INTEGRATION PACK FOR SERVICENOW (REST)

For Microsoft System Center Orchestrator

For System Center 2016 and 2019, you must use the 32-bit version of the integration pack, which has the name **Kelverion_Integration_Pack_for_ServiceNow_Rest_3.6**

For System Center 2022 and later, you must use the 64-bit version of the integration pack, which has the name **Kelverion_IP_ServiceNow_x64_3.6**

User Guide
Version 3.6

Kelverion Integration Pack for ServiceNow (REST)

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Feedback

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Installation and Configuration

The Integration Pack for ServiceNow (REST) is an add-on for System Center Orchestrator that enables you to integrate with ServiceNow and automate service management processes.

System Requirements

The Integration Pack for ServiceNow (REST) requires the following software to be installed and configured prior to implementing the integration. For more information about installing and configuring Orchestrator and ServiceNow, refer to the respective product documentation.

Kelverion_Integration_Pack_for_ServiceNow_Rest (32-bit)

- Microsoft System Center Orchestrator 2016, 2019
- Microsoft .NET Framework 4.7.2

Kelverion_IP_ServiceNow_x64 (64-bit)

- Microsoft System Center Orchestrator 2022
- Microsoft .NET Framework 4.7.2

The integration packs can integrate with the following versions of ServiceNow:

- Washington
- Vancouver
- Utah

Important: The Kelverion Integration Pack for ServiceNow (REST) requires that the user that it uses to connect to ServiceNow with is configured to use the **English** language.

Preparing to Connect to ServiceNow

The following sections outline how to configure your ServiceNow instance to work with the activities in the Kelverion Integration Pack for ServiceNow.

Security Configuration

To integrate successfully with ServiceNow, the Kelverion Integration Pack for ServiceNow requires access to the tables that will be targeted by your runbooks as well as several system tables. System table access is used to retrieve information, such as table and field descriptions, which are used to provide a rich runbook authoring experience.

For non-admin users, access to ServiceNow is configured using user roles and access control rules (ACLs). The following sections outline the process of setting up a dedicated user role and ACLs to enable the Integration Pack for ServiceNow to integrate with your ServiceNow environment.

1. Create a dedicated Role for Automation.
2. Create system table Access Control List (ACL) rules.
3. Enable API Endpoints.

4. Create a dedicated User for Automation.

5. Create ACL rules to support your runbooks.

Step 1: Create a Dedicated Role for Automation

Roles are used to control access to features and capabilities in ServiceNow and it is strongly recommended that you create a dedicated role for the integration pack and your runbooks to access your ServiceNow environment.

1. Navigate to **User Administration > Roles** and create a new record.

2. In the **Name** field, type a name for the role, such as *auto_admin*.

3. In the **Application** field, select *Global.*

4. Disable the **Elevated privilege** option.

5. In the **Description** field, enter a description of the role.

6. Click **Submit.**

To enable access to the tables that will be targeted by your runbooks it may be necessary to add existing roles, such as the ITIL role, to the role that you created for the integration pack.

1. Navigate to **User Administration > Roles** and open the role that you created for the integration pack.

2. Click **Edit** in the **Contains Roles** list.

3. Use the slush-bucket to add one or more roles. Note, you must add the *snc_platform_rest_api* role.

4. Click **Save**.

The user that you define in System Center Orchestrator to connect to ServiceNow must use this role and the Access Control List Rules that you will assign to it in the next step.

Step 2: Create System Table ACL Rules

To provide a rich authoring experience, the Integration Pack for ServiceNow must be able to retrieve system information from your ServiceNow environment. To enable access for non-admin users it is necessary to create Access Control List (ACL) rules.

The integration pack requires *Table and Field ACLs* for the following ServiceNow System tables:

- Choice [sys_choice]
- Table [sys_db_object]
- View Table [sys_db_view_table]
- Database View [sys_db_view]
- Dictionary Entry [sys_dictionary]

- Field Label [sys_documentation]
- Field Class [sys_glide_object]
- Journal Entry [sys_journal_field]
- *Field Map [sys_transform_entry]
- *Table Transform Map [sys_transform_map]

* Only required if you plan to use the **Import Set** activity

First, you need to create ACLs to let the integration pack access the preceding ServiceNow system tables. *For each table in the preceding list of system tables*, create a read ACL to enable the integration pack to access the table:

1. Elevate privileges to the *security_admin* role.

2. Navigate to **System Security > Access Control (ACL).**

3. Click **New**.

4. In the **Type** field, select *record*.

5. In the **Operation** field, select *read*.

6. Leave the **Active** and **Admin overrides** fields enabled.

7. In the **Name** field, select that system table that is being secured and in the adjacent field select *None.*

8. Optionally, in the **Description** field, enter a description of the rule.

9. In the **Requires role** section type or enter the role that you created for your integration pack in the previous section.

10. Click **Submit**.

When you are finished, the form should look something like this:

Next, you need to create ACLs to let the integration pack access the **fields** in the preceding ServiceNow system tables. *For each table in the preceding list of system tables*, create a read ACL to enable the integration pack to access the **fields** in the table:

1. Elevate privileges to the *security_admin* role.

2. Navigate to **System Security > Access Control (ACL).**

3. Click **New**.

4. In the **Type** field, select *record*.

5. In the **Operation** field, select *read*.

6. Leave the **Active** and **Admin overrides** fields enabled.

7. In the **Name** field, select that system table that is being secured and in the adjacent field select *asterisk (*).*

8. Optionally, in the **Description** field, enter a description of the rule.

9. In the **Requires role** section type or enter the role that you created for your integration pack in the previous section.

10. Click **Submit**.

When you are finished, the form should look something like this:

Step 3: Enable API Endpoints

The Integration Pack requires that **REST_Endpoint ACLs** be enabled for the following APIs.

- Table API

- Attachment API

- Import Set API

For each API in the preceding list, enable the ACL entry:

1. Elevate privileges to the *security_admin* role.

2. Navigate to **System Security > Access Control (ACL).**

3. Search for the API name.

4. Open the API entry.

5. Select the Active check box.

6. Click **Update.**

Step 4: Create a Dedicated User for Automation

It is recommended that you create a dedicated user to enable the Integration Pack for ServiceNow to access your ServiceNow environment. Using a dedicated user will provide the ability to more easily configure the ACL rules and other options and roles that are required by the Integration Pack for ServiceNow and the runbooks that your author in System Center Orchestrator.

1. Navigate to **User Administration > Users**.

2. Click **New**.

3. In the **User ID** field, type a Sys ID.

4. In the **First name** and **Last name** fields type appropriate values.

5. In the **Password** field, type a password.

6. Disable the **Password needs reset** option.

7. Optionally, enable the Web service access only option.

8. In the **Time zone** field, select an appropriate time zone. See the next section regarding working with date and time values in ServiceNow and System Center Orchestrator.

9. If language settings are enabled, in the **Language** box, select **English**.

10. Fill in additional information, as necessary.

11. Click **Submit**.

Assign roles to the new user:

1. Navigate to **User Administration > Users** and open the user that you created in the previous steps.

2. In the **Roles** related list, click **Edit.**

3. In the **Collection** list, select the dedicated Automation role that you created in step 1.

4. Optionally, add additional roles as necessary to support your runbooks.

5. Click **Save**.

Step 5: Create ACL Rules to Support Your Runbooks

It may also be necessary to create additional ACL rules to enable your runbooks to access other tables in your ServiceNow environment. Alternatively, you may be able to assign additional roles to the user that you are using to connect to ServiceNow from System Center Orchestrator to enable the access that your runbooks require.

Connecting to ServiceNow using OAuth 2.0

The Integration Pack for ServiceNow supports basic and OAuth 2.0 authentication. For most scenarios, basic authentication using a username and password is recommended; however, OAuth is provided in those cases where basic authentication has been disabled. For more information, see OAuth 2.0 in the online ServiceNow documentation.

Setup OAuth

To use OAuth 2.0 to connect to ServiceNow, you must first setup and activate the OAuth plugin and create an OAuth application endpoint for the integration module to access the instance.

To Activate OAuth 2.0 in your ServiceNow instance:

1. Login to your ServiceNow instance using a user with the **admin** role.
2. Navigate to **System Applications** > **All Available Applications** > **All**.
3. Find the plugin titled **OAuth 2.0** using the filter criteria and search bar. You can search for the plugin by its **name** or **ID**. If you cannot find a plugin, you might have to request it from *ServiceNow* personnel. For more information, see Request a plugin.
4. Click **Install**, and then in the Activate Plugin dialog box, click **Activate**.

To Create a Client Endpoint:

1. Login to your ServiceNow instance using a user with the **admin** role.
2. Navigate to **System OAuth > Application Registry.**
3. Click **New**.
4. Click **Create an OAuth API endpoint for external clients.**
5. In the **Name** box, enter a unique name for the endpoint such as **Kelverion Automation**.
6. In the **Client Secret** box, enter a secret that both the instance and module can use to authorize communication. Leave empty to auto-generate a client secret.
7. In the **Refresh Token Lifespan** field, enter a lifespan for the refresh token. We recommend using a value sufficient to support your automation environment. For example, enter the value 86,400,000 to indicate that the token will expire in 1,000 days.
8. Click **Submit**.

Alternatively, you can use a third-party OAuth provider that provides the authorization to access your instance. See Use a third-party OAuth provider in the online ServiceNow documentation.

Refresh Tokens

Refresh tokens are credentials used by the Integration Pack to obtain access tokens to access your ServiceNow instance. Refresh tokens have a limited lifespan; however, you have the option to override the default lifespan when you setup and configure the application endpoint. To minimize the risk of refresh tokens expiring unexpectedly, we recommend using a lifespan of at least 365 days.

The Integration Pack for ServiceNow includes a **Get Refresh Token** activity to assist you with obtaining refresh tokens for your KA ServiceNow connections.

The following steps demonstrate how you can use the activity to request a refresh token.

To create a Refresh Token using Runbook Designer:

1. Start Orchestrator Runbook Designer.
2. In the **Connections** pane, right-click **Runbooks** to select **New…**, and then select **Runbooks**. A **New Runbook** tab appears at the top of the **Runbook Designer** workspace with the name **New Runbook**.

3. In the **Activities** pane, expand the **KA ServiceNow REST** category.
4. Select and drag a **Get Refresh Token** activity to the **Runbook Designer** design workspace.
5. Double-click the **Get Refresh Token** activity to open its **Properties** dialog.
6. In the **Authorization URL** box, enter the ServiceNow Authorization URL. This URL will usually end with */oauth_token.do* OR */oauth_auth.do*.
7. In the **Client ID** box, enter the Client ID of your OAuth API endpoint.
8. In the **Client Secret** box, enter the Client Secret of you your OAuth API endpoint.
9. In the **Username** and **Password** boxes, enter the credentials of a ServiceNow user that has permission to access the OAuth API endpoint.
10. Click **Finish**.
11. In the **Toolbar** click **Runbook Tester**. The **Runbook Tester** application appears.
12. In the **Toolbar** click **Run**.
13. In the **Log** window click the expand button.
14. Right-click on the value for the **Refresh Token** output and select **Select All.** Right-click on the value of the **Refresh Token** output again and select **Copy**. You can now use the refresh token to setup **KA ServiceNow (REST)** configurations in **Runbook Designer**.

Working with Date and time Values

Due to the way that the ServiceNow web service API handles date and time values, the following information should be considered when working the date and time values.

Optional and Required Date and Time Properties

When configuring the Insert and Update Record activities it is assumed that the values for all date and time fields are relative to the time zone of the ServiceNow user that owns the record. If an Owner is not explicitly defined, ServiceNow will assume that the owner is the ServiceNow user that was specified in the configuration that was selected when the activity was defined.

All date and time values should use the standard System Center Orchestrator date and time format, regardless of the date and time formats that have been assigned to the ServiceNow user that owns the record. The standard Orchestrator date and time format is **yyyy-MM-ddTHH:mm:ss**, for example 2012-12-14T15:00:00.

To minimize problems with date and time values create a special admin user in ServiceNow that can be used by your ServiceNow runbooks. This user should be assigned the local time zone of the Orchestrator host system(s).

Due to differences in ServiceNow date and time format strings and Microsoft .NET format strings we strongly suggest using a standard, non-ambiguous date, and time format, such as **yyyy-MM-dd HH:mm:ss**.

Date and Time Filters

When defining filters for the Get and Monitor Records activity that are associated with ServiceNow date and time fields you should use the local time of the system that is hosting Orchestrator.

All date and time values should use the standard System Center Orchestrator date and time format, regardless of the date and time formats that have been assigned to the ServiceNow user that owns the record.

Publishing ServiceNow Date and time Fields

When publishing data from ServiceNow, the integration pack converts all date and time field values into the local time of the Orchestrator host system. All date and time values are published using the standard Orchestrator date and time format.

Reference Cache

The Kelverion Integration Pack for ServiceNow uses the ServiceNow REST API to access your ServiceNow environment. To provide users with the ability to connect to any ServiceNow table, the Kelverion Integration Pack for ServiceNow builds table references as required. The process of building a table reference can be time consuming, and this explains the delay that you may experience when connecting to a new table for the first time.

To minimize the performance impact of building table reference on demand, the Kelverion Integration Pack uses a local cache to store table reference and other related connection information. Although this cache provides a significant performance benefit, there is a chance that it can become outdated when significant changes are made your ServiceNow system, such as adding fields to a ServiceNow table. When this happens, you must remove the cached files so that they can be rebuilt.

To remove the ServiceNow Web Reference cache:

1. Open Windows Explorer.
2. Select *C:\ProgramData\Kelverion\ServiceNow.*
3. Delete the folder that matches your ServiceNow host.
4. Repeat for each Runbook Server host system.

Registering and Deploying the Integration Pack

After you download the integration pack file, you must register it with the Orchestrator management server and then deploy it to Runbook Servers and computers that have Runbook Designer installed. For more information about how to install integration packs, see the [How to Install an Integration Pack](#) in the online documentation for System Center Orchestrator.

IMPORTANT: Ensure that you are deploying the correct version of the Integration Pack.

- For System Center 2016 and 2019, you must use the 32-bit version of the integration pack, which has the name **Kelverion_Integration_Pack_for_ServiceNow_Rest**
- For System Center 2022 and later, you must use the 64-bit version of the integration pack, which has the name **Kelverion_IP_ServiceNow_x64.**

To register the integration pack:

1. On the management server, copy the **.OIP** file for the integration pack to a local hard drive or network share.
2. Confirm that the file is not set to **Read Only** to prevent unregistering the integration pack later.
3. Start the **Deployment Manager**.
4. In the navigation pane of the Deployment Manager, expand **Orchestrator Management Server**, right-click **Integration Packs** to select **Register IP with the Orchestrator Management Server**. The **Integration Pack Registration Wizard** opens.
5. Click **Next**.
6. In the **Select Integration Packs or Hotfixes** dialog box, click **Add**.
7. Locate the **.OIP** file that you copied locally from step 1, click **Open** and then click **Next**.
8. In the **Completing the Integration Pack Wizard** dialog box, click **Finish**.
9. On the **End User Agreement** dialog box, read the Kelverion License Terms**,** and then click **Accept**.
10. The **Log Entries** pane displays a confirmation message when the integration pack is successfully registered.

To deploy the integration pack:

1. In the navigation pane of the **Deployment Manager**, right-click **Integration Packs**, click **Deploy IP to Runbook Server or Runbook Designer**.
2. Select the integration pack that you want to deploy, and then click **Next**.
3. Enter the name of the runbook server or computers with the Runbook Designer installed, on which you want to deploy the integration pack, click **Add**, and then click **Next**.
4. Continue to add additional runbook servers and computers running the Runbook Designer, on which you want to deploy the integration pack. Click **Next**.
5. In the **Installation Options** dialog box configure the following settings.

6. To choose a time to deploy the integration pack, select the **Schedule installation** check box, and then select the time and date from the **Perform installation** list.

7. Click one of the following:

    a. **Stop all running runbooks before installing the integration pack** to stop all running runbooks before deploying the integration pack.

    b. **Install the Integration Packs without stopping the running Runbooks** to install the integration pack without stopping any running runbooks.

8. Click **Next**.

9. In the **Completing Integration Pack Deployment Wizard** dialog box, Click **Finish**.

10. When the integration pack is deployed, the **Log Entries** pane displays a confirmation message.

Upgrading from a Previous Version

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

To upgrade the integration pack:

1. On all computers that have a Runbook Server or Runbook Designer installed, uninstall any earlier version of the integration pack. You can achieve this by doing any one of the following:

    a. Sign in to each computer and uninstall the integration pack from Programs and Features in Control Panel.

    b. On the management server, start the Deployment Manager, and then right-click on the deployed integration pack for each Runbook Server or Runbook Designer computer and select Uninstall Integration Pack for Hotfix.

2. Register and deploy the upgraded integration pack.

Licensing the Integration Pack

After you register and deploy the integration pack you must provide a valid Kelverion license before running any runbooks that contain activities from the integration pack

To deploy the integration pack license file to System Center Orchestrator 2019 or earlier:
1. Copy the .KAL license file to %PROGRAMFILES(X86)%\Kelverion Automation\Licenses
2. Repeat for each Orchestrator Runbook Server and Runbook Designer host system.

To deploy the integration pack license file to System Center Orchestrator 2022 or later:
1. Copy the .KAL license file to %PROGRAMFILES%\Kelverion Automation\Licenses
2. Repeat for each Orchestrator Runbook Server and Runbook Designer host system.

Configuring the Kelverion Integration Pack for ServiceNow (REST) Connections

A connection establishes a reusable link between Orchestrator and a specific table on a ServiceNow server. You can create as many connections as you require specifying links to multiple tables on multiple ServiceNow servers. You can also create multiple connections to the same table to allow for differences in security permissions for different user accounts. The Kelverion Integration Pack for ServiceNow REST supports connecting to ServiceNow using **basic authentication** and **OAuth 2.0**.

To set up a ServiceNow configuration (Basic Authentication):

1. In **Runbook Designer**, click the **Options** menu, and select *KA ServiceNow REST*. The **KA ServiceNow REST** dialog box appears.

2. On the **Configurations** tab, click **Add** to begin the configuration setup. The **Add Configuration** dialog box appears.

3. In the **Name** box, enter a name for the configuration. This could be the name of the ServiceNow table or a descriptive name to distinguish the type of configuration.

4. Click the ellipsis button (…) next to the **Type** box and select *ServiceNow Configuration.*

5. In the **ServiceNow URL** box, type the full URL of the ServiceNow host. For example, https://myserver.service-now.com.

6. In the **User Name** and **Password** boxes, type the credentials that Orchestrator will use to connect to the ServiceNow server.

7. In the **User Date Format** box, enter the date format for the specified user. By default, the IP uses **yyyy-MM-dd**, which is also the default ServiceNow format.

8. In the **User Time Format** box, enter the time format for the specified user. By default, the IP uses **HH:mm:ss**, which is also the default ServiceNow format. Available options are:

    - HH:mm:ss – 24-hour clock format – Ex.: 15:30:00

    - Hh:mm:ss tt – 12-hour clock format – Ex.: 03:30:00 PM

9. If you are using a proxy server then in the **Proxy Server URL** box, type the full URL of the proxy server, starting with http:// or https://. Generally, using an IP address is preferable over FQDN. The URL should also contain the port used to access the proxy server.

10. If you are using a proxy server then provide credentials using the **Proxy Use Name, Proxy Password**, and **Proxy Domain** boxes.

11. In the **Skip Certificate Validation** box, specify if you want the IP to perform server certificate validation or not. This applies only when connecting to the server over HTTPS. When set to True, the IP will not perform certificate validation. This is typically used in secure environments, when working with trusted servers and self-signed certificates. When set to False, the IP will validate the server certificate. The server must be configured with a valid certificate signed by a valid certificate authority and the server's name in the Server URL must be listed on the certificate.

12. Add additional connections if applicable.

13. Click **OK** to close the configuration dialog box, and then click **Finish**.

To set up a ServiceNow configuration (OAuth 2.0):

1. In the **Runbook Designer**, click the **Options** menu, and select *KA ServiceNow REST*. The **KA ServiceNow REST** dialog box appears.

2. On the **Configurations** tab, click **Add** to begin the configuration setup. The **Add Configuration** dialog box appears.

3. In the **Name** box, enter a name for the configuration. This could be the name of the ServiceNow table or a descriptive name to distinguish the type of configuration.

4. Click the ellipsis button (…) next to the **Type** box and select *ServiceNow Configuration.*

5. In the **ServiceNow URL** box, type the full URL of the ServiceNow host. For example, https://myserver.service-now.com.

6. In the **Access Token URL** box, enter the ServiceNow Access Token URL. This URL will usually end with */oauth_token.do*.

7. In the **Client ID** box, enter the Client ID of your OAuth API endpoint.

8. In the **Client Secret** box, enter the Client Secret of you your OAuth API endpoint.

9. In the **Refresh Token** box, enter the refresh token that you created using the **Get Refresh Token** activity.

10. In the **User Date Format** box, enter the date format for the specified user. By default, the IP uses **yyyy-MM-dd**, which is also the default ServiceNow format.

11. In the **User Time Format** box, enter the time format for the specified user. By default, the IP uses **HH:mm:ss**, which is also the default ServiceNow format. Available options are:

    *   HH:mm:ss – 24-hour clock format – Ex.: 15:30:00

    *   Hh:mm:ss tt – 12-hour clock format – Ex.: 03:30:00 PM

12. If you are using a proxy server then in the **Proxy Server URL** box, type the full URL of the proxy server, starting with http:// or https://. Generally, using an IP address is preferable over FQDN. The URL should also contain the port used to access the proxy server.

13. If you are using a proxy server then provide credentials using the **Proxy Use Name, Proxy Password**, and **Proxy Domain** boxes.

14. In the **Skip Certificate Validation** box, specify if you want the IP to perform server certificate validation or not. This applies only when connecting to the server over HTTPS. When set to True, the IP will not perform certificate validation. This is typically used in secure environments, when working with trusted servers and self-signed certificates. When set to False, the IP will validate the server certificate. The server must be configured with a valid certificate signed by a valid certificate authority and the server's name in the Server URL must be listed on the certificate.

15. Add additional connections if applicable.

16. Click **OK** to close the configuration dialog box, and then click **Finish**.

Note: When using a proxy server please ensure that the Runbook Designer and Runbook Service Account use Local Admin account to avoid *'The remote server returned an error: (407) Proxy Authentication Required'* errors.

ServiceNow Activities

This integration pack adds the KA ServiceNow REST category to the **Activities** pane in the Client. This category contains the following activities:

- Delete Record
- Download Attachment
- Get Count
- Get Records
- Identify and Reconcile
- Import Set

- Insert Record
- Monitor Records
- Run Query
- Update Record
- Upload Attachment

Common Configuration Instructions for All Activities

The following configuration instructions apply to all activities in this integration pack. Links to this section are included in the configuration instructions for each activity.

Activity Properties

Each activity has a set of required or optional properties that define the configuration of that activity. This includes how it connects to other activities or how the activity performs its actions. You can view or modify activity properties in the Orchestrator Client.

To configure the properties for an activity:

1. Double-click the activity. Alternatively, you can right-click the activity, and then click **Properties**.
2. To save your configuration entries, click **Finish**.

In the activity properties dialog box, several tabs along the left side provide access to general and specific settings for the activity. Although the number of available tabs for activity properties differs from activity to activity, all activities will have a **General** tab, a **Properties** tab and/or **Filters** tab, and a **Run Behavior** tab. Some activities may have additional tabs.

General Tab

This tab contains the **Name** and **Description** properties for the activity. By default, the **Name** of the activity is the same as its activity type, and the **Description** is blank. You can modify these properties to create more descriptive names or provide detailed descriptions of the actions of the activity.

Properties/Filters Tab

These tabs contain properties that are specific to the activity.

All activities in this integration pack have the **Configuration Name** property at the top of the **Properties** tab. This property is used to specify the connection to a Service-now.com table.

- Click the ellipsis **(…)** button next to the **Name** field, and then select the applicable connection name. Connections displayed in the list have been previously configured as described in [Configuring the ServiceNow Connections](#).

Filter Behavior

The Monitor and Get activities use filters to determine the values that will invoke a runbook or retrieve activities. Property values of potential candidates are compared to the values of the filters to determine if they meet the criteria. When matching against values, you select one of the available methods of comparison. An option is provided to either match or not match the filter using each method. For example, the "Does not" version of a method causes alerts that do not match the filter to trigger the runbook.

- **Equals**: the field of the record exactly matches the text or number specified in the filter.
- **Does not equal**: the field of the record does not exactly match the text or number specified in the filter.
- **Is less than**: the field of the record is less than the number specified in the filter.
- **Is less than or equal to**: the field of the record is less than or equal to the number specified in the filter.
- **Is greater than**: the field of the record is greater than the number specified in the filter.
- **Is greater than or equal to**: the field of the record is greater than or equal to the number specified in the filter.
- **Contains**: the field of the record contains the exact text specified in the filter. Unlike the Equals behavior, there can be other text surrounding the matching text.
- **Does not contain**: the field of the record does not contain the exact text specified in the filter. Unlike the Equals behavior, there can be other text surrounding the matching text.
- **Starts with**: the field of the record starts with the exact text specified in the filter. Unlike the Equals behavior, there can be other text following the matching text.
- **Ends with**: the field of the record ends with the exact text specified in the filter. Unlike the Equals behavior, there can be other text preceding the matching text.

Run Behavior Tab

This tab contains the properties that determine how the activity handles multi-value published data and what notifications will be sent if the activity fails or runs for an excessive period.

Multi-Value Published Data Behavior

The Get activities retrieve information from another activity or outside source and can return one or more values in the published data. For example, when you use the Get Collection Member activity, the data output from that activity might be a list of computers that belong to the specified collection.

By default, the data from the Get activity will be passed on as multiple individual outputs. This invokes the next activity as many times as there are items in the output. Alternatively, you can

provide a single output for the activity by enabling the **Flatten** option. When you enable this option, you also choose a formatting option:

- **Separate with line breaks**. Each item is on a new line. This format is useful for creating human-readable text files for the output.
- **Separate with _** . Each item is separated by one or more characters of your choice.
- **Use CSV format**. All items are in CSV (comma-separated value) format. This format is useful for importing data into spreadsheets or other applications.

The activity will produce a new set of data every time it runs. The **Flatten** feature does not flatten data across multiple instances of the same activity.

Event Notifications

Some activities are expected to take a limited amount of time to complete. If they do not complete within that time they may be stalled or there may be another issue preventing them from completing. You can define the number of seconds to wait for completion of the action. After this period, a platform event will be sent, and the issue will be reported. You can also choose whether to generate a platform event if the activity returns a failure.

To be notified when the activity takes longer than a specified time to run or fails to run:

1. In the **Event Notifications** box, enter the **number of seconds** of run time before a notification is generated.
2. Select **Report if activity fails to run** to generate run failure notifications.

For more information about Orchestrator events, see the "Event Notifications " topics in the [Runbook Properties](https://technet.microsoft.com/en-us/library/hh489610.aspx#Event) (https://technet.microsoft.com/en-us/library/hh489610.aspx#Event Notifications).

Published Data

Published data is the foundation of a working runbook. It is the data produced because of the actions of an activity. This data is published to an internal data bus that is unique for each runbook. Subsequent activities in the runbook can subscribe to this data and use it in their configuration. Link conditions also use this information to add decision-making capabilities to runbooks.

An activity can subscribe only to data from the activities that are linked before it in the runbook. You can use published data to automatically populate the property values needed by activities.

To use published data:

1. Right-click the property value box, click **Subscribe**, and then click **Published Data**.

2. Click the **Activity** drop-down box and select the activity from which you want to obtain the data.

3. To view additional data elements common to all activities, select **Show Common Published Data**.

4. Click the published data element that you want to use, and then click **OK**.

For a list of the data elements published by each activity, see the Published Data tables in the activity topic. For information about the common published data items, see the Published Data (http://technet.microsoft.com/en-us/library/hh403821.aspx).

Delete Record Activity

The **Delete Record** activity is used in a runbook to remove an existing record from a ServiceNow table.

Required Properties

You must configure the following properties.

Sys ID	The Sys ID of the record to delete from the table.
Table Name	The name of the ServiceNow table that contains the record to be deleted.

Optional Properties

You can configure the following properties, as necessary, to alter the behavior of the activity.

Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Published Data

The activity publishes the following data.

Sys ID	The Sys ID of the record that was deleted.
Table Name	The name of the ServiceNow table that contains the record that was deleted.

Download Attachment Activity

The **Download Attachment** activity is used in a runbook to download the attachments associated with a ServiceNow record.

Required Properties

You must configure the following properties.

Destination Folder	The path to the local folder where the attachments will be saved.
Record Sys ID	The Sys ID of the ServiceNow record for which attachments are being downloaded.
Table Name	The name of the ServiceNow table that contains the record for which attachments are being downloaded.

Optional Properties

You can use the following properties, as necessary, to filter which attachments to download.

File Mask	A file mask that can be used to control which attachments to download. May contain wildcard characters (* and ?)
Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Published Data

The activity publishes the following data.

Attachment Count	The number of attachments that were downloaded.
Attachment Sys ID	The Sys ID of an attachment that was downloaded.
Content Type	Describes the MIME type of the attachment.
Created By	The user id of the ServiceNow user that created the attachment.
Created On	The date and time that the attachment was created.
Destination Folder	The path to the local folder where the attachments will be saved.
File Name	The name of the file(s) that was downloaded.
File Path	The full path of the file(s) that was downloaded.
File Size (bytes)	The size in bytes of the file(s) that was downloaded.
Record Sys ID	The unique Sys ID of the ServiceNow record for which attachments were downloaded.
Table Name	The name of the ServiceNow table that contains the record for which attachments were downloaded.
Updated By	The user id of the ServiceNow user that last updated the attachment.
Updated On	The date and time that the attachment was last updated.

File Mask Options

If the optional File Mask property is not included or empty the activity will download all available attachments. If the File Mask property is present and not empty the activity will download only those attachments whose filename matches the file mask.

The file mask may be a combination of valid filename and wildcard (* and ?) characters but does not support regular expressions.

Wildcard Specifier	Matches
* (asterisk)	Zero or more character in that position
? (question mark)	Zero or one characters in that position

When you use the asterisk wildcard character in the file mask, such as "*.txt", the number of characters in the specified extension affects the search as follows:

- If the specified extension is exactly three characters long, the activity downloads files with extensions that begin with the specified extension. For example, "*.xls" matches "book.xls" and "book.xlsx"
- In all other cases, the activity downloads files that exactly match the specified extension. For example, "*.ai" matches "file.ai" but not "file.aif"

Get Count Activity

The **Get Count** activity counts the number of records in a ServiceNow table that match filter criteria that you specify.

Required Properties

You must configure the following properties.

Table Name	The name of the ServiceNow table that contains the records to be counted.
Search By	Specify whether to select records using Orchestrator filters or ServiceNow encoded query
Encoded Query	Specifies the encoded query string to use to filter the records to be counted. Available when **Search By** is set to **Query**. If you leave this property empty the activity will return the number of records in the entire table.

Optional Properties

You can configure the following properties, as necessary, to alter the behavior of the activity.

Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Filters

When **Search By** is set to **Filters**, the activity will provide filters that correspond to the fields in the ServiceNow table that you selected. You can combine one or more filters to selectively filter the records to count.

Published Data

The activity publishes the following data.

Record Count	The number of records that match the filters or encoded query that you specified.
Table Name	The name of ServiceNow table from which the records were counted.

Get Records Activity

The **Get Records** activity retrieves records from a ServiceNow table according to filter criteria that you specify.

Required Properties

You must configure the following properties.

Table Name	The name of the ServiceNow table that contains the records to be retrieved.
Record Limit	The maximum number of records the activity will return. Default is 10,000.

Optional Properties

You can use the following properties, as necessary, to control the behavior of the activity.

Ascending Order	Instruct the activity to order the returned results in ascending or descending order. Used in conjunction with the Order By property.
Display Value	Instruct the activity whether to retrieve display values or actual values from ServiceNow. The default, true, is to retrieve display values.
First Record	Instruct the activity to offset the returned results by this number of records from the beginning of the set.
Order By	Instruct the activity to order the returned results by the specified field.
Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Filters

The activity provides filters that correspond to the fields in the ServiceNow table that you selected. You can combine one or more filters to selectively control which records to retrieve. If no filters are selected, the activity will return all records in the table, up to the specified record limit.

Published Data

The activity publishes data that represents the records that were retrieved, and each record has items that correspond to the fields in the ServiceNow table that you selected. The activity also publishes the following data.

Order By	The name of the field used to order the returned results
Record Count	The number of records returned by the activity.
Table Name	The name of ServiceNow table from which the records were retrieved.

Identify and Reconcile Activity

The **Identify and Reconcile** activity is used in a runbook upload Configuration Item (CI) data to the Configuration Management Database (CMDB) using the Identification and Reconciliation Engine (IRE) to minimize the creation of duplicate CIs and to reconcile CI attributes by only accepting information from authorized sources. For more information, see [Identification and Reconciliation Engine (IRE)](#) in the ServiceNow's online documentation.

Required Properties
You must configure the following properties.

Payload	JSON formatted data to be submitted the ServiceNow IRE.

Optional Properties
You can configure the following properties, as necessary, to alter the behavior of the activity.

Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Published Data
The activity publishes the following data.

Result	The JSON formatted response from the ServiceNow IRE

Import Set Activity

The **Import Set** activity is used in a runbook to insert a record into a ServiceNow import set table. When using this activity, the imported data will be transformed based on the transform maps that are associated with the import set table.

When specifying values for date and time fields, ensure that the values are formatted according to the date and time format that was specified in the transform map that is associated with the import set. When configuring transform maps in ServiceNow we recommend changing the default date and time format used by transforms maps to a standard, non-ambiguous format, such as **yyyy-MM-dd HH:mm:ss** (the default format uses a 12-hour clock without an am/pm designator which can cause import problems because it is ambiguous).

Required Properties

You must configure the following property. In addition, the activity will provide parameters that correspond to any required fields in the import set that is selected.

Import Set	The name of the ServiceNow import set table where the record will be inserted.

Optional Properties

The activity will provide parameters that correspond to the fields in the import set that you selected, and these can be used, as necessary, to import data into ServiceNow. The activity also provides the following property, which can be used to alter the activity's default behavior.

Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Published Data

The activity publishes the following data.

Display Name	The name of the field that is set as the display field for the record that was created or modified.
Display Value	The value of the field that is set as the display field for the record that was created or modified.
Import Set	The name of the ServiceNow import set table where the record will be inserted.
Import Set ID	Identifier of the import set operation.
Import Status	Indicates the action that occurred because of the import. Values include: • inserted: the record was inserted. • updated: an existing record was updated. • ignored: the input was ignored. The record was not updated, and no new record was created.

	• skipped: the input data was skipped due to missing coalesce values.
	• error: there was an error processing the input
Import Status Message	The message related to a status of error
Record count	The number of records that were inserted.
Record Sys ID	The Sys ID of the resulting record that was inserted or modified.
Target Table	The name of the table targeted by the transform map.
Transform Map	The name of the transform map.

Insert Record Activity

The **Insert Record** activity is used in a runbook to insert a new record into a ServiceNow table.

Required Properties

You must configure the following property. In addition, the activity will provide parameters that correspond to any required fields in the ServiceNow table that is selected, and these must also be configured.

Table Name	The name of the ServiceNow table where the record will be inserted.

Optional Properties

The activity will provide parameters that correspond to the non-required fields in the ServiceNow table you selected, and these can be configured, as necessary, to initialize the new record. The activity also provides the following property, which can be used to alter the activity's default behavior.

Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Published Data

The activity publishes the following data.

Sys ID	The Sys ID of the record that was inserted.
Table Name	The name of the ServiceNow table where the record was inserted.

Monitor Records Activity

The **Monitor Records** monitor activity is triggered when new ServiceNow records are inserted, and/or existing ServiceNow records are updated, according to filter criteria that you specify.

Required Properties
You must configure the following properties.

Monitor Interval	The time in seconds that the monitor will wait before polling ServiceNow.
Monitor New Records	If true, the monitor will invoke the runbook when new records are inserted.
Monitor Updated Records	If true, the monitor will invoke the runbook when existing records are updated.
Table Name	The name of the ServiceNow table to be monitored.

Optional Properties
You can configure the following properties, as necessary, to alter the behavior of the activity.

Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Filters
The activity provides filters that correspond to the fields in the ServiceNow table that was selected. You can combine one or more filters to selectively control which records will trigger the monitor.

Published Data
The activity publishes data that represents the records that triggered the monitor, and each record has items that correspond to the fields in the ServiceNow table that you selected. The activity also publishes the following data.

Monitor Interval	The time in seconds that the monitor waited before polling ServiceNow.
Monitor New Records	If true, the monitor will invoke the runbook when new records are inserted.
Monitor Updated Records	If true, the monitor will invoke the runbook when existing records are updated.
Record count	The number of records returned by the activity.
Table Name	The name of the ServiceNow table that is being monitored.

Run Query Activity

The **Run Query** activity is used in a runbook to retrieve records from a ServiceNow table using a ServiceNow encoded query string.

The Run Query activity is for advanced scenarios where the filters provided by the Get Records activity are insufficient or when a union of multiple filters is required. For more information on encoded query strings, see Encoded Query Strings.

Required Properties
You must configure the following properties.

Encoded Query	A ServiceNow encoded query that will be used to determine what records to retrieve.
Record Limit	The maximum number of records the activity will return. Default is ten thousand.
Table Name	The name of the ServiceNow table that contains the records to be retrieved.

Tip: You can easily generate encoded query strings using the ServiceNow filter tools and then copy the encoded query by right clicking on the filter breadcrumbs and selecting "Copy query" from the context menu.

Optional Properties
You can use the following properties, as necessary, to control the behavior of the activity.

Ascending Order	Instruct the activity to order the returned results in ascending or descending order. Used in conjunction with the Order By property.
Display Value	Instruct the activity whether to retrieve display values or actual values from ServiceNow. The default, true, is to retrieve display values.
First Record	Instruct the activity to offset the returned results by this number of records from the beginning of the set.
Order By	Instruct the activity to order the returned results by the specified field.
Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Published Data
The activity publishes the following data.

Created	The date and time that the record was created.
Created by	The user that created the record.
Encoded Query	The ServiceNow encoded query that was used to retrieve the records.

Order By	The name of the field used to order the returned results
Record count	The number of records returned by the activity.
Sys ID	The record's Sys ID.
Table Name	The name of ServiceNow table from which the records were retrieved.
Updated	The date and time that the record was updated last.
Updated by	The user that updated the record last.

Update Record Activity

The **Update Record** activity is used in a runbook to update one or more fields of an existing ServiceNow record.

Required Properties
You must configure the following properties.

Sys ID	The Sys ID of the record to update.
Table Name	The name of the ServiceNow table that contains the record to be updated.

Optional Properties
The activity will provide parameters that correspond to the fields in the ServiceNow table that you selected, and these can be used, as necessary, to update the specified record. The activity also provides the following property, which can be used to alter the activity's default behavior.

Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Published Data
The activity publishes the following data.

Sys ID	The Sys ID of the record that was updated.
Table Name	The name of the ServiceNow table that contains the record that was updated.

Upload Attachment Activity

The **Upload Attachment** activity is used to upload a file attachment to an existing ServiceNow record.

Required Properties
You must configure the following properties.

File Path	The path to the file to be uploaded
Target Record Sys ID	The Sys ID of the record that you want to upload the attachment to.
Target Table	The name of the table that contains the record to which you are uploading.

Optional Properties
You can use the following properties, as necessary, to control the behavior of the activity.

Content Type	The MIME type of the file that you want to upload. If you do not specify a Content Type an appropriate MIME type will be selected based on the file extension of the file to be uploaded.
Timeout in Seconds	The number of seconds to wait for ServiceNow to respond to the request before failing with an error. The default is one hundred seconds.

Published Data
The activity publishes the following data.

Attachment Sys ID	The Sys ID of the attachment record that was inserted.
Content type	The MIME type selected for the file that was uploaded.
Created On	The date and time that the attachment was uploaded.
Created By	The user that uploaded the attachment
File Name	The name of the file that was uploaded.
File Path	The full path of the file that was uploaded.
File Size (bytes)	The size in bytes of the file that was uploaded.
Target Record Sys ID	The of the record that the file was attached to.
Target Table	The name of the table that contains the record that the file was attached to.
Updated On	The date and time that the record was updated last.
Updated By	The user that updated the record last.