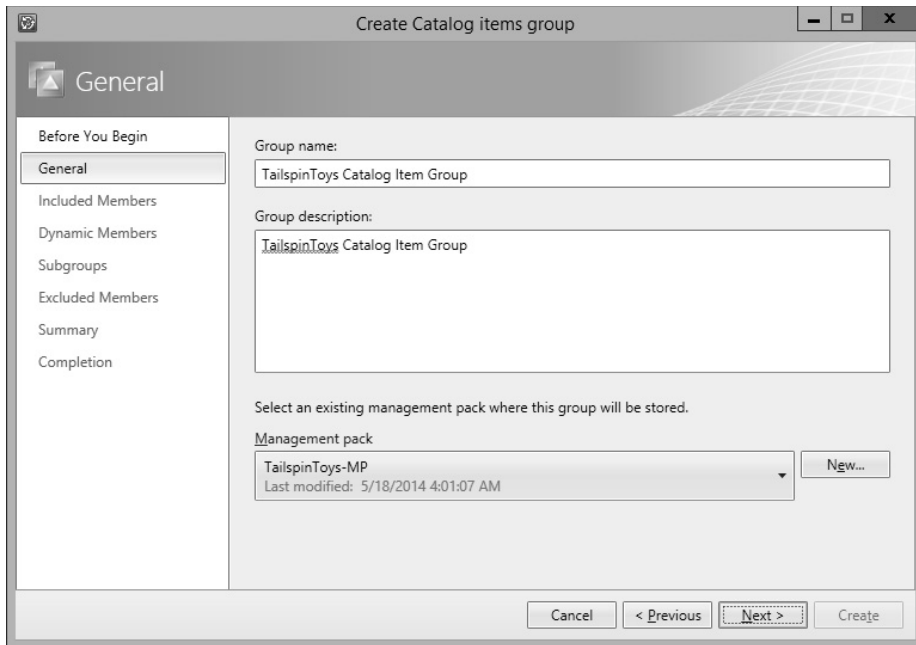
# Catalog item groups

You use catalog item groups to restrict access to service manager catalog items. You add service manager catalog items to the catalog item group, and then configure access to the catalog item group by configuring a Service Manager user role. Service manager catalog items can be members of multiple catalog item groups. By default Service Manager has two catalog item groups:

- Generic Incident Request Catalog Items Group
- Global Operators Group

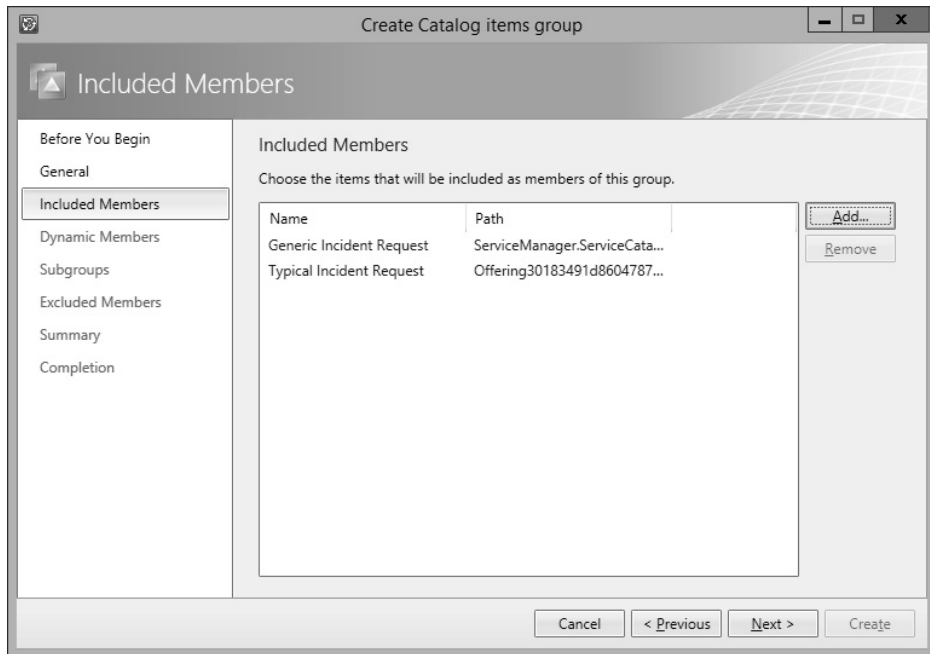
To create a catalog item group, perform the following general steps:

- In the Library workspace of the Service Manager console, click the Groups node.
- In the Tasks pane, click Create Catalog Group.
- On the General page of the Create Catalog Items Group Wizard, specify a group name, group description, and a management pack in which to save the group as shown in Figure 1-38.



**FIGURE 1-38** Catalog items group

1. On the Included Members page, specify the items that will be included as members of the group as shown in Figure 1-39. You can view by Catalog Item, Offering, Request Offering, or Service Offering.



**FIGURE 1-39** Included members

2. On the Dynamic Members page, you can have items added automatically on the basis of class and criteria.
3. On the Subgroups page, you can select existing groups as members of the new group that you are creating.
4. On the Excluded Members page, you can automatically exclude a class and specific objects based on class and criteria.

**MORE INFO CATALOG GROUPS**

You can learn more about creating service offerings at <http://technet.microsoft.com/en-us/library/hh519639.aspx>.

To provide access to members of a specific user role, edit the properties of that role and specify the catalog item groups to which the user role should have access as shown in Figure 1-40.

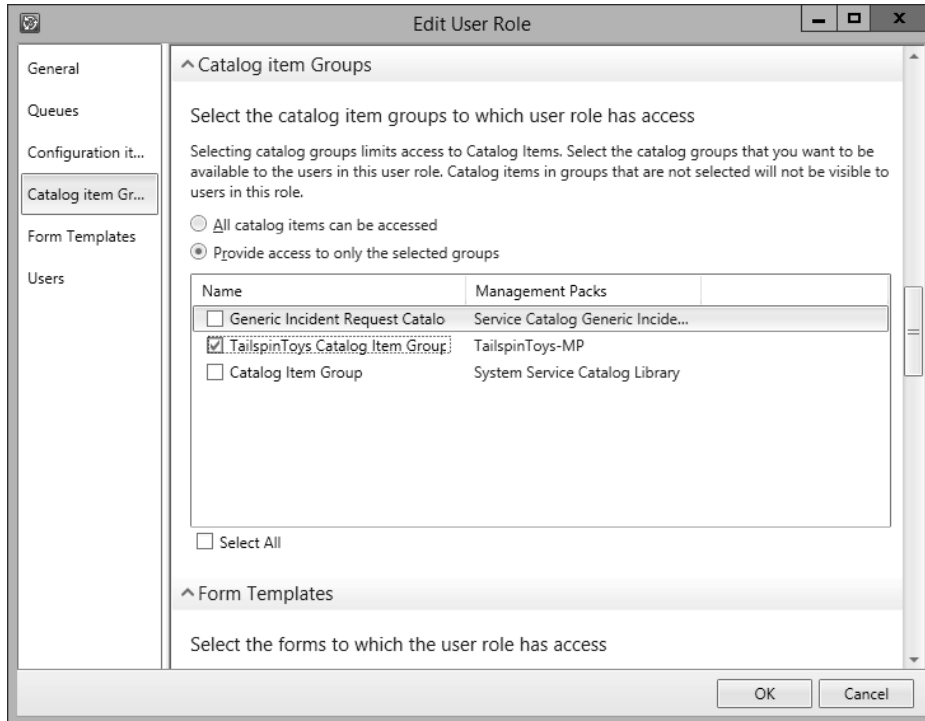


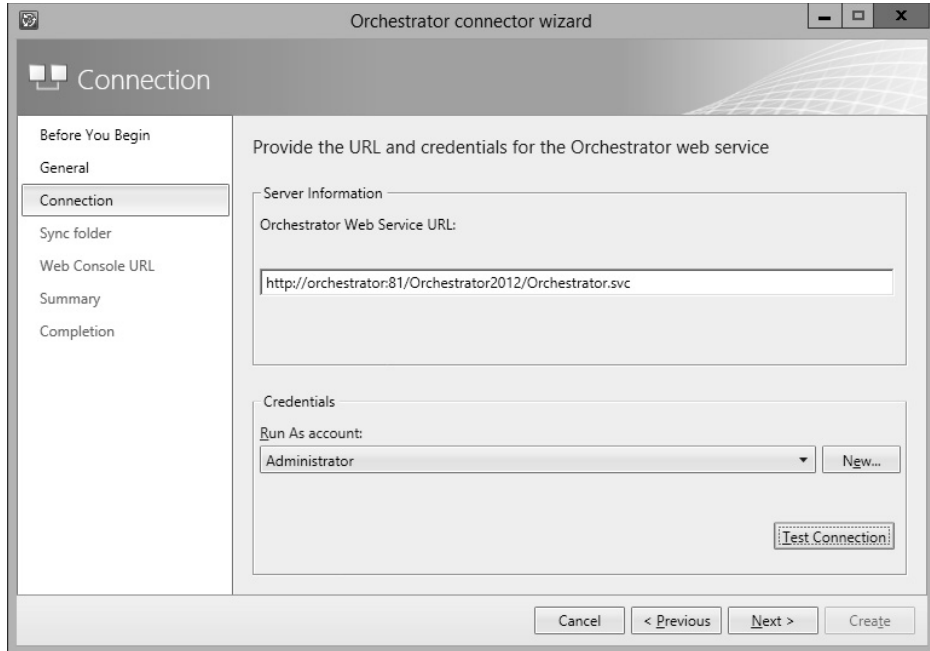
FIGURE 1-40 Edit user role

## Orchestrator and Service Manager

Earlier in this chapter you learned how to connect Orchestrator to Service Manager, which allows you to use Orchestrator runbooks to perform tasks in Service Manager. You can also configure a connector that works the other way, between Service Manager and Orchestrator, which allows Service Manager to make reference to and utilize Orchestrator runbooks. To configure the connector between Service Manager and Orchestrator, perform the following steps:

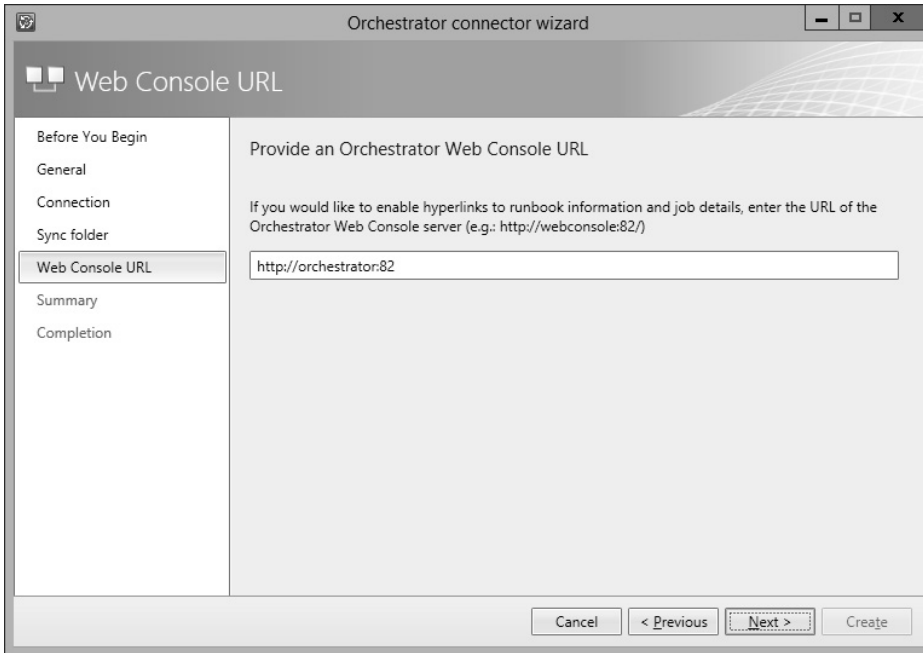
1. In the Administration workspace of the Service Manager console, click Connectors.
2. In the Tasks pane, click Create Connector, and then click Orchestrator Connector.
3. On the General page of the Orchestrator Connector Wizard, enter a name for the connector.

4. On the Connection page, specify the Orchestrator Web Service URL as shown in Figure 1-41, and the operational database account. The URL of the Orchestrator web service will be `http://computer.fqdn:81/Orchestrator2012/Orchestrator.svc`. The Run As account you use must have the right to connect to Orchestrator. Ensure that you click Test Connection to verify that the connection is successful.



**FIGURE 1-41** Orchestrator connector

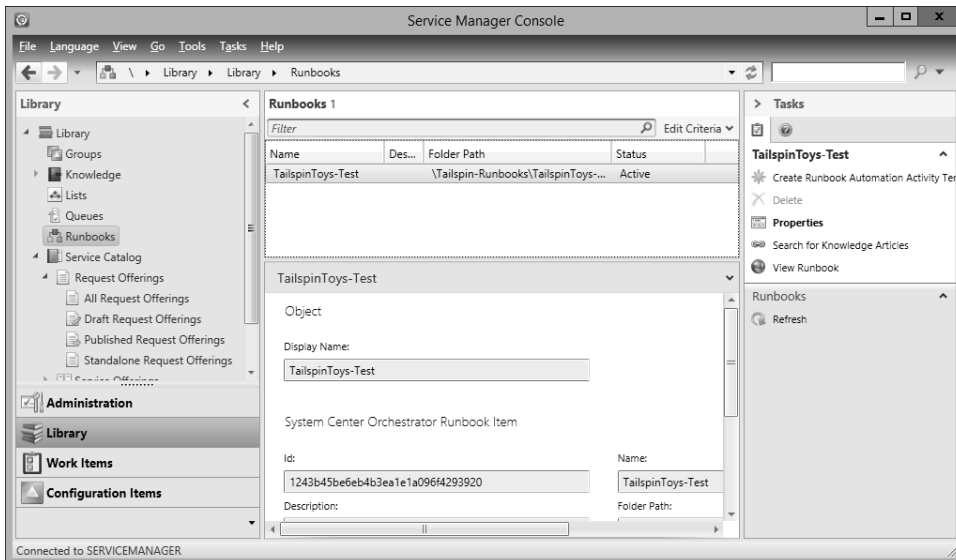
5. On the Sync Folder page, select a Sync Folder, and click Next.
6. On the Web Console URL page, shown in Figure 1-42, specify the URL for the Orchestrator web console. The URL will be `http://computer.fqdn:82`.



**FIGURE 1-42** Web console URL

7. On the Summary page, review the settings, and click Create.

You will be able to verify that the process has worked by navigating to the Library workspace and clicking the Runbooks node. Any runbooks that you've created on the Orchestrator will be present in this node. Figure 1-43 shows this node with a runbook present.



**FIGURE 1-43** Synchronized runbooks

## **MORE INFO CREATING ORCHESTRATOR CONNECTOR**

You can learn more about creating a connector between Service Manager and Orchestrator by consult the following article at <http://technet.microsoft.com/en-us/library/hh519779.aspx>.

## Using Orchestrator runbooks with Service Manager

Once information about runbooks is imported from Orchestrator into Service Manager by configuring the Orchestrator connector for Service Manager, you can trigger the runbooks from Service Manager by configuring runbook automation activity templates.

To create a runbook automation activity template, perform the following steps:

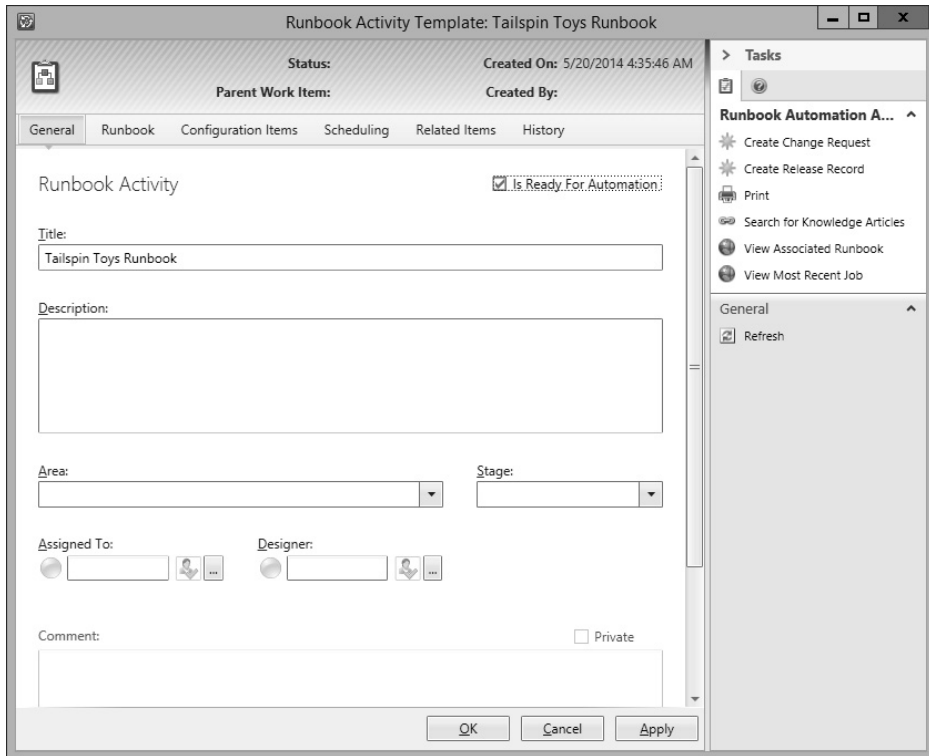
1. In the Library workspace of the Service Manager console, click Runbooks, and click the Orchestrator runbook for which you want to create an activity template.
2. On the Tasks pane, click Create Runbook Automation Activity Template.
3. In the Create Template dialog box, specify a name for the template as shown in Figure 1-44, ensure the class Runbook Automation Activity is selected, and select a management pack to store the runbook in.

The screenshot shows the 'Create Template' dialog box. The title bar reads 'Create Template'. The main area contains the following elements:

- A section titled 'Enter a name and description for the template' with a 'Name' text box containing 'Tailspin Toys Runbook' and an empty 'Description' text box.
- A 'Class' dropdown menu set to 'Runbook Automation Activity' with a 'Browse...' button to its right.
- A note: 'For example, to create an incident template, select the Incident class.'
- A 'Management pack' dropdown menu set to 'Tailspin Toys MP' (Last modified: 5/20/2014 4:33:02 AM) with a 'New...' button to its right.
- A checked checkbox labeled 'When I click OK, open the template form.'
- 'OK' and 'Cancel' buttons at the bottom right.

**FIGURE 1-44** Create template

4. When you click OK, the Runbook Activity Template will open. Provide a title for the template and ensure that the Is Ready For Automation option is selected, as shown in Figure 1-45.



**FIGURE 1-45** Runbook Activity Template

5. On the Runbook tab, there will be a list of parameters that are used for runbook input and output. You can edit mappings and specify default values to be used when Service Manager triggers the runbook.
6. Click OK to close and save the runbook automation activity template.

#### **MORE INFO USING RUNBOOKS WITH SERVICE MANAGER**

You can learn more about using Orchestrator runbooks with Service Manager at <http://technet.microsoft.com/en-us/library/hh519695.aspx>.



## Self-service provisioning of virtual machines

When you enable self-service virtual machine provisioning, users are able to navigate to a specially configured portal and are able to use the portal to request virtual machines by filling out a form providing relevant details. The type of portal and the details required will depend on the self-service strategy that you choose. There are three basic strategies that you can pursue when providing self-service virtual machine provisioning to users when using Hyper-V and the System Center products. These are:

- Self-service with Virtual Machine Manager, and App Controller
- Self-service with Virtual Machine Manager, Service Manager, and Orchestrator
- Self-service with the Windows Azure pack

### Self-service with VMM and App Controller

System Center App Controller provides users with self-service virtual machine deployment functionality for VMM 2012 SP1 and VMM 2012 R2. App Controller runs as a web application, shown in Figure 1-46. To perform self-service virtual machine deployment using App Controller, a user must be a member of a VMM self-service user role.

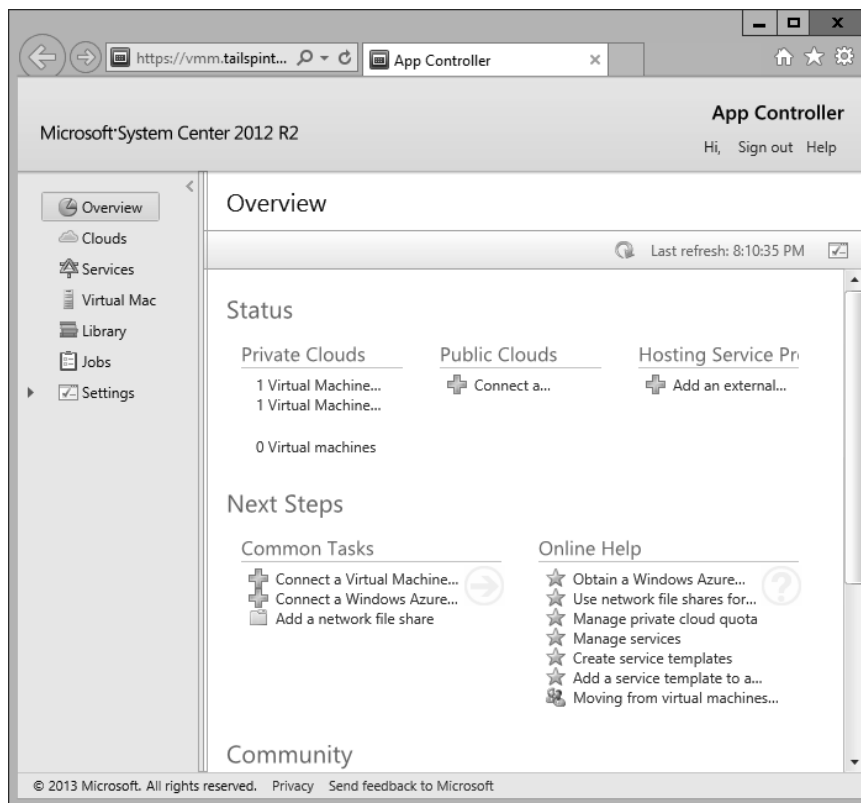


FIGURE 1-46 App Controller

### MORE INFO SELF-SERVICE IN VMM

You can learn more about self-service in VMM by consulting the following article at <http://technet.microsoft.com/en-us/library/gg610573.aspx>.

To create a self-service user role in VMM, perform the following steps:

1. Click Create User Role on the ribbon when in the Settings workspace of the VMM console.
2. On the Name And Description page of the Create User Role Wizard, provide a name for the role and an optional description.
3. On the Profile page, click Application Administrator (Self-Service User), as shown in Figure 1-47.

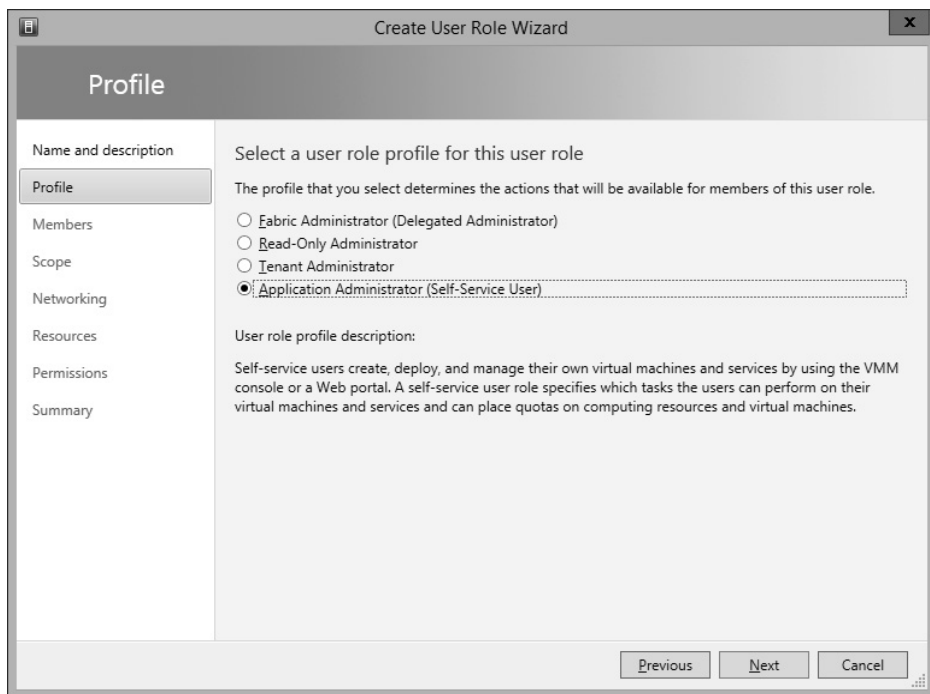
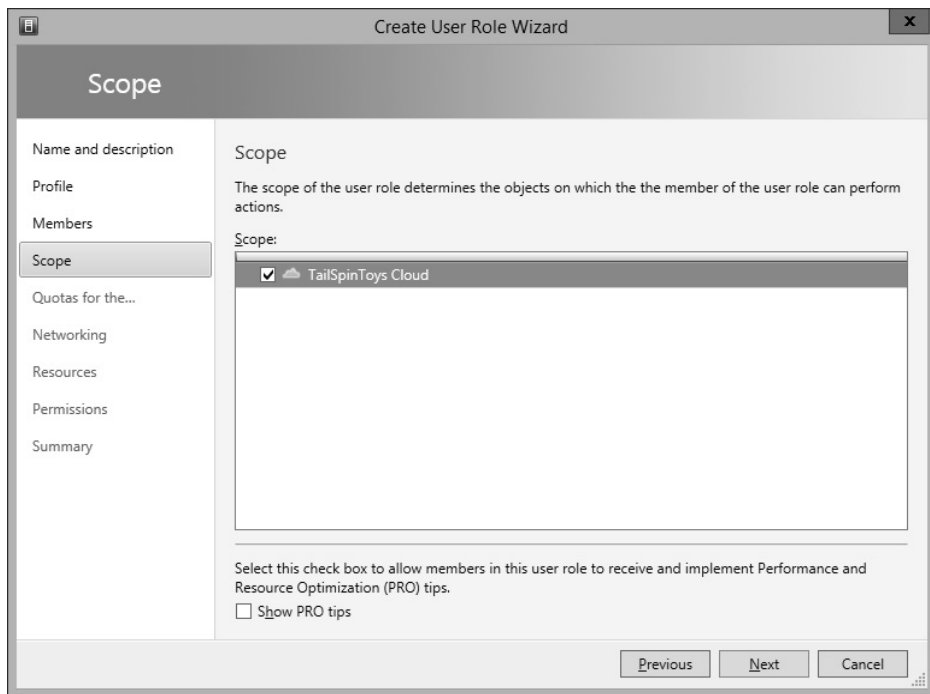


FIGURE 1-47 Create User Role

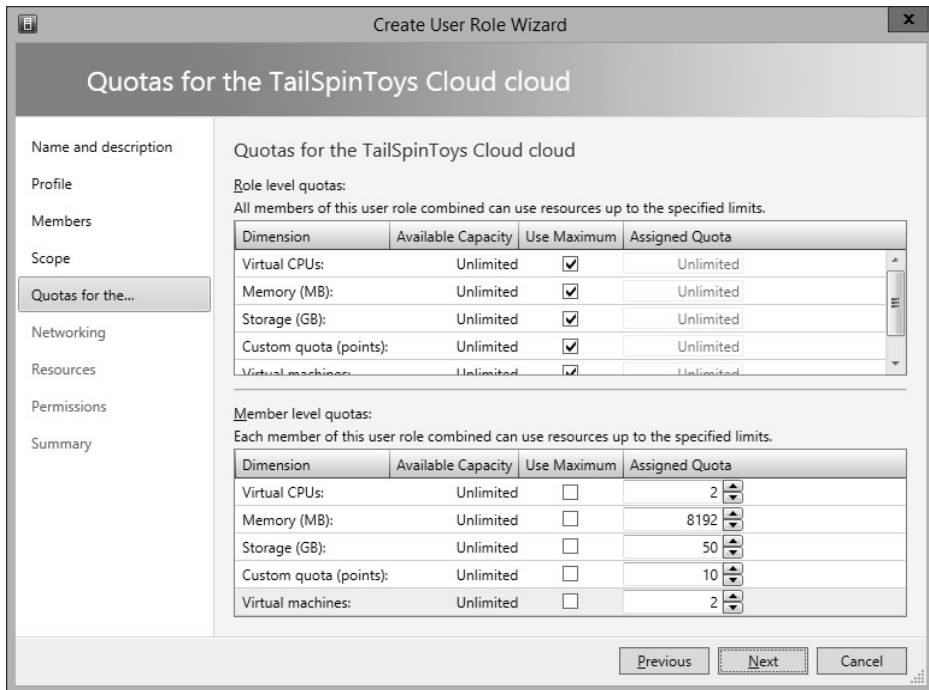
4. On the Members page of the Create User Role Wizard, click Add, and add an Active Directory security group that will host the user accounts of the people who you want to grant self-service privileges to.

5. On the Scope page, shown in Figure 1-48, select the private cloud into which self-service users will be able to deploy VMs.



**FIGURE 1-48** Create User Role

6. On the Quotas page, specify the quotas for the self-service user role. You can configure role level quotas, which apply to all users of the role, or individual quotas, that apply to individual users. For example, Figure 1-49 shows member level quotas configured so that each role member can use a maximum of 2 virtual CPUs, 8192 MB of RAM, 50 GB of storage, and deploy a maximum of 2 virtual machines.



**FIGURE 1-49** Member level quotas

7. On the Networking page, select which networks, if any, to which you will restrict the self-service users. If you don't specify any networks, self-service users can use any configured VM network.
8. On the Resources page, select which resources, if any, to which you will restrict the self-service users. If you don't specify any resources, self-service users can use any available VMM resources.

9. On the Permissions page, shown in Figure 1-50, configure the permissions that you want to assign to the users.

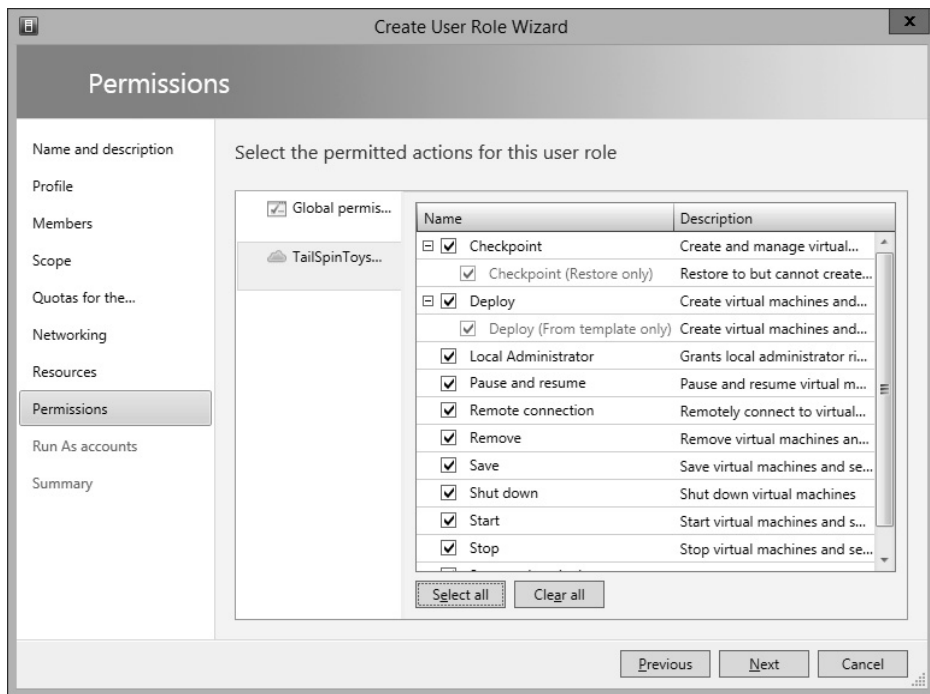


FIGURE 1-50 Permitted actions

10. On the Run As accounts page, select which VMM Run As Accounts that members of the user role can utilize.

Users assigned the appropriate permissions through the VMM role are able to sign in to the App Controller portal, connect to the private clouds hosted through VMM to which they have been assigned access, and deploy and manage virtual machines.

#### **MORE INFO SYSTEM CENTER APP CONTROLLER**

You can learn more about System Center App Controller by consulting the following article at <http://technet.microsoft.com/en-us/library/hh546834.aspx>.

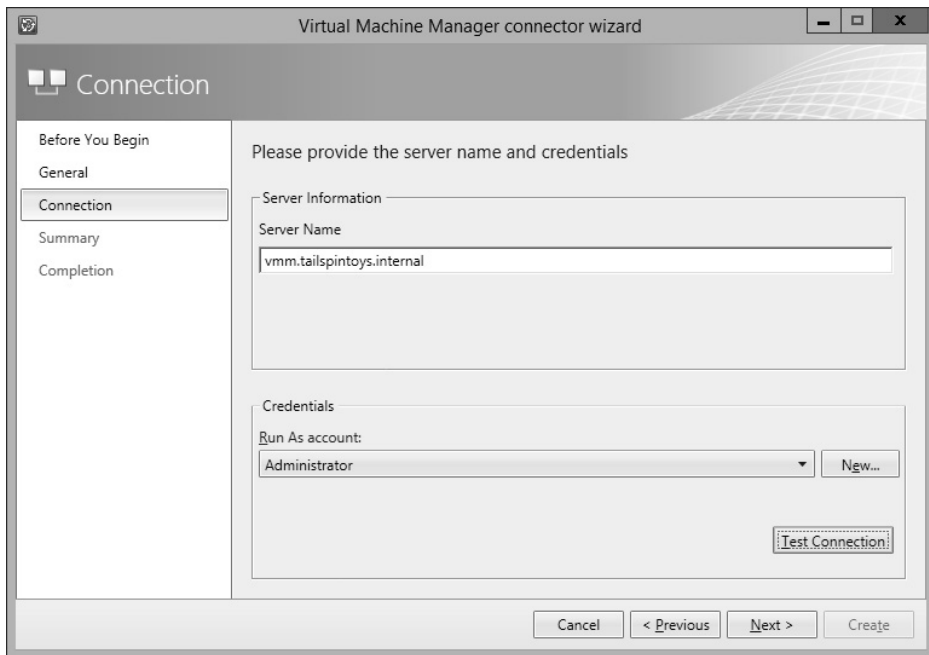
## Self-service with VMM, Service Manager, and Orchestrator

By integrating VMM, Service Manager, and Orchestrator, you can configure self-service virtual machines as Service Manager request offerings. To be able to perform this action, you'll need to configure the VMM Connector for Service Manager, and the VMM Connector for Orchestrator. When the user requests the VM through the Self-Service Portal, an Orchestrator

runbook will start, which performs the necessary activities to trigger VMM tasks deploying the virtual machine.

Configuring the VMM connector for Service Manager will provide Service Manager with information about the VMM environment. To configure the VMM connector for Service Manager, perform the following steps:

1. In the Administration workspace of the Service Manager console, click Connectors.
2. In the Tasks pane, click Create Connector, and then click Virtual Machine Manager connector.
3. On the General page of the Virtual Machine Manager Connector Wizard, type the connector name.
4. On the Connection page, shown in Figure 1-51, type the FQDN of the VMM server, and specify a Run As account. This account needs to have permissions to access VMM. Click Test Connection to verify this account.

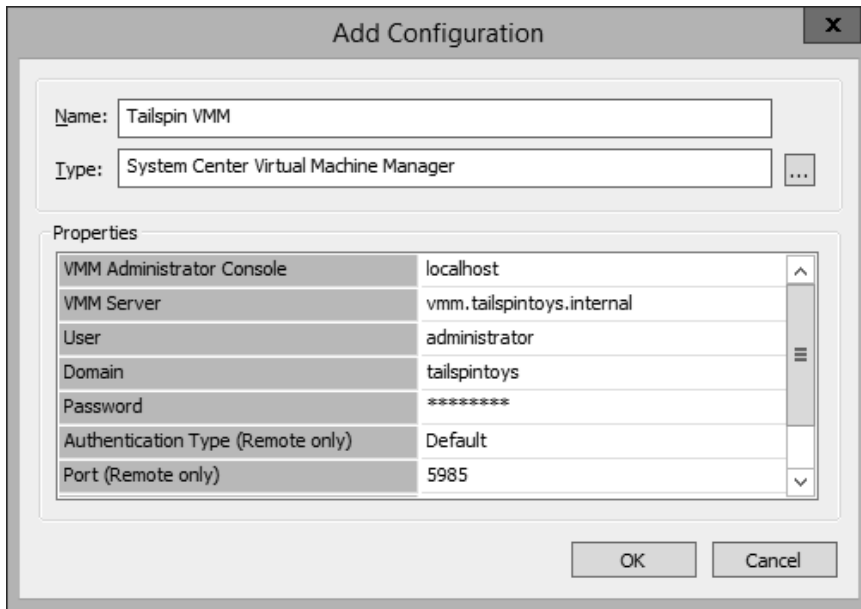


**FIGURE 1-51** VMM connector

5. On the Summary page, review the configuration information, and click Create.

To create Orchestrator runbooks that can use activities that perform tasks in VMM, you configure VMM integration for Orchestrator. To configure the VMM connector for Orchestrator, perform the following steps:

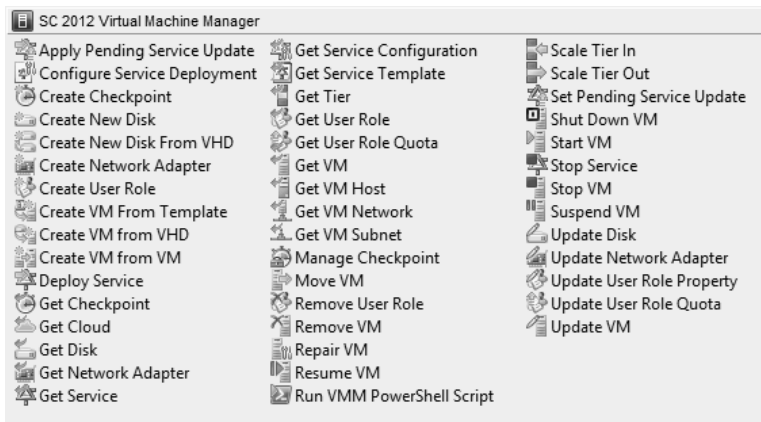
1. Ensure that the VMM integration pack is installed on the Orchestrator server.
2. Ensure that the VMM Administration console is installed on the Orchestrator server. It is possible to configure the connector without a local deployment of the VMM console, but this is a more complicated process than installing the console on the Orchestrator server.
3. Ensure that the Windows PowerShell initiation policy on the Orchestrator server is set to Remote Signed.
4. In the Options menu of the Orchestrator Runbook Designer, click SC 2012 Virtual Machine Manager.
5. On the SC 2012 Virtual Machine Manager dialog box, click Add.
6. On the Add Configuration dialog box, specify the name of the connection. Next to type, click the ellipsis (...).
7. On the Item Selection page, click System Center Virtual Machine Manager.
8. In the Properties section of the Add Configuration dialog box, shown in Figure 1-52, configure the following settings:
  - **VMM Administrator Console** Address of the server with the VMM console
  - **VMM Server** Address of the VMM server
  - **User** User account of user with permissions to the VMM server
  - **Domain** Domain that hosts the user account
  - **Password** Password associated with the account
  - **Authentication Type (Remote Only)** Needs to be configured if the VMM Administrator console is not installed on the Orchestrator server. You need to enable the authentication method for WinRM using Group Policy.
  - **Port (Remote Only)** Only required if the Orchestrator runbook server doesn't have an instance of the VMM Administrator console.
  - **Use SSL (Remote Only)** Only required if the Orchestrator runbook server doesn't have an instance of the VMM Administrator console.
  - **Cache Timeout** Amount of time in minutes before the session times out



**FIGURE 1-52** Connect VMM to Orchestrator

9. Click OK on the Add Configuration dialog box, and the SC 2012 Virtual Machine Manager dialog box.

As shown in Figure 1-53, the VMM integration pack contains 45 activities.



**FIGURE 1-53** VMM activities for Orchestrator



These activities allow you to do the following:

- **Apply Pending Service Update** Apply a pending service update to a VMM service.
- **Configure Service Deployment** Configures a VMM service for deployment. Requires the service configuration name, service template name, and deployment target.
- **Create Checkpoint** Create a VM checkpoint. Requires the GUID of the VM.
- **Create New Disk** Creates a new virtual hard disk. Requires you specify IDE/SCSI, Dynamic or Fixed, File Name, Size, and VM GUID of VM to which the disk should be attached.
- **Create New Disk From VHD** Creates a new virtual hard disk from an existing virtual hard disk. Requires you specify IDE/SCSI, Dynamic or Fixed, file name of new disk, path to original disk, VM GUID of VM to which the disk should be attached.
- **Create Network Adapter** Creates a new network adapter and attaches it to a VM. Requires the VM GUID. You can also configure additional network adapter properties such as MAC Address, MAC Address Pool, Network Tag, Virtual Network ID, VLAN ID, and Logical Network.
- **Create User Role** Creates a VMM user role. Requires that you specify a role name and the VMM user role profile that the role will use.
- **Create VM From Template** Allows you to create a VM from an existing VMM template. Requires the Type Of VM, Destination, Path, Source Template Name, Cloud Capability Profile, and VM Name.
- **Create VM From VHD** Use this activity to create a VM from an existing virtual hard disk. Requires you to specify IDE or SCI, name of destination VHD, path, location of VHD from which you will be creating the VM, the name of the VM host, and the VM name.
- **Create VM From VM** Use this activity to create a new VM from an existing VM. Requires that you specify the type of VM to create, destination, VM path, the VM GUID of the source VM, and the name to apply to the newly created VM.
- **Deploy Service** Use this activity to create a VMM service using a VMM service template. Requires that you specify the new service's name, and the VMM template name.
- **Get Checkpoint** Use this activity to retrieve VM checkpoint information.
- **Get Cloud** Get information to view information about clouds on the VMM management server.
- **Get Network Adapter** View information about VMM virtual network adapters.
- **Get Service** Use this activity to return data on all services on the VMM management server.
- **Get Service Configuration** You use this activity to generate information about service configurations on the VMM management server.
- **Get Service Template** This activity allows you to generate a list of all VMM service templates.

- **Get Tier** Provides information about all VMM tiers.
- **Get User Role** Use this activity to extract information about VMM user roles.
- **Get User Role Quota** Use this activity to return information about all user role quotas on VMM management server.
- **Get VM** This activity provides information on a specific VM.
- **Get VM Host** Use this activity to extract information about a virtualization host.
- **Get VM Network** This activity allows you to extract information about a VMM VM network.
- **Get VM Subnet** Use this activity to provide Orchestrator with information about a VMM VM subnet.
- **Manage Checkpoint** You can use this activity in an Orchestrator runbook to revert a VMM VM to a specific checkpoint, or to remove checkpoints that are no longer required.
- **Move VM** This activity allows you to move a VM to a new location.
- **Remove User Role** This activity deletes a user role from VMM.
- **Remove VM** Use this activity to delete a VM. This activity can only target a VM that is in a shutdown state.
- **Repair VM** Use this activity to issue a retry, undo, or dismiss action on a VMM VM.
- **Resume VM** This activity allows Orchestrator to resume a VM that is in a paused state.
- **Run VMM PowerShell Script** Use this activity to trigger a PowerShell script.
- **Scale Tier In** This activity allows Orchestrator to remove a virtual machine instance from a specific service tier.
- **Scale Tier Out** This activity allows Orchestrator to add a virtual machine instance to a specific service tier.
- **Set Pending Service Update** Use this activity to set a specific VMM service template as the pending service update.
- **Shut Down VM** This activity allows Orchestrator to shut down a stopped VM, taking the VM offline.
- **Start VM** Use this activity in an Orchestrator runbook to start a VM that has been paused, shut down, or stopped.
- **Stop Service** This activity will stop a VMM service.
- **Stop VM** Use this activity in an Orchestrator runbook to place a VM into a stopped state.
- **Suspend VM** This activity will place a VM into a suspended state.
- **Update Disk** This activity allows an Orchestrator runbook to change the properties of an existing disk.

- **Update Network Adapter** Use this activity to update the properties of an existing network adapter.
- **Update User Role Property** Updates the properties of a VMM user role.
- **Update User Role Quota** Updates the quota for a user role.
- **Update VM** Use this activity in an Orchestrator runbook to update a VM.

#### **MORE INFO VMM INTEGRATION PACK**

Learn more about the VMM integration pack for Orchestrator by consulting the following article at: <http://technet.microsoft.com/en-us/library/hh830704.aspx>.

To configure self-service deployment using VMM, Service Manager, and Orchestrator, you need to perform the following general steps:

1. Create an Orchestrator runbook that takes inputs to create a VM. At a minimum this would involve the Create VM From Template Orchestrator Runbook activity, but more complex runbooks might extract more information about the VM, the template, and the Private Cloud to which the VM is deployed. You use the Initialize Data activity to collect parameters to be used with the runbook.
2. In Service Manager, create a runbook automation activity template, ensuring that the template is configured as Ready For Automation. Configure the runbook automation activity template to collect the parameters that will be used with the Orchestrator runbook. For example, this might be the VM template name and the private cloud name.
3. In Service Manager, create a service request template. In the template's Activities tab, link the runbook automation activity that you configured, which leverages the Orchestrator runbook that deploys the VM.
4. Create a Request Offering and use it to collect the parameters from the person using the request offering that will be passed to the Orchestrator runbook to perform VM deployment.
5. Create and publish a Service Offering that links the request offering. This will update the Self-Service Portal. When complete, a user will use the portal to enter the parameters needed by the Orchestrator runbook to leverage VMM to deploy the requested VM.

#### **MORE INFO AUTOMATING SELF-SERVICE VMM DEPLOYMENT**

Learn more about automating VMM deployment with Service Manager by consulting the following article at <http://technet.microsoft.com/en-us/magazine/jj933281.aspx>.

## Self-service with Windows Azure Pack for Windows Server

An additional method to provide self-service virtual machine deployment to users in an organization is to deploy the Windows Azure Pack for Windows Server. Windows Azure Pack for Windows Server runs on top of Windows Server 2012 R2 and System Center 2012 R2, and provides a self-service multi-tenant cloud that uses the same interface as Microsoft's public cloud. Although not explicitly addressed by the 70-246 objectives, the Windows Azure Pack for Windows Server provides a pre-built alternative for organizations that want to provide on-premises self-service virtual machine deployment.

### **MORE INFO WINDOWS AZURE PACK FOR WINDOWS SERVER**

You can learn more about the Windows Azure Pack for Windows Server by consulting the following article at <http://technet.microsoft.com/en-us/library/dn296435.aspx>.



### **EXAM TIP**

While Virtual Machine Manager 2012 RTM had a Self-Service Portal, this functionality was removed in Virtual Machine Manager 2012 SP1 and Virtual Machine Manager 2012 R2 in favor of App Controller.



### **Thought experiment**

#### **Self-service Virtual Machine deployment at WingTipToys**

You want to trial self-service virtual machine deployment as a way of providing people at WingTipToys with the necessary IT infrastructure to complete their projects. You have the following goals:

- You want to provide users with the ability to deploy virtual machines. These users will be members of the Self-Service\_VM security group in Active Directory.
- Users should be only able to deploy a maximum of 2 virtual machines.

With this information in mind, answer the following questions:

1. Which System Center products can you deploy to support virtual machine self-service deployment?
2. What should you configure in VMM to allow members of the Self-Service\_VM security group to deploy and manage VMs using System Center App Controller?
3. What steps would you take to ensure that users are only able to deploy a maximum of 2 virtual machines?

## Objective summary

- Custom workflows allow you to further automate Service Manager processes. You create custom workflows with the Service Manager Authoring Tool.
- The Service Manager 2012 R2 Self-Service Portal is a SharePoint 2010 website that customers can use to submit requests for service offerings and request offerings using their web browser.
- The service catalog is a collection of Service Manager items, assistance, actions, or groupings of items, assistance, or actions.
- Request offerings are items or actions that you can make available to users through the service catalog.
- Service offerings are collections of request offerings.
- You use catalog item groups to restrict access to service manager catalog items.
- You can configure a connector between Service Manager and Orchestrator, which allows Service Manager to make reference to and utilize Orchestrator runbooks.
- You can trigger the runbooks from Service Manager by configuring runbook automation activity templates.
- System Center App Controller provides users with self-service virtual machine deployment functionality for VMM 2012 SP1 and VMM 2012 R2.
- By integrating VMM, Service Manager, and Orchestrator, you can configure self-service virtual machines as Service Manager request offerings.

## Objective review

Answer the following questions to test your knowledge of the information in this objective. You can find the answers to these questions and explanations of why each answer choice is correct or incorrect in the “Answers” section at the end of this chapter.

1. Which of the following Service Manager items do you use to collect together request offerings for publication on the Service Manager Self-Service Portal?
  - A. Catalog item groups
  - B. Incident templates
  - C. Change Management workflows
  - D. Service offerings
2. Which of the following server and software configurations support hosting the System Center 2012 R2 Service Manager Self-Service Portal?
  - A. Windows Server 2012 R2
  - B. Windows Server 2008 R2
  - C. SharePoint Server 2010
  - D. SharePoint Server 2013

- 3.** You want to use an Orchestrator runbook as part of a Service Manager Change Management workflow. You have configured the Orchestrator connector for Service Manager. Which of the following must you also create to use the runbook with the workflow?
  - A.** Manual activity
  - B.** Review activity
  - C.** Runbook automation activity
  - D.** Sequential activity
- 4.** Which of the following tools do you use to create a custom workflow for Service Manager?
  - A.** Service Manager Authoring Tool
  - B.** Orchestrator Runbook Designer
  - C.** Service Manager console
  - D.** Operations Manager console
- 5.** Which of the following steps must you take prior to configuring a connection between Orchestrator server and a Virtual Machine Manager server?
  - A.** Install the VMM Management Console on the Orchestrator server.
  - B.** Install the Service Manager Authoring Tool on the Orchestrator server.
  - C.** Install the VMM integration pack on the Orchestrator server
  - D.** Install the Service Manager console on the Orchestrator server.

# Answers

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This section contains the solutions to the thought experiments and answers to the lesson review questions in this chapter.

## Objective 1.1: Thought experiment

1. This solution can be configured using Operations Manager and Service Manager. Orchestrator is not required, though could also be used if more complicated automation is necessary.
2. To configure this solution, you only need to configure the Operations Manager connector for Orchestrator.
3. You need to configure a change management workflow to automatically close completed change requests.

## Objective 1.1: Review

1. **Correct answers:** B and C
  - A. **Incorrect:** You don't need to configure a connection from the Operations Manager server to the Orchestrator server with this proposed solution.
  - B. **Correct:** You need to configure the connector from Orchestrator to Operations Manager so that you can then use the activities in the Operations Manager integration pack.
  - C. **Correct:** You also need to configure a connection from the Orchestrator server to the Service Manager server so that you can have the Orchestrator workflow create incidents triggered by Operations Manager alerts.
  - D. **Incorrect:** The solution mentions using an Orchestrator runbook. While it is possible to have incidents created using the Operations Manager connector for Service Manager, Orchestrator runbooks allow you to configure more complex automation.
2. **Correct answers:** A and C
  - A. **Correct:** In this scenario, you should configure the Operations Manager connector for Service Manager as a way of extracting alert information.
  - B. **Incorrect:** It is not necessary to deploy the Operations Manager agent on the Service Manager server to accomplish this goal.
  - C. **Correct:** You need to create specific incident template and then configure an alert routing rule that leverages this template.
  - D. **Incorrect:** According to the question text, Orchestrator has not been deployed in this environment.

- 3. Correct answer: A**
- A. Correct:** By configuring a change request workflow, you can configure certain users to be notified when change requests that meet specific criteria are entered into Service Manager.
  - B. Incorrect:** You would configure a change request, rather than an incident event workflow.
  - C. Incorrect:** You would configure a change request, rather than an activity event workflow.
  - D. Incorrect:** You would configure a change request, rather than a desired configuration management event workflow.
- 4. Correct answer: A**
- A. Correct:** You should select the change request class when creating a change request template.
  - B. Incorrect:** You should select the change request class when creating a change request template.
  - C. Incorrect:** You should select the change request class when creating a change request template.
  - D. Incorrect:** You should select the change request class when creating a change request template.
- 5. Correct answer: B**
- A. Incorrect:** This activity allows you to create alerts.
  - B. Correct:** The Get Alert activity allows you to extract data from Operations Manager alerts.
  - C. Incorrect:** Use this activity to watch for specific alerts, rather than to extract information from those alerts.
  - D. Incorrect:** Use this activity to update an alert.

## Objective 1.2: Thought experiment

- 1.** You can use System Center App Controller and Virtual Machine Manager, or a combination of Service Manager, Orchestrator, and Virtual Machine Manager.
- 2.** You need to configure a VMM user role that uses the Application Administrator role profile and configure it to have the Self-Service\_VM security group define its membership.
- 3.** You'll need to configure a self-service user role with a quota limiting each user to a maximum of 2 virtual machines.



## Objective 1.2: Review

1. **Correct answer:** D
  - A. **Incorrect:** You use catalog item groups to collect together catalog items so that you can make them available to members of a specific user role.
  - B. **Incorrect:** An incident template forms the basis of an incident in Service Manager.
  - C. **Incorrect:** You use change management workflows to automate change management processes.
  - D. **Correct:** You use service offerings to collect together request offerings for publication on the Service Manager Self-Service Portal.
2. **Correct answers:** B and C
  - A. **Incorrect:** The System Center 2012 R2 Service Manager Self-Service Portal can only be hosted on SharePoint 2010, which can be deployed on Windows Server 2008 R2.
  - B. **Correct:** The System Center 2012 R2 Service Manager Self-Service Portal can only be hosted on SharePoint 2010, which can be deployed on Windows Server 2008 R2.
  - C. **Correct:** The System Center 2012 R2 Service Manager Self-Service Portal can only be hosted on SharePoint 2010.
  - D. **Incorrect:** The System Center 2012 R2 Service Manager Self-Service Portal can only be hosted on SharePoint 2010.
3. **Correct answer:** C
  - A. **Incorrect:** You need to create a runbook automation activity to use the runbook with the workflow.
  - B. **Incorrect:** You need to create a runbook automation activity to use the runbook with the workflow.
  - C. **Correct:** You need to create a runbook automation activity to use the runbook with the workflow.
  - D. **Incorrect:** You need to create a runbook automation activity to use the runbook with the workflow.
4. **Correct answer:** A
  - A. **Correct:** You use the Service Manager Authoring Tool to create custom workflows for Service Manager.
  - B. **Incorrect:** You use the Service Manager Authoring Tool to create custom workflows for Service Manager.
  - C. **Incorrect:** You use the Service Manager Authoring Tool to create custom workflows for Service Manager.
  - D. **Incorrect:** You use the Service Manager Authoring Tool to create custom workflows for Service Manager.

**5. Correct answers:** A and C

- A. Correct:** You need to deploy the VMM Management Console on the Orchestrator server and install the VMM integration pack on the Orchestrator server prior to configuring a connection between the Orchestrator server and a VMM server.
- B. Incorrect:** You need to deploy the VMM Management Console on the Orchestrator server and install the VMM integration pack on the Orchestrator server prior to configuring a connection between the Orchestrator server and a VMM server.
- C. Correct:** You need to deploy the VMM Management Console on the Orchestrator server and install the VMM integration pack on the Orchestrator server prior to configuring a connection between the Orchestrator server and a VMM server.
- D. Incorrect:** You need to deploy the VMM Management Console on the Orchestrator server and install the VMM integration pack on the Orchestrator server prior to configuring a connection between the Orchestrator server and a VMM server.



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