Universal Controller 6.7.x

Bundles and Promotion

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Bundles and Promotion

Bundles and Promotion Overview

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The information on these pages also is located in the [UACDOC67:All Universal Automation Center PDFs^Universal Controller 6.7.x Bundles and Promotion.pdf].

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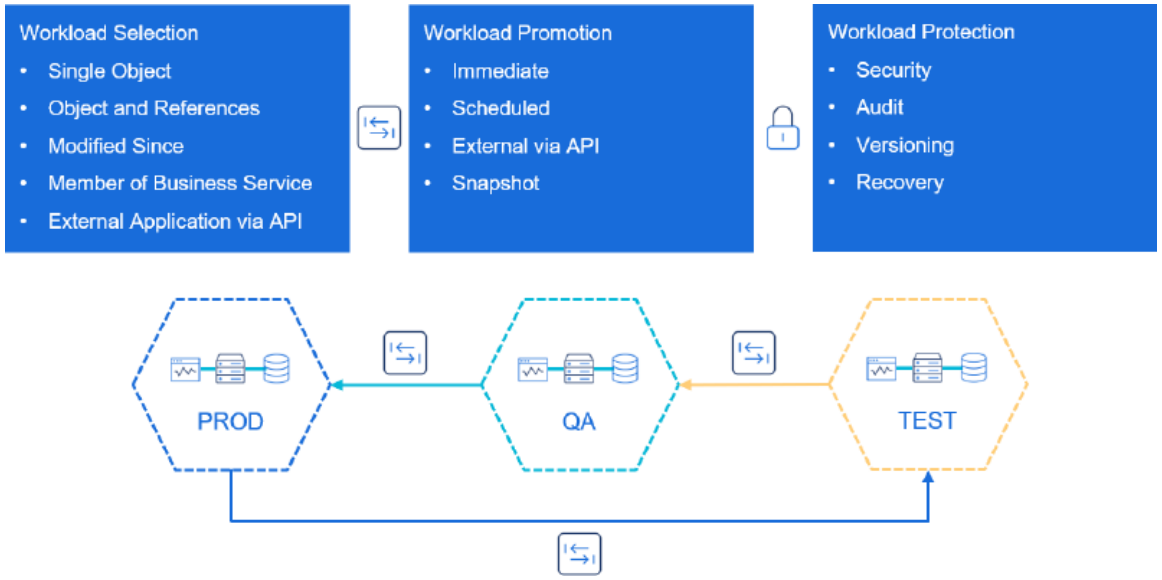
Overview

The Bundles and Promotion feature is designed to facilitate migrating (promoting) groups (bundles) of workload automation definitions (Triggers, Workflows, Tasks, Calendars, Custom Days, Variables, Business Services, Credentials, Agent Clusters, Virtual Resources, Scripts, Email Templates, Email Connections, Database Connections, SNMP Managers, SAP Connections, PeopleSoft Connections, Applications, and Universal Templates) between Universal Controller instances.

This allows you to develop, modify, and test changes in a non-production environment and migrate them to your production environment in a fully secure and audited manner (with back-out capabilities, if required).



One or more Workload automation definitions of the same type can be promoted without going through the process of creating a bundle, or you can use a bundle to group together related workload automation definitions of different types for promotion at the same time.

Bundles can be promoted manually or scheduled to be promoted at a specific date and time. If you choose to schedule a bundle promotion, you can either promote the definitions as they stand at promotion time or use a snapshot of the definitions as they stand when the promotion schedule is created. This can be useful if you have completed changes that need to be promoted out-of-hours but want to allow more changes to be made on the source system without having to wait until the promotion is complete.

CLI (Command Line Interface) and API (Application Programming Interface) functions are provided to allow you to integrate the bundles and promotion feature with your external application life-cycle, source management, and change control systems.

If you plan on using the Bundles and Promotion feature, it is important that you review the recommended best practices for this feature.

Bundle and Promotion Security

Use of the Bundle and Promotion feature requires some thought, based on which users require the feature and what functions they need access to.

Bundle Security

The ops_bundle_admin role, which automatically is encompassed within the ops_admin role, grants the following functions:

- Create, read, update, and delete Bundles.
- View Promotion Targets, including agent mappings.
- View Promotion History.
- View a record's list of bundles.
- View Promotion Schedules.
- Add a record to a bundle.
- Create bundles by date.
- Generate a Bundle Report.

Users can be granted more granular permissions to Bundles via their User or Group permissions:

- Read - View bundles based on name and/or membership of business service.
- Update - View, and Modify bundles based on name and/or membership of business service.
- Create - Create, View, and Modify bundles based on name and/or membership of business service.
- Delete - Delete bundles based on name and/or membership of business service.
- The Promote command for a bundle can be granted or denied via the Bundle permission.

Users can select definitions only for Bundles that they can at least view.

Promotion Security

The ops_promotion_admin role, which automatically is encompassed within the ops_admin role, grants the following functions:

- Create, read, update, and delete Promotion Targets, including agent mappings.
- View Bundles.
- Refresh Target Agents.
- Promote records.
- Promote or schedule the promotion of a bundle.
- Reschedule, cancel, and delete Promotion Schedules.

- Generate a Bundle report.
- Accept bundles being promoted to a target server. (The **Accept Bundle** command is executed on the target server automatically as part of the **Promote** and **Promote Bundle** commands and does not involve user interaction.)

Note
By default, the ops_promotion_admin role also grants Read permission for any type of definition that can be added to a Bundle, given the expectation that a promotion administrator would review the content of a Bundle before promoting it. To change this default behaviour, see the Promotion Read Permission Required Universal Controller system property.

Users can be granted more granular permissions to Promotion Targets via their User or Group permissions:

- Read - View promotion targets based on name and/or membership of business service
- Update - View, and Modify promotion targets based on name and/or membership of business service
- Create - Create, View, and Modify promotion targets based on name and/or membership of business service
- Delete - Delete promotion targets based on name and/or membership of business service
- The Refresh Target Agents command for a promotion target can be granted or denied via the bundle permission.

The ability to Promote a Bundle without the ops_promotion_admin role requires:

- Read permission to the Bundle
- Permission to the Promote command for the Bundle
- Execute permission to the Promotion Target
- ops_promotion_accept_bundle role assigned to the target user; specifically, the user specified on the Promotion Target or on the Promote Bundle command dialog.

Bundleless Promotion

With the ops_promotion_admin role, users can promote definitions by clicking **Promote...** in the Action menu.

The Bundleless Promotion With Execute Permission Permitted Universal Controller system property can be set to true (default = false) to allow promotion of definitions outside of a Bundle without requiring the ops_promotion_admin role if the users also have Execute permission to at least one Promotion Target.

Universal Controller Properties

The following Universal Controller system properties also should be reviewed in accordance with the desired behavior of the Bundles and Promotion feature:

- Promotion Accept Bundle Create/Update Permission Required
- Promotion History Retention Period in Days
- Promotion Read Permission Required
- Promotion Schedule Retention Period In Days
- Promotion Strict Mode

Best Practices

Shared Records

Because workload automation definitions have many inter-related records (for example a single task may reference an agent, a credential, and virtual resources), it is important that care is taken to avoid breaking these links between Universal Controller instances when promoting.

For Agents, you can specify agent mappings on the promotion target definition to translate between an agent connected to the source Universal Controller instance and a different agent connected to the target Universal Controller instance.

For other definitions, you should ensure that each definition's UUID (Universally Unique IDentifier) is the same on all Universal Controller instances involved in your promotion hierarchy (Production, QA, Development, etc.).

One best practice for this is to create the definitions on one Universal Controller instance and promote them to the other Universal Controller instances. In some cases, these definitions will need to be different on each Universal Controller instance; for example, a credentials password will be different between the test and production instances. In these cases, you would need to modify them after the initial promotion, and you will need to take care not to promote the test definition and overwrite the production definition with the wrong password.

Another approach would be to use variables for the related definition; for example, a Task definition could use variables to identify its agent and credential definition. Note that variables can be nested, so you can use an instance identifier within the variable.

For example:

- On the PROD instance, the Agent name is PROD_APP_Server and the following global variable exists: ENV = PROD
- On the TEST instance, the Agent name is TEST_APP_Server and the following global variable exists: ENV = TEST

In this case, for the Agent within a Task definition, you would specify the following variable: ${ENV}_APP_Server.

Follow References

When promoting workload automation definitions between Universal Controller instances, you have the option to Follow References, which automatically includes inter-related records when promoting.

In other words, you do not have to build a bundle definition with all of the inter-related records; you can just specify a high-level item such as a trigger or workflow.

Caution should be used when considering the Follow References feature in relation to the shared records you may have on different Universal Controller instances. As of version 6.4.2.0 of the Controller, you have the ability to exclude certain definition types from the promotion when using the Follow References feature. For example, you can follow references and exclude variables.

Note that for some workload automation definitions, there are references that are followed implicitly, even if Follow References is not specified. For example, a workflow will always also promote the tasks within the workflow.

For additional information on Follow References behavior, see Records Promoted When Follow References is Selected or Not Selected.

Promoting Between Different Controller Versions

Promotion of workload automation definitions between Universal Controller instances at different versions is supported from version 6.3.0.0 and later. Promotion can be performed to earlier or later versions as long as both Universal Controller instances are at least at the 6.3.0.0 version.

Note
Promoting to an earlier version, when supported, requires that the promotion payload not include features or options that are unknown to the target promotion server. Any violation of this will prevent the promotion from continuing, as promoting those changes could have unintentional consequences.

Promoting to Same or Later Versions

Supported

Promotion from Controller 6.x to Controller 6.x of the same or later version, release, modification, and maintenance level is supported.

For example:

- 6.3.0.2 to 6.7.0.0
- 6.1.3.0 to 6.1.3.2

Promoting to Earlier Versions

Supported

Promotion from Controller 6.7.x to an earlier 6.7.x, 6.6.x, 6.5.x, 6.4.x, or 6.3.x version, release, modification, or maintenance level of the Controller is supported.

Not Supported

Promotion from Controller 6.7.x, 6.6.x, 6.5.x, 6.4.x, or 6.3.x to any 6.2.x or earlier version, release, modification, or maintenance level of the Controller is not supported.

Promotion from Controller 6.2.x to any earlier version, release, modification, or maintenance level of the Controller is not supported.

For example:

- 6.7.0.0 to 6.2.2.2
- 6.3.0.0 to 6.2.2.2
- 6.2.2.2 to 6.2.2.1
- 6.2.2.2 to 6.1.3.0
- 6.1.3.2 to 5.2.0.5

Bundling and Promoting Process

The general process for bundling and promoting your data is:

Step 1	Prepare a Bundle for Promotion record.
Step 2	Add records to a Bundle.
Step 3	Create a Promotion Target record for each target Controller.
Step 4	Specify Agent mappings between the source and target Controllers.
Step 5	Promote the Bundle to the target Controller.

These features use web services calls to communicate when you are promoting Bundles of records from one Controller to another.

Diagnosing Promotion Failures

The following error messages are provided for various promotion failure scenarios.

Note
For a Bundle promotion, the beginning of each error message is: *Promotion of bundle "bundle-name" failed with the following error(s):*

For a Bundle-less promotion, the beginning of each error message is: *Promotion failed with the following error(s):*

Error Message	Diagnosis
Acceptance of bundle "<bundle-name>" from <node-id> prohibited because a payload from a bundle with the same name is currently being processed by another Universal Controller process.	Accept Bundle command invoked on the target for a bundle with a bundle name for which another Universal Controller process has already acquired a lock.
Bundle "Member of Business Services" option requires a minimum promotion target release level of 6600.	Attempt to promote a Bundle that is a member of a Business Service to a target that is not 6.6.0.0. or higher.
Cluster node information could not be determined for the promotion target because the host is unknown (hostname).	Invalid hostname.
Cluster node information could not be determined for the promotion target (Connection refused: connect).	Valid hostname, but no service to accept the connection.
Cluster node information could not be determined for the promotion target because the Web Service is unavailable; the target Universal Controller may still be initializing.	Attempt to promote to a target Universal Controller that is still initializing (starting up).
Cluster node information could not be determined for the promotion target because the user is not authorized; please verify the promotion target user and password.	Invalid user name and/or password.
Cluster node information could not be determined for the promotion target because the user is not authorized for Web Service Access; please verify the promotion target user has Web Service Access enabled.	Valid user name and password, but the user is not authorized for Web Service Access.
Cluster node release level for the promotion target could not be determined and one or more items being promoted require a minimum release level of 6300.	Attempt to promote to a pre-6.3.0.0 release from a 6.3.0.0 or later release.

Cluster node release level for the promotion target is 6xxx, which does not meet the required release level of 6xxx.	Attempt to promote a definition, or a definition using a particular feature, that is not recognized by the promotion target. This message will be followed by one or more messages, each detailing a specific definition or specific feature used by a definition that is not recognized by the promotion target. For example: *Cluster node release level for the promotion target is 6403, which does not meet the required release level of 6420.* *Windows Task "Resolve Name Immediately" option requires a minimum promotion target release level of 6420.* *Web Service Tasks require a minimum promotion target release level of 6410.* **OR** *Cluster node release level for the promotion target is 6601, which does not meet the required release level of 6700.* *<task-type> Task "Cluster Broadcast Variable" option requires a minimum promotion target release level of 6700.*
Command Accept Bundle prohibited due to security constraints.	Valid user name and password, but the user is not authorized for the Accept Bundle command, which requires the ops_promotion_admin role.
Command Accept Bundle prohibited due to security constraints. User on target server requires "ops_bundle_admin" role if "Promote Bundle Definition" option is enabled.	Valid user name and password, but the user is not authorized for the Accept Bundle command with the Promote Bundle Definition option enabled, which requires both the ops_promotion_admin role and the ops_bundle_admin role.*
Command Promote (or Promote Bundle) has been routed to the Active server and continues to run in the background.	Promote (or Promote Bundle) command was issued to a Passive server and routed to the Active server, where the Promote (or Promote Bundle) command will run, however, the Promote (or Promote Bundle) command did not complete within approximately 2 minutes. The Promote (or Promote Bundle) command will continue to run in the background and the Audit can be consulted to determine the outcome of the command.
Credential "<credential-name>" cannot be promoted because web service credentials are not permitted; Universal Controller property Web Service Credentials Permitted is not enabled.	Attempt to promote to a target Controller where the Web Service Credentials Permitted Universal Controller system property is set to false.
Promoted {EMAIL CONNECTION: Incoming} with name "Gmail" and id 04e5e1074c1f42908d9b3f62f36fff50 is a different type than the original {EMAIL CONNECTION: Outgoing} with name "Gmail" and id 195fc662df8447dc90dec02ea8be0cb4	Attempt to promote an Incoming email connection type and the email connection on the target system is an Outgoing email connection type.
Promoted {EMAIL CONNECTION: Outgoing} with name "Gmail" and id ab36222512cf4ae4afa7e59a8ccbd684 is a different type than the original {EMAIL CONNECTION: Incoming} with name "Gmail" and id a037048f7c4b4e3f9e8691e3f664e5a7	Attempt to promote an Outgoing email connection type and the email connection on the target system is an Incoming email connection type.
Promoted {TASK: Universal} with name "ABC", id 8ee785079fcc4142873486e921bfe789, and universal template id 04cbe858ba7a4bc8bdb26202f359e318 has a different universal template id than the original "ABC" with id 8ee785079fcc4142873486e921bfe789, and universal template id 04cbe858ba7a4bc8bdb26202f359e319.	Attempt to promote a Universal Task with an associated Universal Template that is not equivalent to the Universal Template associated with the target Universal Task.

Promoted {TASK: Universal, TaskUniversalBean} with name "ABC" and id 8ee785079fcc4142873486e921bfe789 is a different type and/or class than the original {TASK: Timer, TaskSleepBean} with name "ABC" and id dfbd23df8ab24b2a9a0891ae2f8ca22f.	Attempt to promote any item of a specific type (or Java class) that matches another item of a different type (or Java class).
Promotion of bundle "<bundle-name>" with id <bundle-uuid> prohibited because the bundle is in use by another Universal Controller process.	Promote Bundle command invoked on the source for a bundle with a bundle id for which another Universal Controller process has already acquired a lock.
Promotion Schedule operation for bundle "<bundle-name>" with id <bundle-uuid> prohibited because the bundle is in use by another Universal Controller process.	Schedule Promotion command requires the bundle id lock, but another Universal Controller process has already acquired that lock.
Promotion target "promotion-target-name" has routed the promotion payload to the Active server and the Accept Bundle command continues to run in the background.	Upon receiving the promotion payload, the promotion target determined it was a Passive server and routed the payload to the Active server, where the Accept Bundle command will run, however, the Accept Bundle command did not complete within approximately 2 minutes. The Accept Bundle command will continue to run in the background and the Audit can be consulted to determine the outcome of the command.
Promotion to an earlier release only supported for target releases starting with 6300.	Attempt to promote to a pre-6.3.0.0 release from a 6.3.0.0 or later release.
Protocol <protocol name> is not allowed since it is being excluded by Universal Controller property "File Transfer Task Exclude Protocols".	Attempt to promote a File Transfer Task that has a protocol currently being excluded by the target server.
Protocol <protocol name> is not allowed since it is being excluded by Universal Controller property "FTP File Monitor Task Exclude Protocols".	Attempt to promote an FTP File Monitor Task that has a protocol currently being excluded by the target server.
SAP Connection "Client" option requires a minimum promotion target release level of 6700.	Attempt to promote an SAP Connection to a release prior to 6.7.0.0 when the Connection Type is Load Balancing and a Client is specified.
SAP Task "<job-id-field-name>" requires a minimum promotion target release level of 6450 when unspecified.	Attempt to promote an SAP Task with an unspecified SAP Job ID field to a pre-6.4.5.0 release of the Controller.
Script "<script-name>" cannot be promoted because scripts are not permitted; Universal Controller property "Windows/Linux Scripts Permitted" is not enabled.	Attempt to promote a **Script** Script Type from a source server to a target server, where the target server is configured with the Windows/Linux Scripts Permitted Universal Controller system property set to false.
<task-type> Task "Exit Codes" requires a minimum promotion target release level of 6700 when unresolved.	Attempt to promote a task with an unresolved Exit Codes field to a release prior to 6.7.0.0.
<task-type> Task "Retry Exit Codes" requires a minimum promotion target release level of 6700 when unresolved.	Attempt to promote a task with an unresolved Retry Exit Codes field to a release prior to 6.7.0.0.
Unable to promote {APPLICATION: Windows Service} with name "<application-name>" and id 0f84fbb388c04bd09a2c7d5a0ac06c70 because an application cannot be promoted with a name change while generated application control tasks are being excluded.	Attempt to promote an Application with a name change while excluding generated Application Control Tasks.
Unable to promote <credential-type> credential "<credential-name>" since original Resolvable credential is referenced by one or more Universal Tasks.	Attempt to promote a Credential that has been converted from a Resolvable type and at least one reference on the target system by a Universal Task requires it to remain a Resolvable type.
Unable to promote <credential-type> credential "<credential-name>" since original Resolvable credential is specified as a default value for one or more Universal Template Fields.	Attempt to promote a Credential that has been converted from a Resolvable type and at least one reference on the target system by a Universal Template Field default value requires it to remain a Resolvable type.

Unable to promote <credential-type> credential "<credential-name>" since original Web Service credential is referenced by one or more Web Service Tasks.	Attempt to promote a Credential that has been converted from a Web Service type and at least one reference on the target system by a Web Service Task requires it to remain a Web Service type.
Unable to promote {CUSTOM DAY} with name "<custom-day-name>" and id 343f68c60cef48279647a45055349c47 because global custom days are not permitted; Universal Controller property "Custom Day Global Permitted" is not enabled.	Attempt to promote a global Custom Day when the Custom Day Global Permitted system property is set to **false**.
Unable to promote {SCRIPT: Web Service Payload} with name "Data2.txt" and id 1a9f0bbad53b4ca9a6d6076c5970586e since original {SCRIPT: Data} with name "Data2.txt" and id 1a9f0bbad53b4ca9a6d6076c5970586e is referenced by one or more Universal Tasks.	Attempt to promote a non-Data script type and the script on the target system is a Data script type currently referenced by a Universal Task (unless all references are included in the promotion payload).
Unable to promote {SCRIPT: Script} with name "Data1.txt" and id c78a9fe3748549808ac5f6248eb4bcc2 since original {SCRIPT: Data} with name "Data1.txt" and id 4d7d06e87aef4461aeabbb21191b4c61 is specified as a default value for one or more Universal Template Fields.	Attempt to promote a non-Data script type and the script on the target system is a Data script type currently referenced by a Universal Template (via Universal Template Field).
Unable to promote {TASK: Application Control} with name "<application-name> #QUERY#" and id e9632e6024324d619b3122832e84c8b0 because a generated application control task cannot be promoted with a name change while applications are being excluded.	Attempt to promote a generated Application Control Task with a name change while excluding Applications.
Universal Template "<template-name>" cannot be promoted because [it is a new template | the template has changed] and the promotion was performed without the "Allow Universal Template Changes" option enabled. Universal Template changes must be promoted by a user with either the "ops_universal_template_admin" role or the "ops_admin" role and with the Allow Universal Template Changes option enabled.	Attempt to promote a new or changed Universal Template without proper authorization or with proper authorization but without proper option usage.
Universal Template "<template-name>" cannot be promoted because [it is a new template | the template has changed] and the promotion user does not have either the "ops_universal_template_admin" role or the "ops_admin" role required to perform the promotion with the "Allow Universal Template Changes" option enabled.	Attempt to promote a new or changed Universal Template without proper authorization (on Promotion Target) but with proper option usage.

Preparing Bundles for Promotion

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  - Creating a Bundle for Promotion by Selecting Individual Records
  - Creating a Bundle for Promotion by Date
  - Creating a Bundle for Promotion by Business Services
  - Promoting Bundles by Business Service Membership
  - Bundle Details
- Adding and Removing Records in a Bundle
  - Adding and Removing Records from the Bundle Details
  - Adding a Record to a Bundle from the Record Details
  - Adding Multiple Records to a Bundle from a Records List
- Displaying the Bundles List for a Record
- Reports

Your user ID must have the ops_bundle_admin role, or be granted Bundle permissions, to use this feature.

Overview

There are four methods of preparing a Bundle for promotion. Each method involves creating a Bundle and selecting records to be included in the Bundle.

1. Select individual records to include in a Bundle.
2. Automatically create a Bundle, including all records of specified record types created or updated on or after a specified date, by Creating a Bundle for Promotion by Date.
3. Automatically create a Bundle, including all records of specified record types that are members of one or more specified Business Services, by Creating a Bundle for Promotion by Business Services.
4. Configure the Promote By Business Service Membership section of a Bundle to dynamically include all records belonging to one or more business services at the time of promotion.

For each method, you can manually add additional records to a Bundle after it has been created.

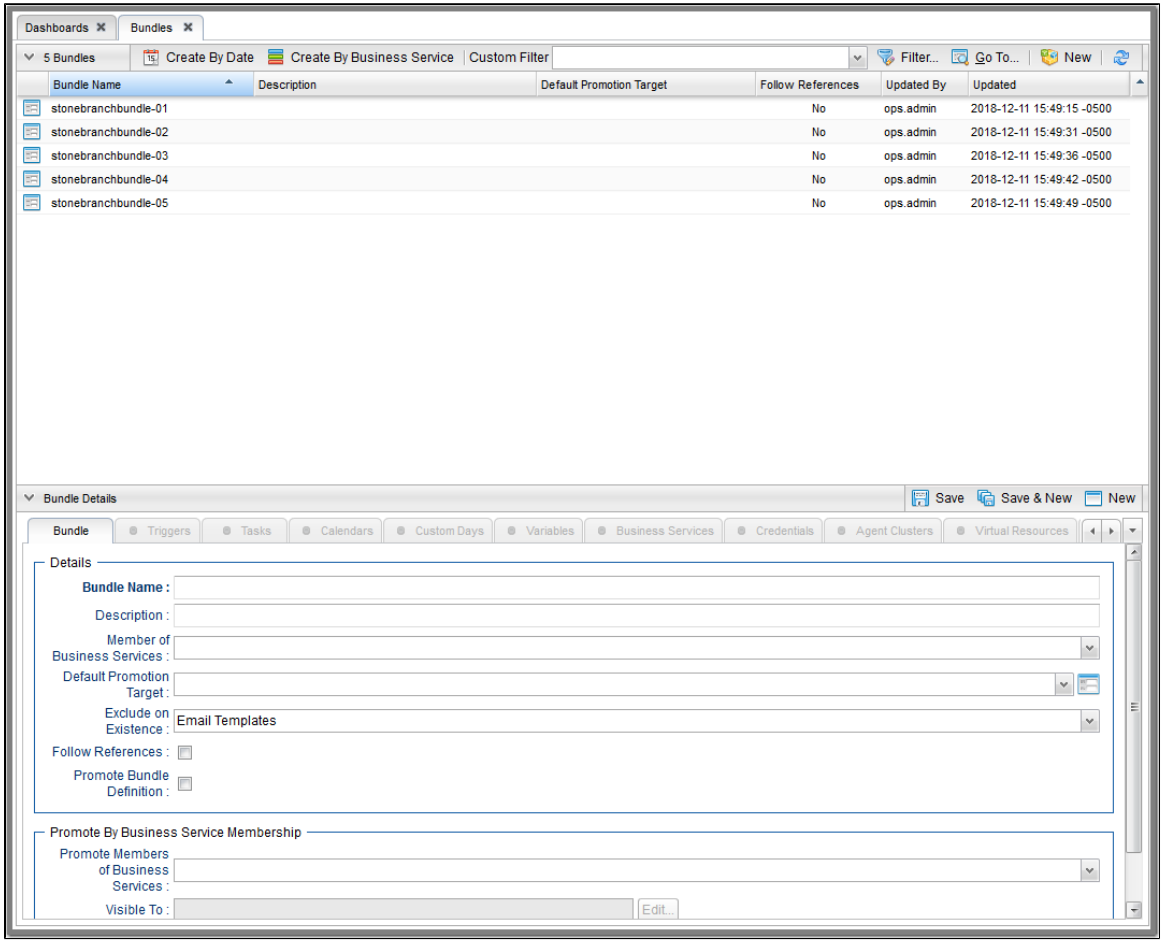
Any records explicitly added to a Bundle can be removed from the Bundle after it has been created. However, if the Promote By Business Service Membership feature is configured for a Bundle, all records that qualify based on Business Service membership at the time of promotion will be included.

Creating a Bundle for Promotion by Selecting Individual Records

You can select individual records to include in a Bundle promotion.

Step 1 From the Bundles & Promotion navigation pane, select **Bundles**. The Bundles list displays.

Below the list, Bundle Details for a new Bundle record displays.



Step 2 Enter / select Details for a new Bundle, using the field descriptions below as a guide.

(The only required field is **Bundle Name**. You do not have to select a Default Promotion Target; you can select (or override) a promotion target when you promote the Bundle.)

To display more of the Details fields on the screen, you can either:

- Use the scroll bar.
- Temporarily hide the list above the Details.
- Click the **New** button above the list to display a pop-up version of the Details.

Step 3	Click a **Save** button. The Bundle record is added to the database, and all buttons and tabs in the Bundle Details are enabled.
Step 4	Open the Bundle and begin adding records to the Bundle.
Step 5	Click the **Update** button.

Note
To open an existing record on the list, either:

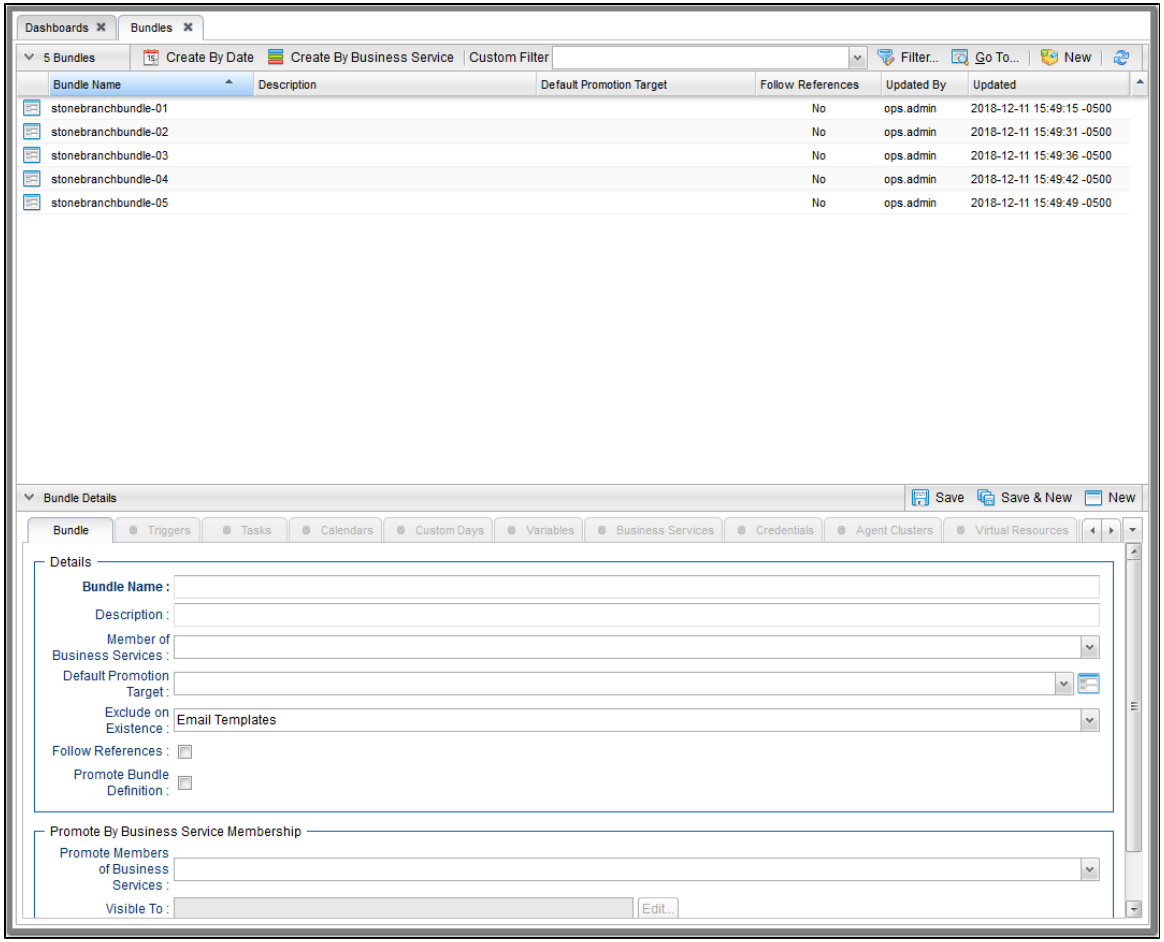
- Click a record in the list to display its record Details below the list. (To clear record Details below the list, click the **New** button that displays above and below the Details.)
- Clicking the Details icon next to a record name in the list, or right-click a record in the list and then click **Open** in the Action menu that displays, to display a pop-up version of the record Details.
- Right-click a record in the a list, or open a record and right-click in the record Details, and then click **Open In Tab** in the Action menu that displays, to display the record Details under a new tab on the record list page (see Record Details as Tabs).

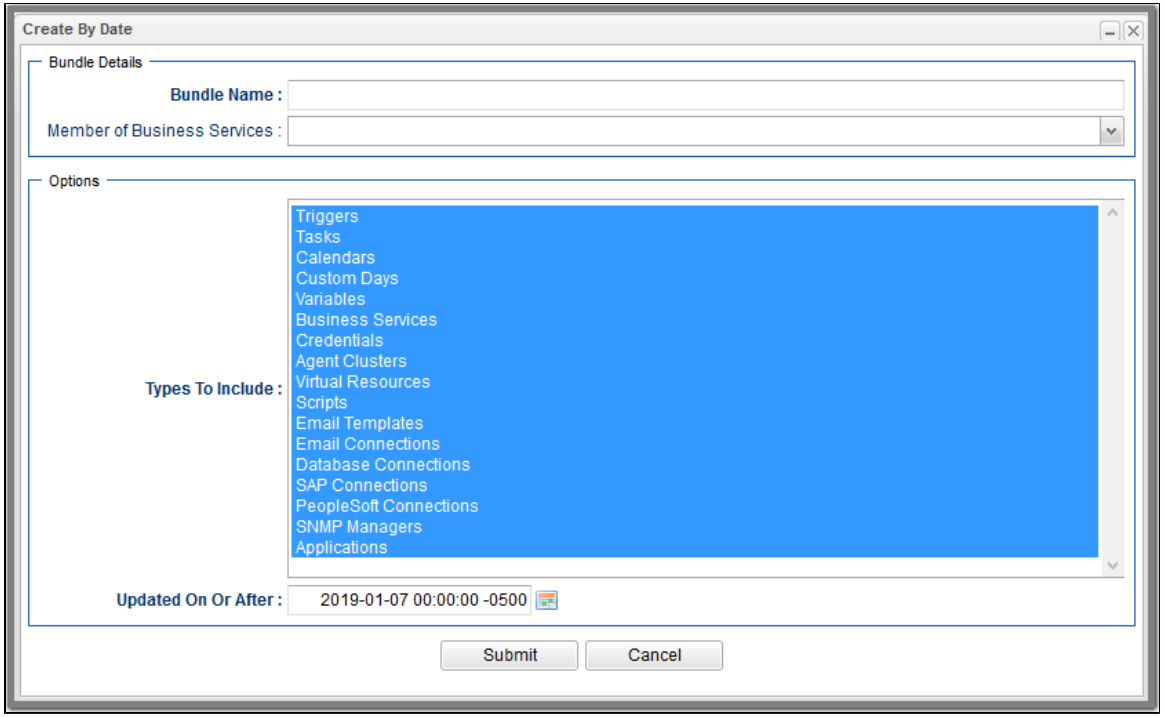
Creating a Bundle for Promotion by Date

This feature allows you to create a bundle for promotion based on a created (or updated) date. You select one or more types of records to be included in the bundle and a date. Any records that have been created or updated since the specified date that match the specified record type(s) will be included in the bundle.

The created bundle will have an Exclude on Existence field value based on the configuration of the Bundle Exclude On Existence Picker Default Universal Controller system property. To modify this and any other field, navigate to the Bundle Details of the created bundle.

Step 1 From the Bundles & Promotion navigation pane, select **Bundles**. The Bundles list displays.



Step 2	Click the **Create By Date** button at the top of the list. The Create By Date pop-up displays. 
Step 3	The **Types To Include** drop-down list pre-selects all record types (by highlighting them in blue). Use Ctrl+click to de-select any record type for records that you do not want in the Bundle. **Note** Only records for record types that you have permission to Read will be included in the bundle.
Step 4	The **Updated On Or After** field specifies the current date, by default. You can change the date manually or by clicking the Calendar icon. All records created or updated on or after the date that you specify will be included in the bundle.
Step 5	Enter a **Bundle Name** and, optionally, select one more Business Services that this Bundle will be a member of. Then click the **Submit** button. If any records qualified for inclusion in the Bundle, the Bundle is created, saved to the database, and the Bundle Details display below the list. However, if no records qualified according to the specified date, the Bundle is not saved.

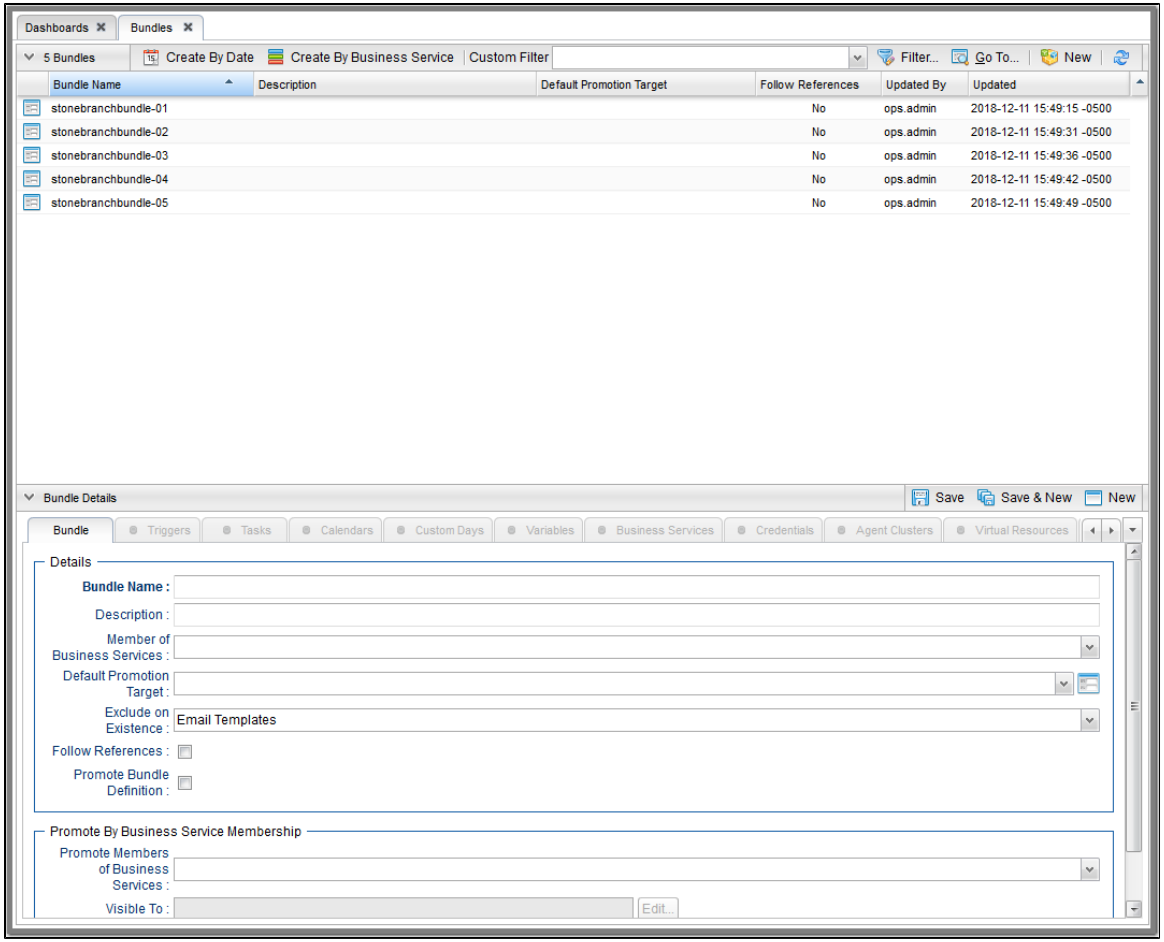
Step 6	You then can open the Bundle and enter / select additional Details for the Bundle, using the field descriptions below as a guide. • Required fields display in **boldface**. • Default values for fields, if available, display automatically. To display more of the Details fields on the screen, you can temporarily hide the list.
Step 7	As desired, you also can add any additional records to (or remove any included records from) the Bundle.
Step 8	Click the **Update** button.

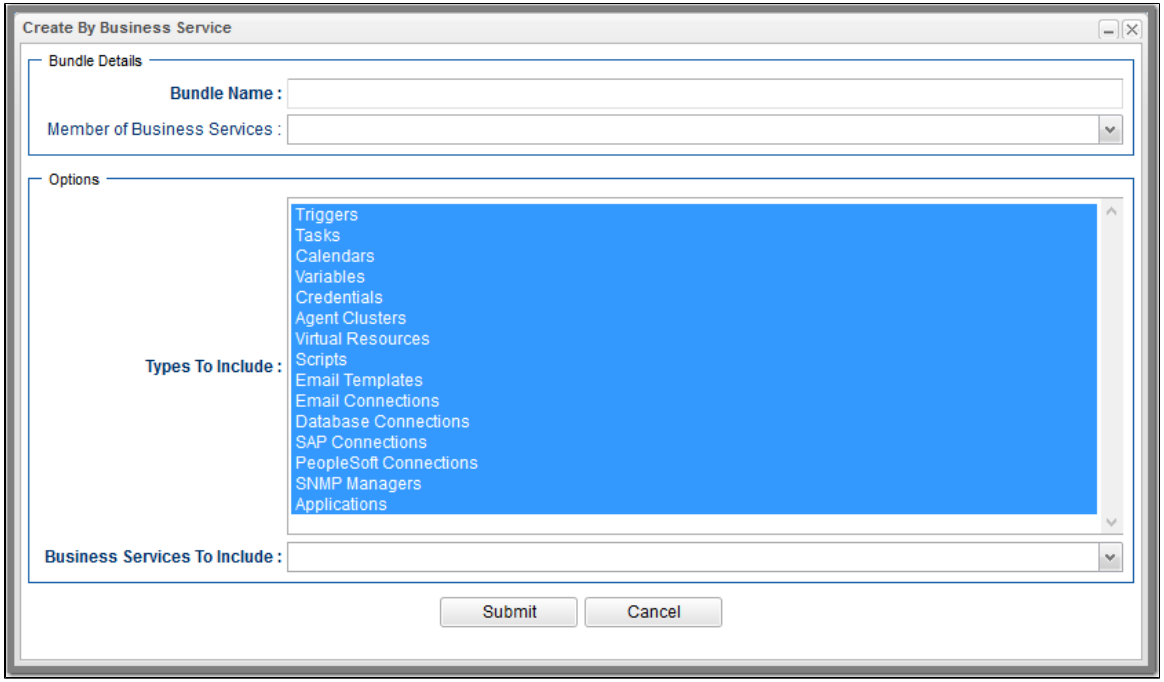
Creating a Bundle for Promotion by Business Services

This feature allows you to create a bundle for promotion based on Business Service membership. You select one or more types of records to be included in the bundle and one or more Business Services of which individual records for those record types must be a member.

The created bundle will have an Exclude on Existence field value based on the configuration of the Bundle Exclude On Existence Picker Default Universal Controller system property. To modify this and any other field, navigate to the Bundle Details of the created bundle.

Step 1 From the Bundles & Promotion navigation pane, select **Bundles**. The Bundles list displays.



Step 2	Click the **Create Bundle By Business Service** button at the top of the list. The Create Bundle By Business Service pop-up displays. 
Step 3	In the Member of Business Services field, specify Business Service memberships for the Bundle being created. Otherwise, if your Bundle permissions are limited to specific Business Services, you may not be able to create the Bundle.
Step 4	The **Types To Include** drop-down list pre-selects all record types (by highlighting them in blue) for records that can belong to Business Services. Use Ctrl+click to de-select any record type for records that you do not want in the Bundle. **Note** Only records for record types that you have permission to Read will be included in the bundle.
Step 4	In the **Business Services To Include** field, select one or more Business Services whose records you want to include in the Bundle.
Step 5	Enter a **Bundle Name** and, optionally, select one more Business Services that this Bundle will be a member of. Then click the **Submit** button. If any records qualified for inclusion in the Bundle, the Bundle is created, saved to the database, and the Bundle Details display below the list. However, if no records qualified according to the specified Business Service(s), the Bundle is not saved.

Step 6	You then can open the Bundle and enter / select additional Details for the Bundle, using the field descriptions below as a guide. • Required fields display in **boldface**. • Default values for fields, if available, display automatically. To display more of the Details fields on the screen, you can temporarily hide the list.
Step 7	As desired, you also can add any additional records to (or remove any included records from) the Bundle.
Step 8	Click the **Update** button.

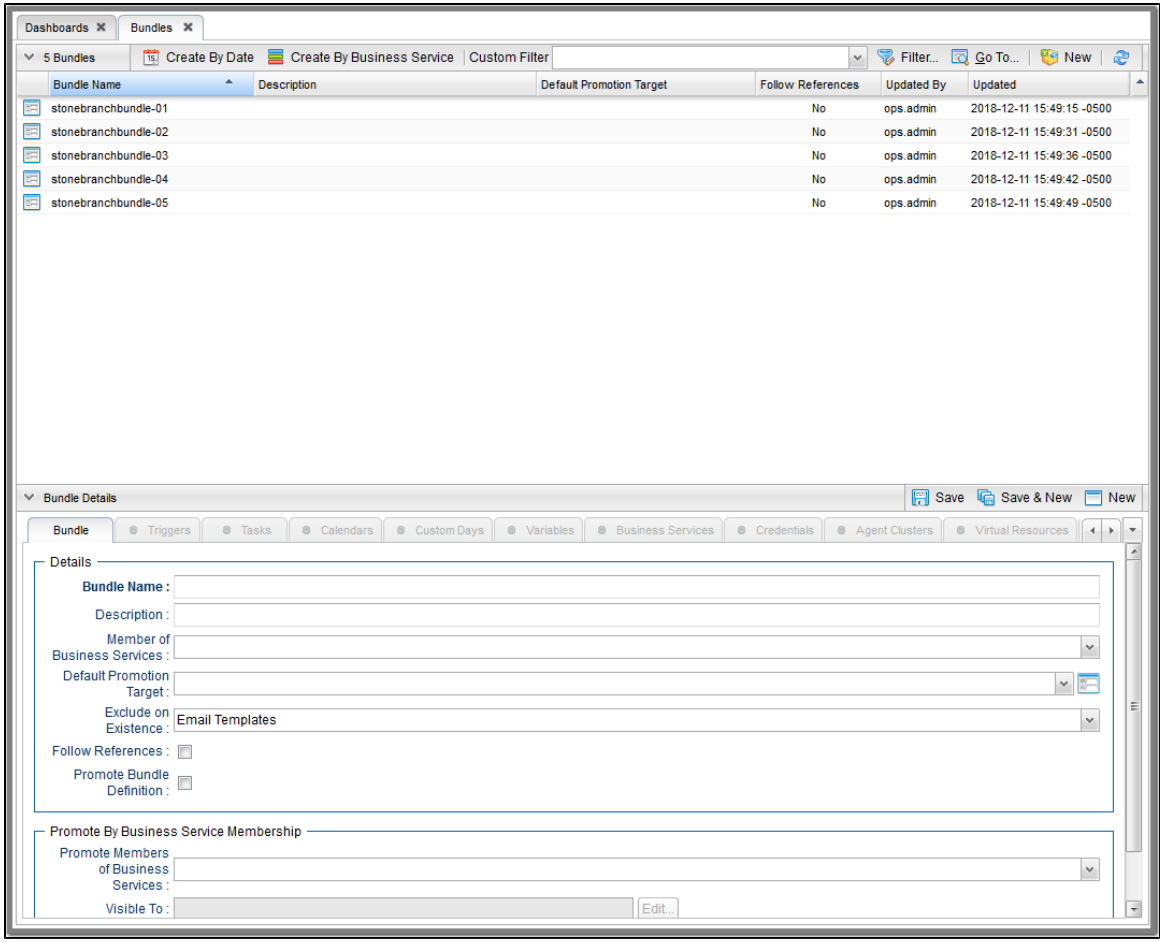
Promoting Bundles by Business Service Membership

In addition to creating a Bundle for promotion by Business Services, you also can promote a Bundle by Business Service membership. When the Bundle is promoted, any record that is a member of one or more of the specified Business Services will be bundled ***dynamically*** - based on the current configuration of the system - during the promotion. These dynamically bundled records will be included in the promotion in addition to any records that you added to the Bundle ***statically***.

These records will not be visible from the corresponding Bundle tabs; they will appear only in the Bundle Report, which will identify all records bundled dynamically with a **+** in the **Added By** column.

Step 1 From the Bundles & Promotion navigation pane, select **Bundles**. The Bundles list displays.

Below the list, Bundle Details for a new Bundle record displays. (You also can click the **New** button to display Bundle Details for a new Bundle.)



Step 2 Enter / select Details for a new Bundle, using the field descriptions below as a guide.

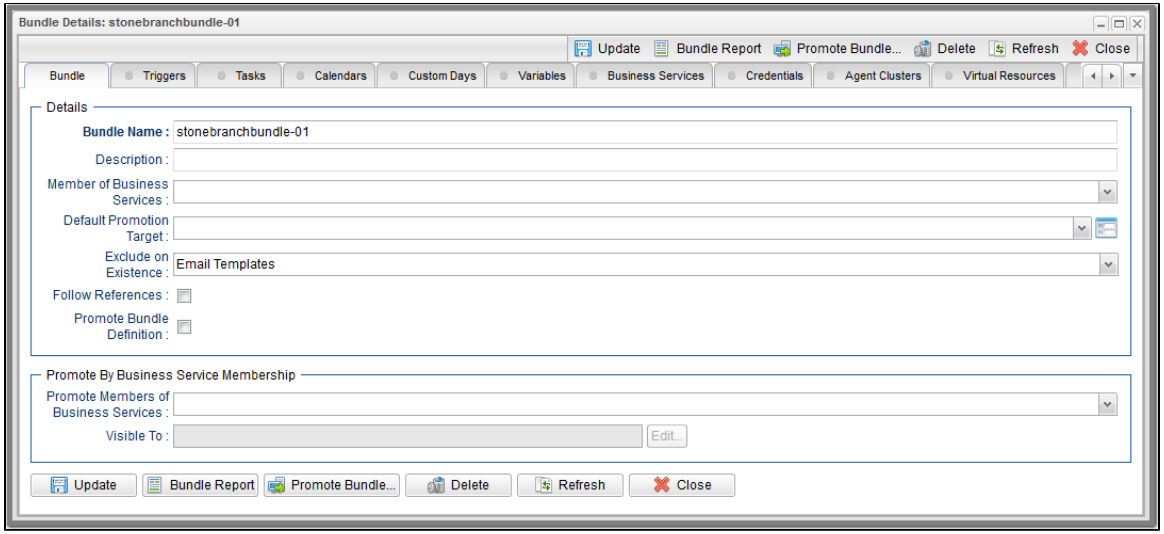
(The only required field is **Bundle Name**. You do not have to select a Default Promotion Target; you can select (or override) a promotion target when you promote the Bundle.)

> **Note**
> If you view Bundle Details for an existing Bundle by clicking a Bundle in the list, and then want to create a new Bundle record, you must click the **New** button that displays above and below the Details.

Step 3	Select one or more Business Services from the **Promote Members of Business Services** drop-down list.
Step 4	In the Visible To field, select a User to which all records being promoted by Business Service membership must be visible. Any qualifying record that is a member of the specified Business Service(s) but is not visible to the specified user will not be promoted.
Step 5	Click the **Save** button. If any records qualified for inclusion in the Bundle, the Bundle is created, saved to the database, and the Bundle Details display below the list. However, if no records qualified according to the specified Business Service(s), the Bundle is not saved. When the Bundle is promoted, all records that are members of the specified Business Services at the time of the promotion will be included in the promotion.
Step 6	As desired, you can open the Bundle and add any additional records to the Bundle.
Step 7	Click the **Update** button.

Bundle Details

The following Bundle Details is for an existing Bundle. See the field descriptions, below, for a description of all fields that display in the Bundle Details.



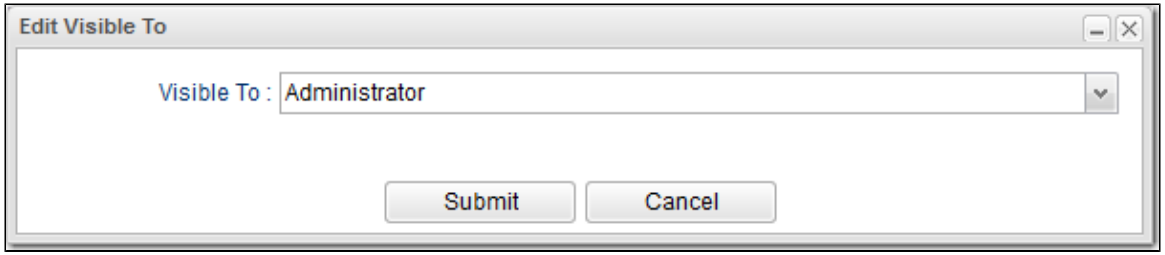
For information on how to access additional details - such as Metadata and complete database Details - for Bundles (or any type of record), see Records.

Bundle Details Field Descriptions

The following table describes the fields, buttons, and tabs that display in the Bundle Details.

Field Name	Description
Details	This section contains detailed information about the Bundle.

Bundle Name	Name for this bundle.
Description	Description of this record. (Maximum = 200 characters.)
Member of Business Services	User-defined; allows you to select one or more Business Services that this record belongs to. If the Business Service Visibility Restricted Universal Controller system property is set to true, depending on your assigned (or inherited) Permissions or Roles, Business Services available for selection may be restricted.
Default Promotion Target	Allows you to browse for and select a Promotion Target, which you defined using the Promotion Targets feature. If you do not specify a default promotion target, you will be prompted for a target when performing a promotion of the bundle.
Exclude on Existence	Record types in the promotion payload that will not be updated if they exist on the target server. You can: • Select one or more record types from the drop-down list. • Click **Check All** above the list to select all record types. • Click **Uncheck All** above the list to de-select all record types. For new Bundles, the Bundle Exclude On Existence Picker Default Universal Controller system property specifies which record types, if any, will be selected by default.
Follow References	Specification for whether or not to dynamically include items that are referenced by bundled item definitions, including items being promoted as members of Business Services. For example, if you bundle an Email Task and enable the Follow References field, the Email Connection and/or Email Template referenced by the Email Task will be included in the promotion operation. If you bundle a Trigger and enable the Follow References option, the Task(s) and Calendar referenced by the Trigger will be included in the promotion. Tasks within a bundled Workflow are included in the promotion regardless of the Follow Reference option. Custom Days that are defined within a bundled Calendar are included in the promotion regardless of the Follow Reference option as well. (The information included is similar to the information included in an XML export with references.) See Records Promoted When Follow References is Selected or Not Selected.
Promote Bundle Definition	Enable this option to promote the Bundle Details, along with the Bundle itself, when promoting the Bundle.
Promote By Business Service Membership	This section contains detailed information for promoting the Bundle with records that are members of one or more Business Service and are visible to a specified user.
Promote Members of Business Services	Business Service(s) whose members will be included in the promoted Bundle.

Visible To	User to which all records being promoted by Business Service membership must be visible. Any qualifying record that is a member of the specified Business Service(s) but is not visible to the specified user will not be promoted. **Notre** Records that are visible to a user are records that the user has permission to Read. Default is the last user to update the Promote Members of Business Services field. You can change the specified user by clicking the **Edit** button next to the **Visible To** field. An Edit Visible To pop-up dialog displays: 
Metadata	This section contains Metadata information about this record.
UUID	Universally Unique Identifier of this record.
Updated By	Name of the user that last updated this record.
Updated	Date and time that this record was last updated.
Created By	Name of the user that created this record.
Created	Date and time that this record was created.
Buttons	This section identifies the buttons displayed above and below the Bundle Details that let you perform various actions.
Save	Saves a new record in the Controller database.
Save & New	Saves a new record in the Controller database and redisplays empty Details so that you can create another new record.
Save & View	Saves a new record in the Controller database and continues to display that record.
New	Displays empty (except for default values) Details for creating a new record.
Update	Saves updates to the record.

Bundle Report	Allows you to generate a report about the current bundle. See Generating a Bundle Report.
Promote Bundle	Allows you to promote this bundle to a target Universal Controller server. See Promoting Bundles and Records to a Target.
Delete	Deletes the current record.
Refresh	Refreshes any dynamic data displayed in the Details.
Close	For pop-up view only; closes the pop-up view of this record.
Tabs	This section identifies the tabs across the top of the Bundle Details that provide access to additional information about the Bundle.
<record type> tabs	Each tab of the following record types lists the records of that type that belong to this Bundle. An **Edit** button on each record type list allows you to add records to and remove records from the Bundle (see Adding and Removing Records in a Bundle, below). • Triggers • Tasks • Calendars • Custom Days • Variables • Business Services • Credentials • Agent Clusters • Virtual Resources • Scripts • Email Templates • Email Connections • Database Connections • SNMP Managers • SAP Connections • PeopleSoft Connections • Applications • Universal Templates

Adding and Removing Records in a Bundle

If you want to select individual records for a Bundle promotion, you first must create and save a Bundle, which is empty of records until you manually add them.

If you selected a date for a Bundle promotion, the Bundle automatically contains records that were added or updated since the specified date, but you can manually add more records to the Bundle or remove any of the automatically added records from the Bundle.

If you selected Business Services Memberships for a Bundle Promotion, records that are members of the selected Business Services are not included in the Bundle until it is promoted. However, you can manually add additional records to the Bundle.

You can add a record to a Bundle from:

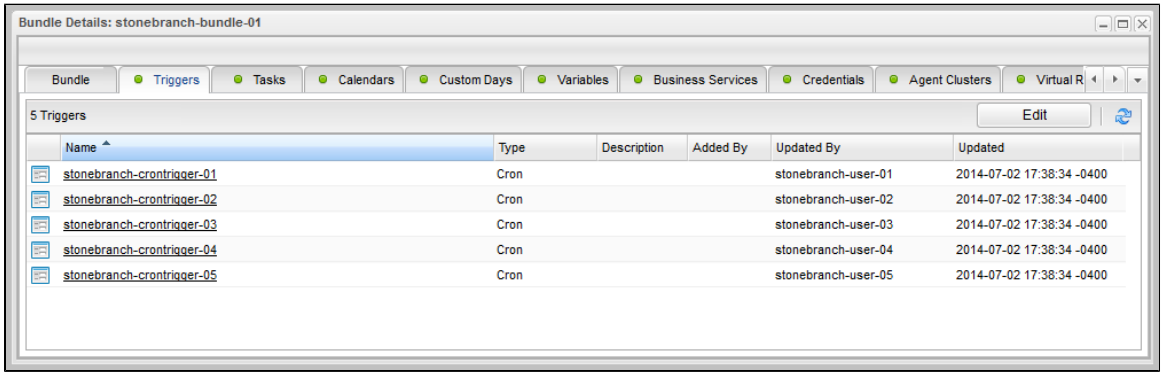
- Bundle Details

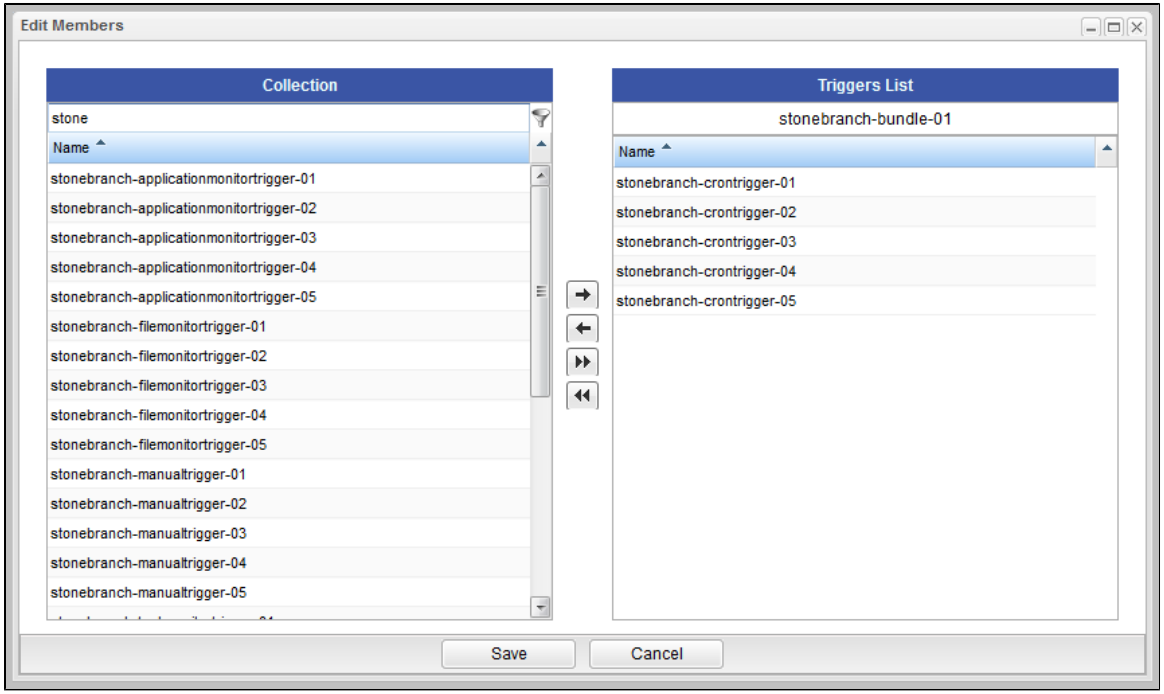
- Record Details
- Records List for the record

You can remove a record from a Bundle only from:

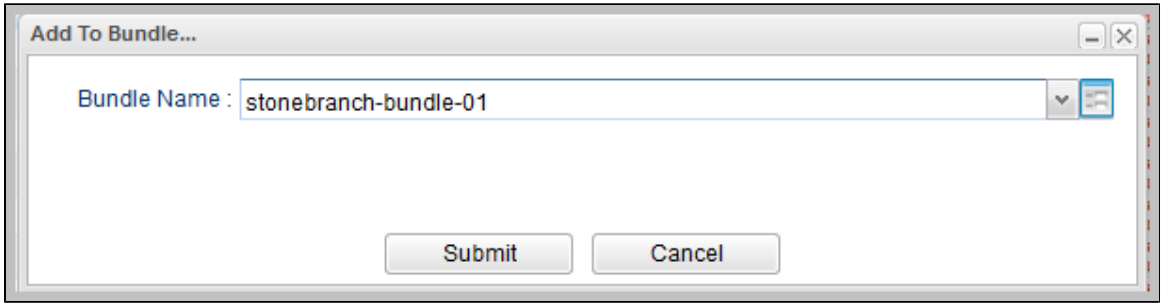
- Bundle Details

Adding and Removing Records from the Bundle Details

Step 1	Display the Bundle Details of the Bundle to which you want to add records.
Step 2	Click a <record type> tab for records that you want to add to the Bundle. A list of all records currently in the Bundle for that type are listed. (If you are adding records to a new Bundle, the list for every record type will be empty.) For example: 

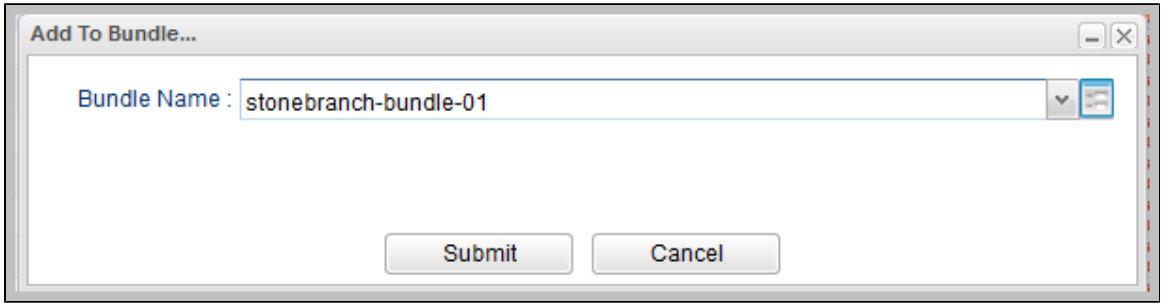
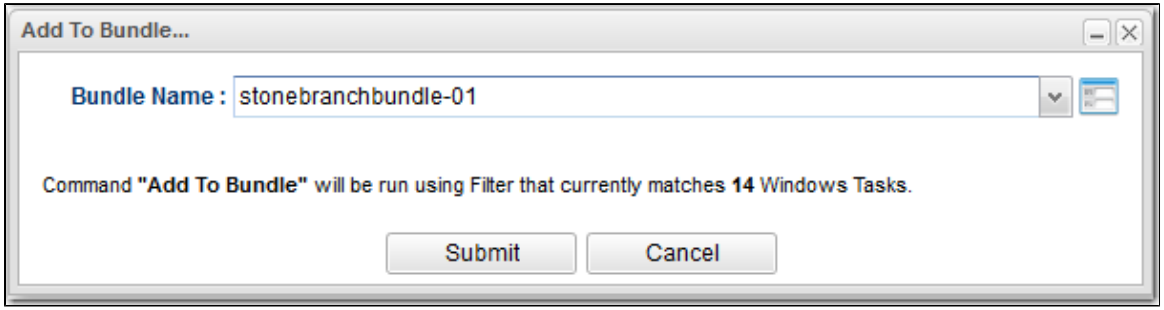
Step 3	Click the **Edit** button above the list. An **Edit Members** pop-up displays that allows you to add records to the Bundle. For example:  • The **Collection** window displays all records of this type that have not been added to the Bundle. • The **Tasks List** window displays all records of this type that have been added to the Bundle.
Step 4	To filter the records listed in the Collection window, enter characters in the text field above the **Name** column. Only records containing that sequence of characters will display in the list.
Step 5	To add a record to the Bundle, move the records from the **Collection** window to the **List** window: 1. To move a single record, double-click it or click it once and then click the **>** arrow. 2. To move multiple records, Ctrl-click them and then click the **>** arrow. 3. To move all records, click the **>>** arrow. To remove a record from the Bundle, move the record from the **List** window to the **Collection** window: 1. To move a single record, double-click it or click it once and then click the **<** arrow. 2. To move multiple records, Ctrl-click them and then click the **<** arrow. 3. To move all records, click the **<<** arrow.
Step 6	Click **Save**.
Step 7	Repeat the above steps in the appropriate tabs for all records you want to add.

Adding a Record to a Bundle from the Record Details

Step 1	Display the list of records containing the record that you want to add to a Bundle.
Step 2	Either right-click the record you want to add or display the Details for that record.
Step 3	Display the Action menu and select Add To Bundle. The **Add To Bundle** pop-up displays. 
Step 4	Select a **Bundle Name** from the drop-down list and click **Submit**. The record is added to the Bundle (see Displaying the Bundles List for a Record).

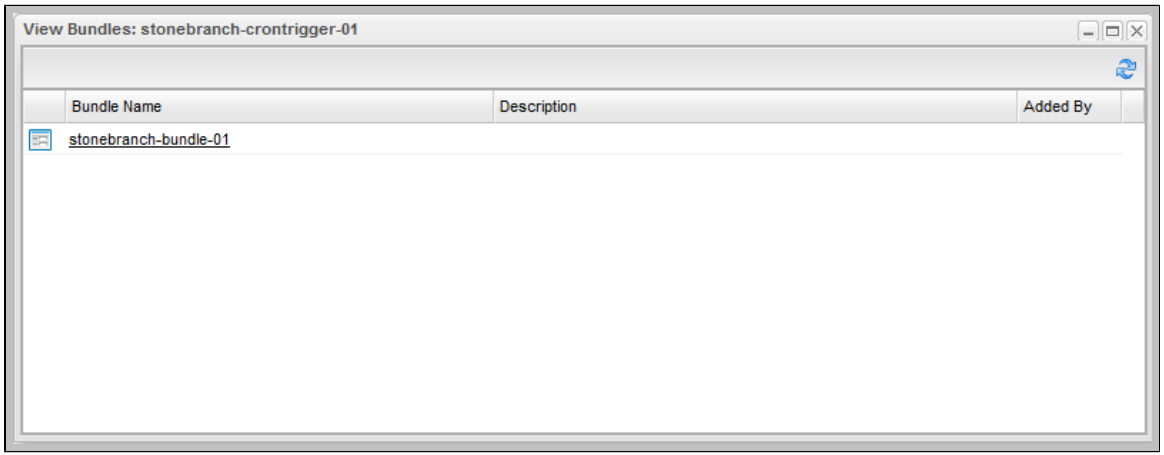
Adding Multiple Records to a Bundle from a Records List

Step 1	Display the list of records containing the records that you want to add to a Bundle.

Step 2	Either: Ctrl-click the records that you want to add to the Bundle, display the Action menu, and select Add To Bundle. The **Add To Bundle** pop-up displays.  **OR** On any tasks list, right-click any column header for the list, display the Action menu, and select Run Command On Filtered > Add To Bundle.... The **Add To Bundle** pop-up displays. 
Step 4	Select a **Bundle Name** from the drop-down list and click **Submit**. The records are added to the Bundle (see Displaying the Bundles List for a Record).

Displaying the Bundles List for a Record

To display a list of Bundles that a record belongs to:

Step 1	Access the Action menu for the record and select View Bundles. A View Bundles pop-up displays the list of Bundles that the record belongs to. 
Step 2	To view Details for a Bundle on the list, click its **Bundle Name**.

Reports

Universal Controller does not support the bundling and promotion of reports. Any report required by a promoted task must already be available on the target system.

Best Practice
We recommend that if you are sharing reports between systems:

1. Create the reports on the source system.
2. List Export the reports.
3. List Import the reports into the target system.

If an Email Task or an Email Notification action for any task type contains a reference to a specific report by id, the promotion payload will include report meta data to allow for proper validation and potential remapping of the report reference on the target system.

The meta data includes:

- Report id
- Report title
- Report user name / user id
- Report group name / group id

If a report by the same id exists on the target system, no UUID mapping is required and the promotion can proceed without issue.

If a report by the same id does not exist on the target system, UUID mapping is required before the promotion can proceed.

Using the report metadata, the Controller will attempt to find a report on the target system with the same title and same visibility.

- If a report is found, the incoming report id will be remapped to the appropriate target system report id.
- If a report is not found, the promotion will fail with the following message: `Unable to find mapping on target system for report reference id report-id. {meta-data}.`

Note
You can disable all Report-related promotion validation on the target system via the Validate Report References On Promotion Universal Controller system property.

Generating a Bundle Report

- Introduction
- Generating a Report

Introduction

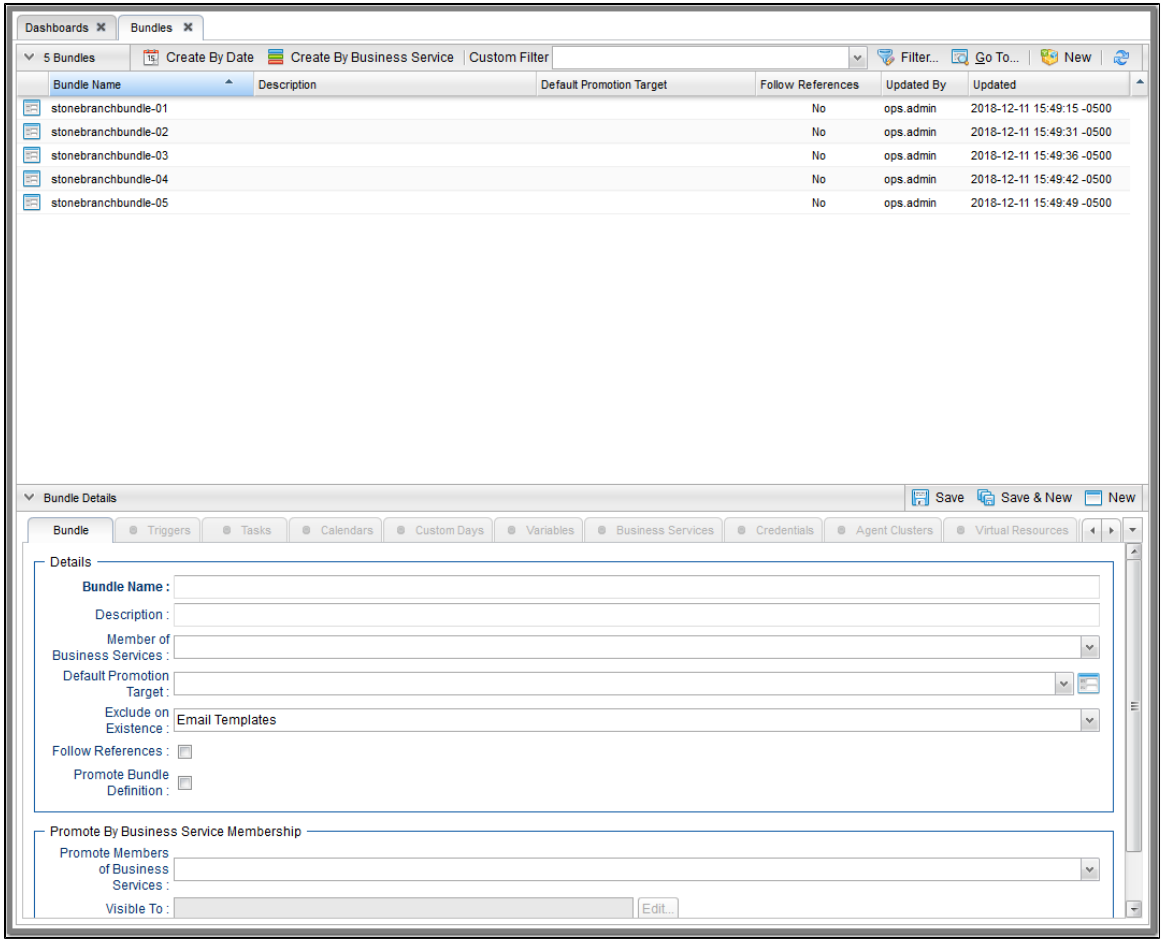
A Bundle Report displays a list of all records included in a Bundle, categorized by record type.

Note
Reports containing over 1,000 records will not be categorized by record type.

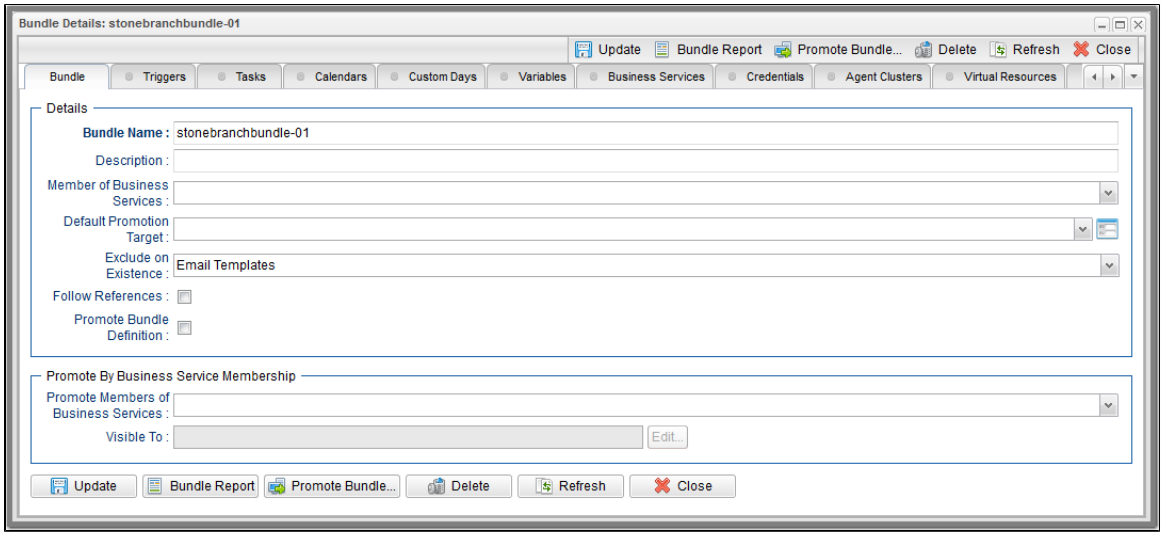
Generating a Report

To generate the report:

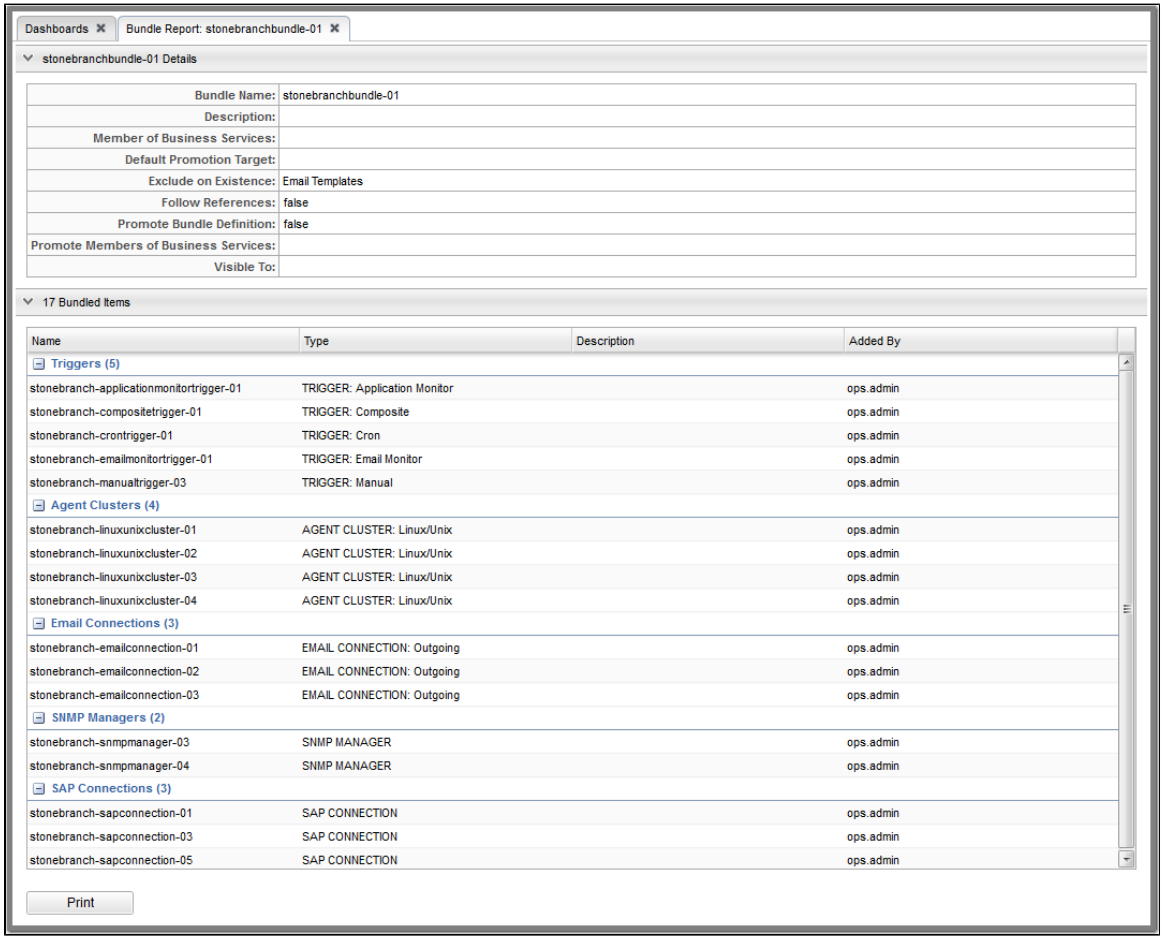
Step 1 From the Bundles & Promotion navigation pane, select **Bundles**. The Bundles list displays.



Step 2 Either right-click the Bundle that you want to create a Bundle Report for and click **Bundle Report** in the Action menu, or display the Details for the Bundle and click the **Bundle Report** button.



A Bundle Report displays for that Bundle.



Note
If the Promotion Bundle Definition and Follow References fields are checked on the Bundle, the Bundle Report includes any Business Services that the Bundle is a member of.

Note
Added By column information:

- Records included in the promotion that were added directly to the Bundle have a user id in the **Added By** column.
- Records included in the promotion dynamically as Tasks within a Workflow, Custom Days within a Calendar, or, when the Follow References field is enabled, the records referenced by the bundled records, have an asterisk (*****) in the **Added By** column. (See Records Promoted When Follow References is Selected or Not Selected.)
- Records included in the promotion dynamically when the Bundle is promoted by Business Service membership have a plus sign (**+**) in the **Added By** column.

Step 3	If you want to print the report, click the **Print** button at the bottom of the report.

Creating Promotion Targets

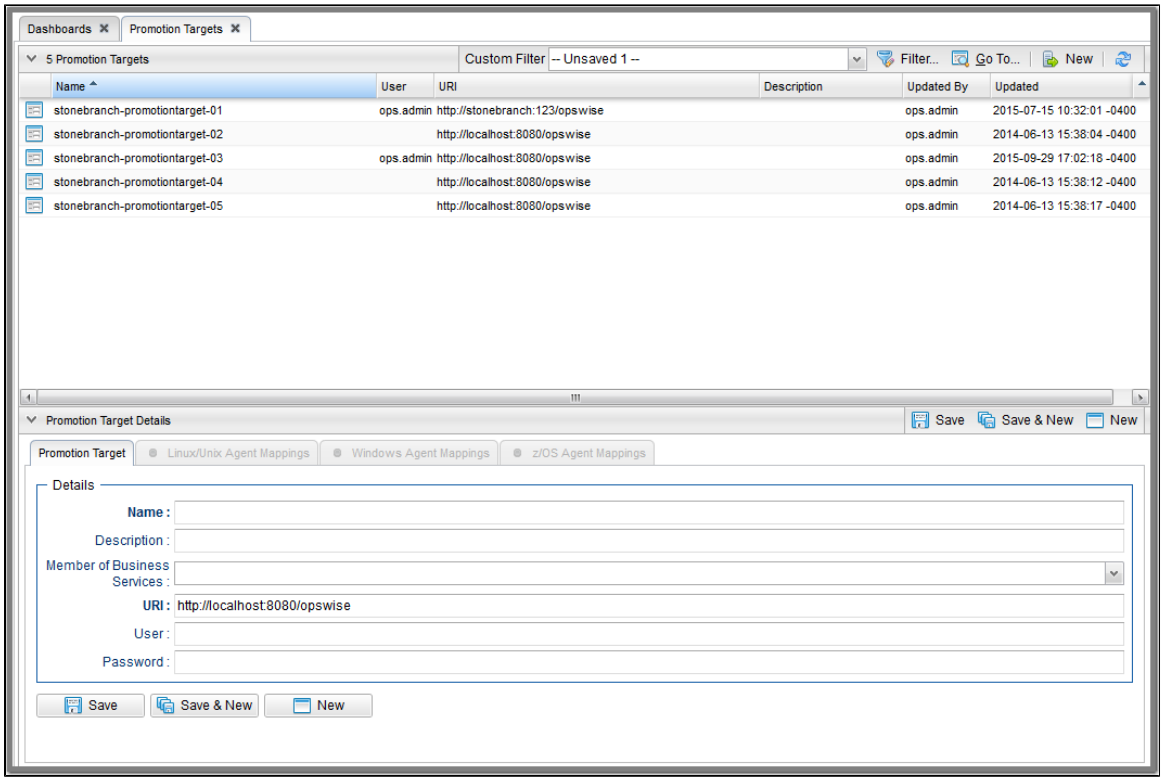
- Creating a Promotion Target
- Promotion Target Details
  - Promotion Target Details Field Descriptions

Creating a Promotion Target

Before you can promote a Bundle (or individual record) to Universal Controller, you must create a Promotion Target record for a cluster node of that Controller. A Promotion Target record contains the Uniform Resource Identifier (URI) of a target cluster node and, optionally, the user name and password required to log on to the cluster node.

Step 1 From the Bundles & Promotion navigation pane, select **Promotion Targets**. The Promotion Targets list displays a list of existing Promotion Targets.

Below the list, Promotion Target Details for a new Promotion Target record displays.



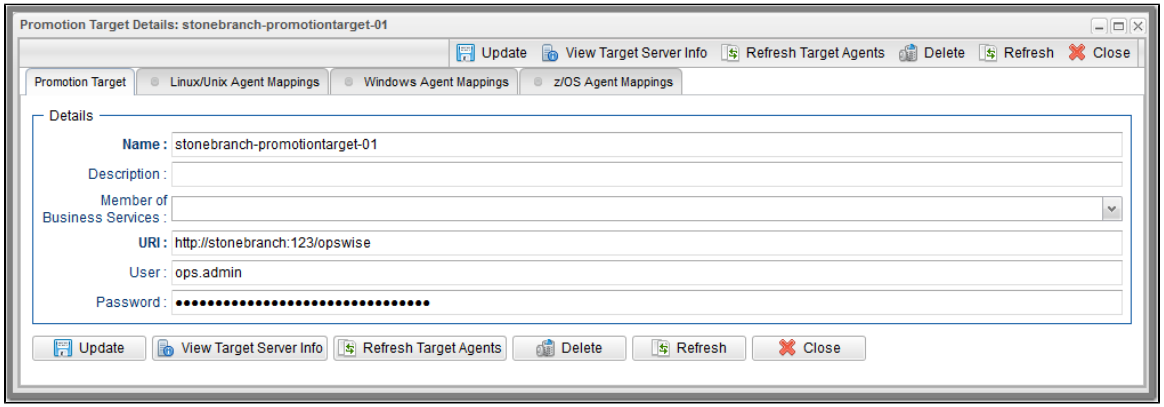
Step 2	Enter / select Details for a new Promotion Target, using the field descriptions below as a guide. • Required fields display in **boldface**. • Default values for fields, if available, display automatically. To display more of the Details fields on the screen, you can either: • Use the scroll bar. • Temporarily hide the list above the Details. • Click the **New** button above the list to display a pop-up version of the Details.
Step 3	Click a **Save** button. The Promotion Target record is added to the database, and all buttons and tabs in the Promotion Target Details are enabled.

Note
To open an existing record on the list, either:

- Click a record in the list to display its record Details below the list. (To clear record Details below the list, click the **New** button that displays above and below the Details.)
- Clicking the Details icon next to a record name in the list, or right-click a record in the list and then click **Open** in the Action menu that displays, to display a pop-up version of the record Details.
- Right-click a record in the a list, or open a record and right-click in the record Details, and then click **Open In Tab** in the Action menu that displays, to display the record Details under a new tab on the record list page (see Record Details as Tabs).

Promotion Target Details

The following Promotion Target Details is for an existing Promotion Target. See the field descriptions, below, for a description of all fields that display in the Promotion Target Details.



For information on how to access additional details - such as Metadata and complete database Details - for Promotion Targets (or any type of record), see Records.

Promotion Target Details Field Descriptions

The following table describes the fields, buttons, and tabs that display in the Promotion Target Details.

Field Name	Description
Details	This section contains detailed information about the Promotion Target.
Name	Name for this Production Target.
Description	Description of this record. (Maximum = 200 characters.)
Member of Business Services	User-defined; allows you to select one or more Business Services that this record belongs to. If the Business Service Visibility Restricted Universal Controller system property is set to true, depending on your assigned (or inherited) Permissions or Roles, Business Services available for selection may be restricted.
URI	Uniform Resource Identifier (URI) used to locate the Promotion Target cluster node. **Note** By default, the URI of the cluster node that you are logged into displays. You must change this to the URI of a target cluster node, using the default URI format.
User	Login ID on the target cluster node of Universal Controller.
Password	Login password on the target cluster node of Universal Controller.
Metadata	This section contains Metadata information about this record.
UUID	Universally Unique Identifier of this record.
Updated By	Name of the user that last updated this record.
Updated	Date and time that this record was last updated.
Created By	Name of the user that created this record.
Created	Date and time that this record was created.
Buttons	This section identifies the buttons displayed above and below the Promotion Target Details that let you perform various actions.

Save	Saves a new record in the Controller database.
Save & New	Saves a new record in the Controller database and redisplays empty Details so that you can create another new record.
Save & View	Saves a new record in the Controller database and continues to display that record.
New	Displays empty (except for default values) Details for creating a new record.
Update	Saves updates to the record.
Server Info	Displays a Remote Server Information pop-up that contains details about the cluster node identified in this record.
Refresh Target Agents	Accesses the specified Universal Controller server and fetches all Agent records. For details, see Specifying Agent Mapping.
Delete	Deletes the current record.
Refresh	Refreshes any dynamic data displayed in the Details.
Close	For pop-up view only; closes the pop-up view of this record.
Tabs	This section identifies the tabs across the top of the Promotion Target Details that provide access to additional information about the Bundle.
<Agent-type> Mappings	Lists all Agent mapping instructions between the source and target Controllers. See Specifying Agent Mapping.

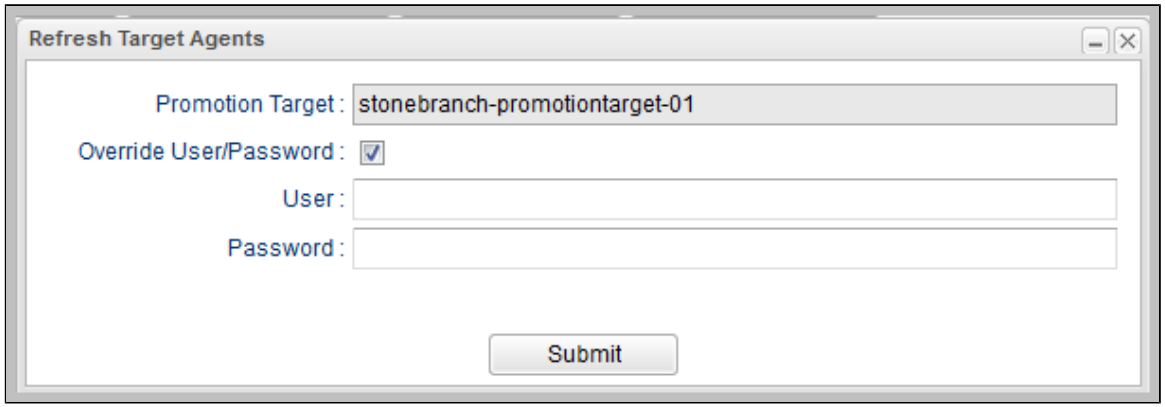
Specifying Agent Mapping

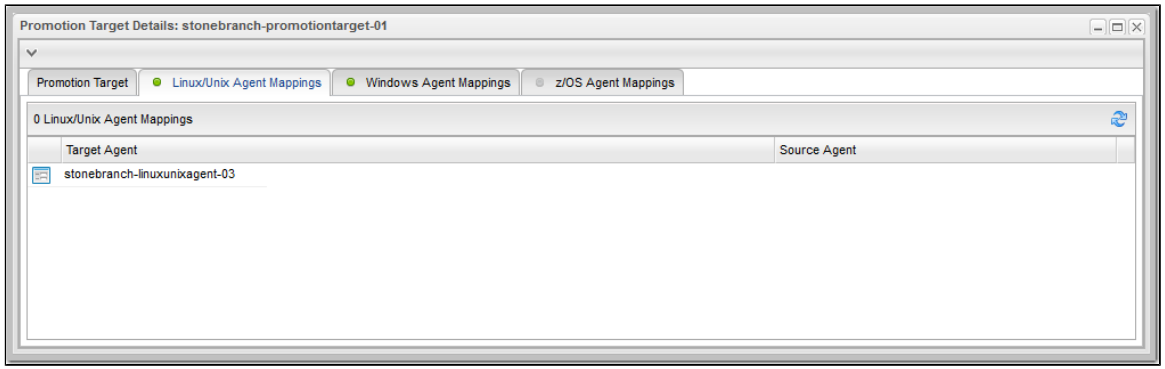
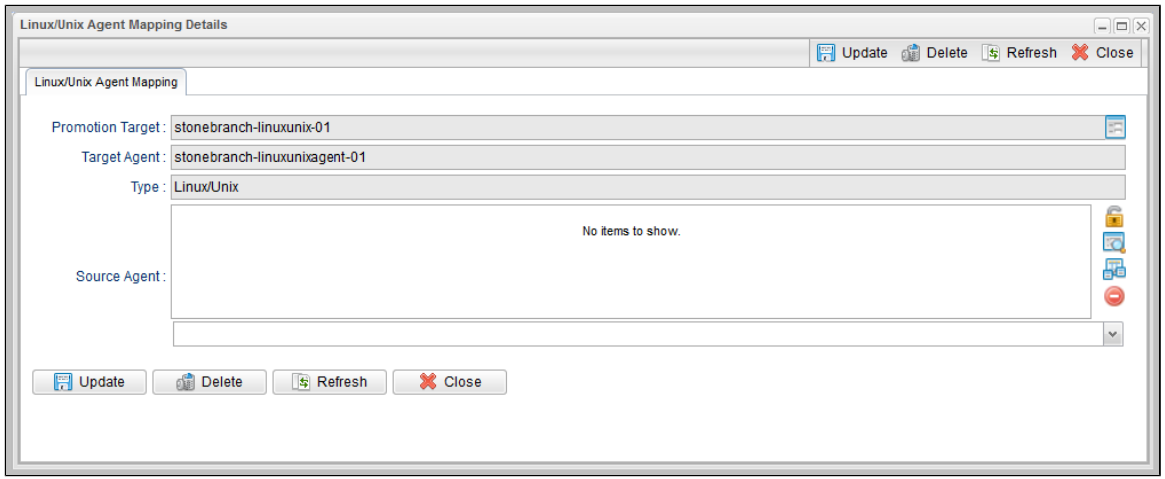
Specifying Agent Mapping

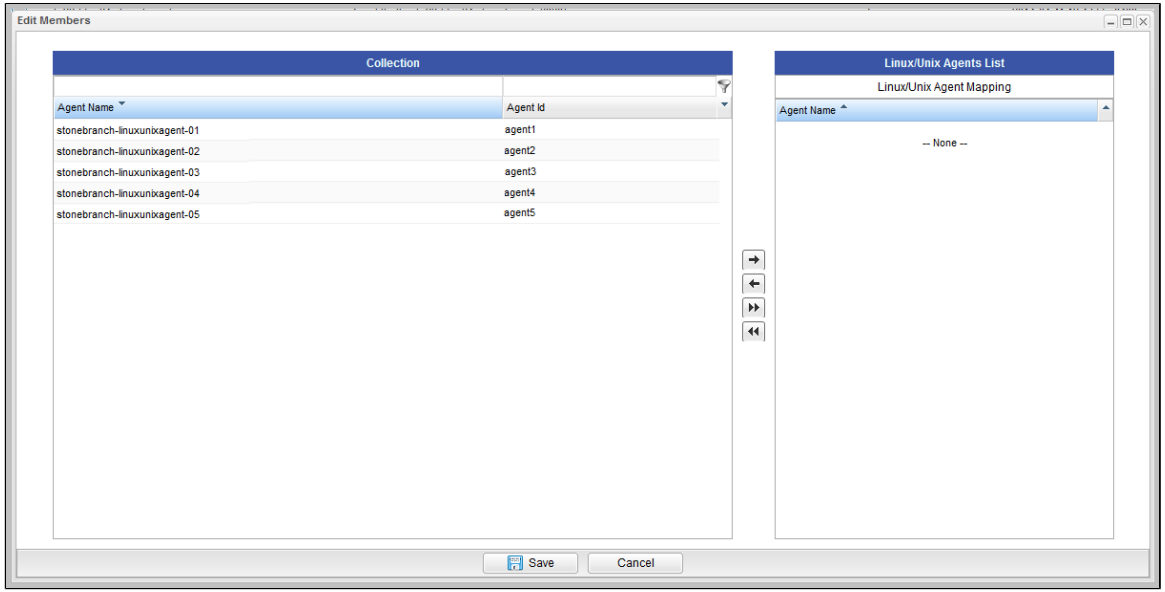
Because your source and target Controller machines may not have the same Agents, you must provide instructions to the Controller on how to map Agents on the source machine to Agents on the target machine.

The process consists of:

- Instructing the Controller to fetch the list of Agents on the target machine.
- Manually identifying how each Agent should be mapped.

Step 1	Access the Action menu for a Promotion Target record.
Step 2	Click **Refresh Target Agents**. The Refresh Target Agents pop-up displays. 
Step 3	If the Promotion Target record does not provide the login credentials (User and Password) for the target machine, you must enter them. If the Promotion Target record does provide login credentials, but you want to override them, click **Override User/Password** and enter a **User** and **Password**.
Step 4	Click **Submit**. The Controller logs in to the target machine specified in the Promotion Target record **URI** field, accesses the appropriate tables, sorts the Agents into Agent types, and lists them in the appropriate <Agent-type> Mappings tab of the Promotion Target record.

Step 5	Open the Promotion Target record for which you have just refreshed Agents and click an Agent Mappings tab for which there are Agents on the target machine. The following example shows a list of Linux/Unix Agents on a target machine: 
Step 6	Click the Details icon next to a Target Agent name to display Agent Mapping Details for that Target Agent. 

Step 7	In the **Source Agent** field, click the **Add-Remove Multiple** icon to display an Edit Members dialog.  • The **Collection** window displays all Agents of this type on the source machine that have not been mapped to the selected Target Agent. • The **Agents List** windows displays all Agents of this type on the source machine that have been mapped to the selected Target Agent.
Step 8	To filter the Agents listed in the Collection window, enter characters in the text field above the **Name** column. Only Agents containing that sequence of characters will display in the list.
Step 9	To map an Agent, move the it from the **Collection** window to the **List** window: 1. To move a single Agent, double-click it or click it once and then click the **>** arrow. 2. To move multiple Agents, Ctrl-click them and then click the **>** arrow. 3. To move all Agents, click the **>>** arrow. To un-map an Agent, move it from the **List** window to the **Collection** window: 1. To move a single Agent, double-click it or click it once and then click the **<** arrow. 2. To move multiple Agents, Ctrl-click them and then click the **<** arrow. 3. To move all Agent, click the **<<** arrow.
Step 10	Click **Save**.
Step 11	Repeat Steps 6 to 10 for each Agent listed in the selected Agent Mappings tab and for all Agents listed in any other Agent Mappings tabs. For best results, you should make sure all the Agents on your source machine are mapped to an Agent on the target machine. You can map as many source Agents to a single target Agent as needed. Once you have specified the mapping for all your source Agents, you can easily promote Bundles or individual records to this Promotion Target. When you promote records (via Bundle or individually) to the target machine, the target Agent will replace the source Agent.

Refresh Agent Error Messages

If your setup is incorrect, you may see the error message described below.

If you tried to refresh target Agents using a non-existent user or invalid password on the Promotion Target:

Error Message	Location
`GET http://NN.NNN.NN.N:8080/opswise/resources/agents/list returned a response status of 401 Unauthorized`	User interface on source machine
`2012-03-29-16:27:17:134  ERROR [http-8080-6] com.sun.jersey.api.client.UniformInterfaceException: GET returned a response status of 401 Unauthorized`	Universal Controller log on source machine
`2012-03-29-16:27:16:138  ERROR [http-8080-1] *** ERROR *** Login using Basic Authentication failed for: [userID]`	Universal Controller log on target machine

Promoting Bundles and Records to a Target

- Overview
- Promoting a Bundle
- Scheduling a Bundle Promotion
- Promoting One or More Individual Records
- Promoting Universal Tasks and Universal Templates
- Diagnosing Promotion Failures
- Promotion Audit Records

To use this feature, the user logged into the source Controller must have the ops_promotion_admin role, or be granted permission to the Promote command and execute permission to one or more promotion targets.

The Promotion Read Permission Required Universal Controller system property specifies whether or not the ops_promotion_admin role additionally requires Read permission, on the source Universal Controller, for any record type being promoted.

Also, the user ID and password specified for the Promotion Target must be for a valid user on the target Controller with the ops_promotion_admin or ops_promotion_accept_bundle role.

The Promotion Accept Bundle Create/Update Permission Required Universal Controller system property specifies whether the ops_promotion_admin role additionally requires Create (or Update) permission, on the target Universal Controller, for any record type being promoted.

Overview

Promoting a Bundle means copying all of the records in a Bundle from a source Controller to a target Controller.

You also can promote one or more individual records without bundling them.

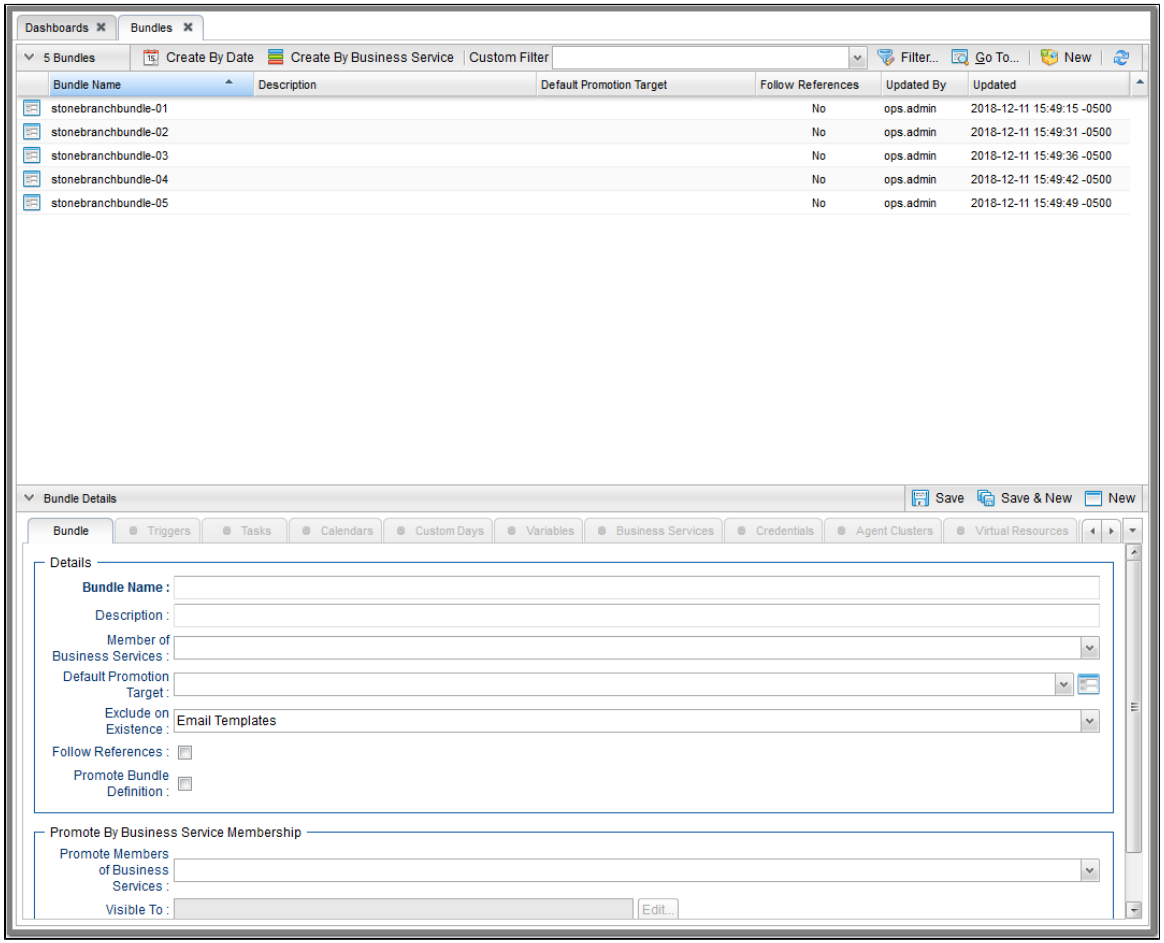
For every record in a bundle being promoted, and every record being promoted individually, the following associated data is always included in the promotion.

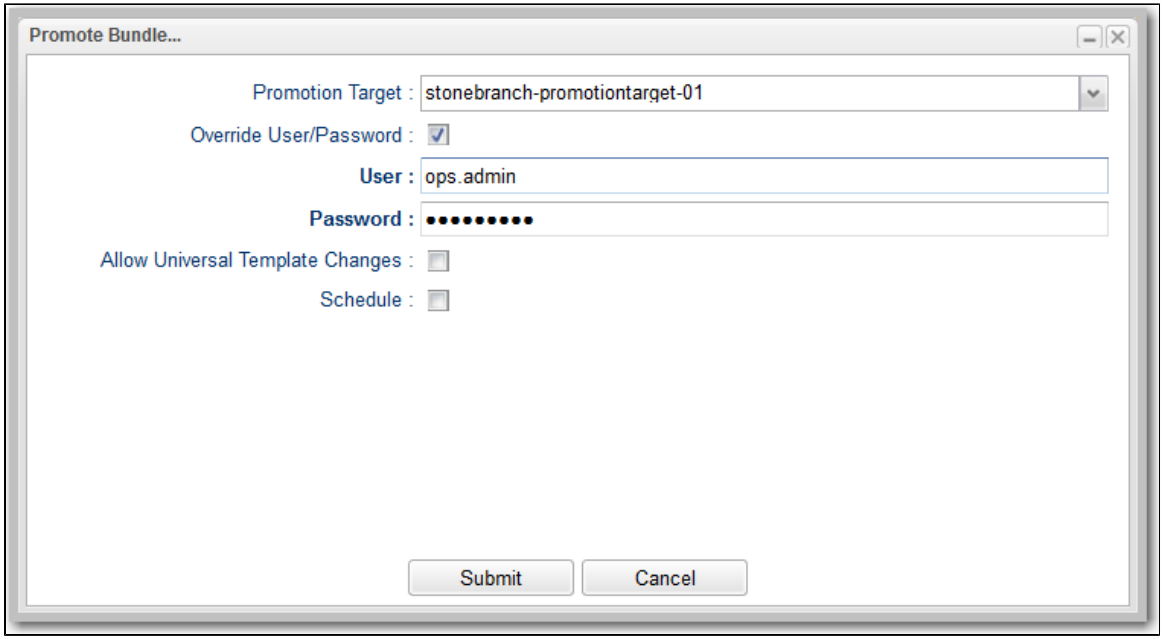
- If you promote a workflow, all of the tasks in the workflow are also promoted.
- If you promote a task (including a workflow), all variables, virtual resource dependencies, actions, notes, etc. are included in the promotion.
- If you promote an application, its associated start, stop, and query tasks are included in the promotion.
- If you promote a calendar, its associated custom days are included in the promotion.

Note
If you promote a trigger whose Forecast field has been checked so that the Controller calculates the date and time when this trigger will be satisfied for the next number of days, the Forecast field will not be checked for that trigger on the target system.

Promoting a Bundle

Step 1 From the Bundles & Promotion navigation pane, select **Bundles**. The Bundles list displays.



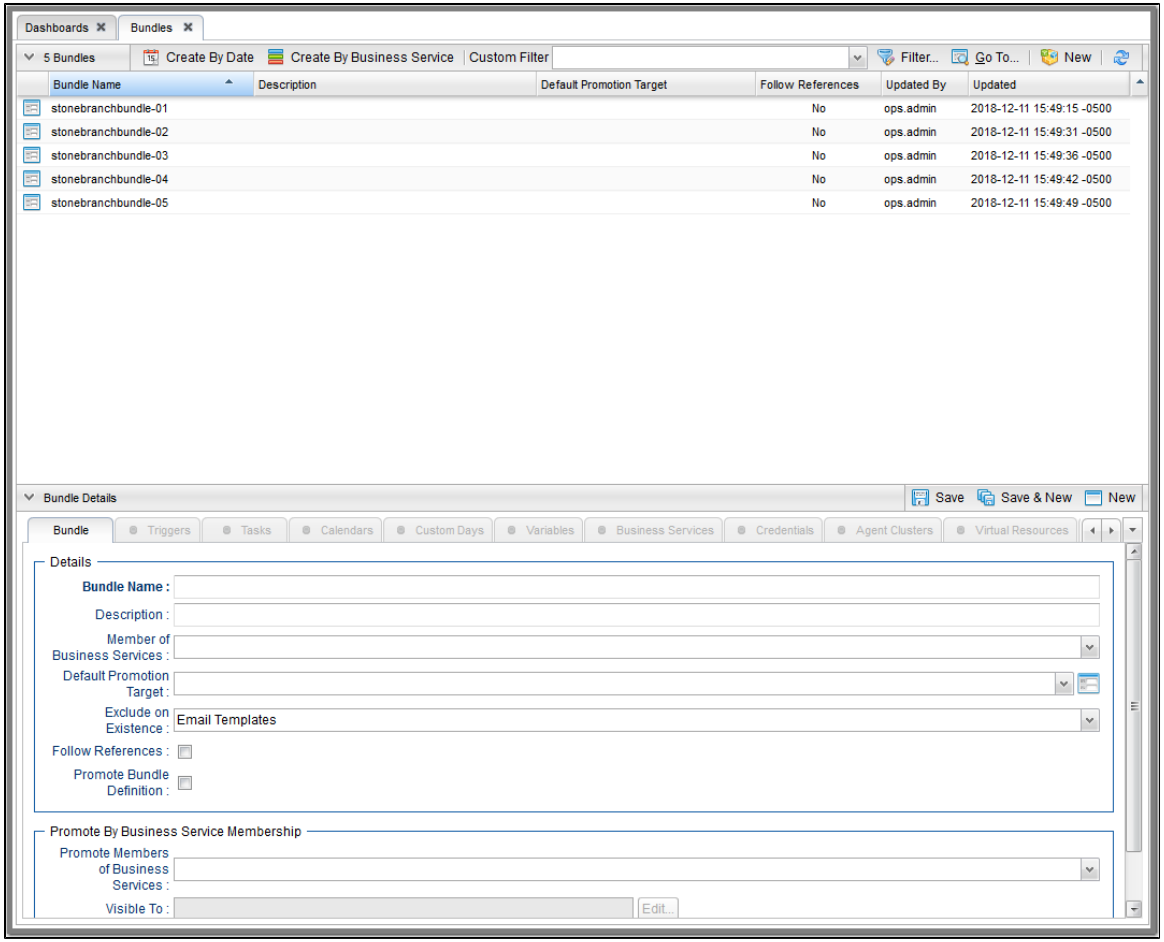
Step 2	Locate the Bundle that you want to promote and either: • Right-click the Bundle on the list to display an Action menu and click **Promote Bundle...**. • Open the Bundle record and either click the **Promote Bundle...** button or access the Action menu and click **Promote Bundle...**. The Promote Bundle pop-up dialog displays. 
Step 3	If the selected Bundle record specifies a Default Promotion Target, the name of that Target displays in the Promotion Target field. You can change the Promotion Target by selecting any Target from the drop-down list.
Step 4	The default login User and Password are provided from the selected Promotion Target record. If you want to override the defaults, click **Override User/Password** and type in the new information.
Step 5	If the promotion contains new or modified Universal Templates, click **Allow Universal Template Changes**; otherwise, the promotion will not succeed. See Diagnosing Promotion Failures for details.
Step 6	If you want to schedule the promotion of the bundle at a later time, click **Schedule**.

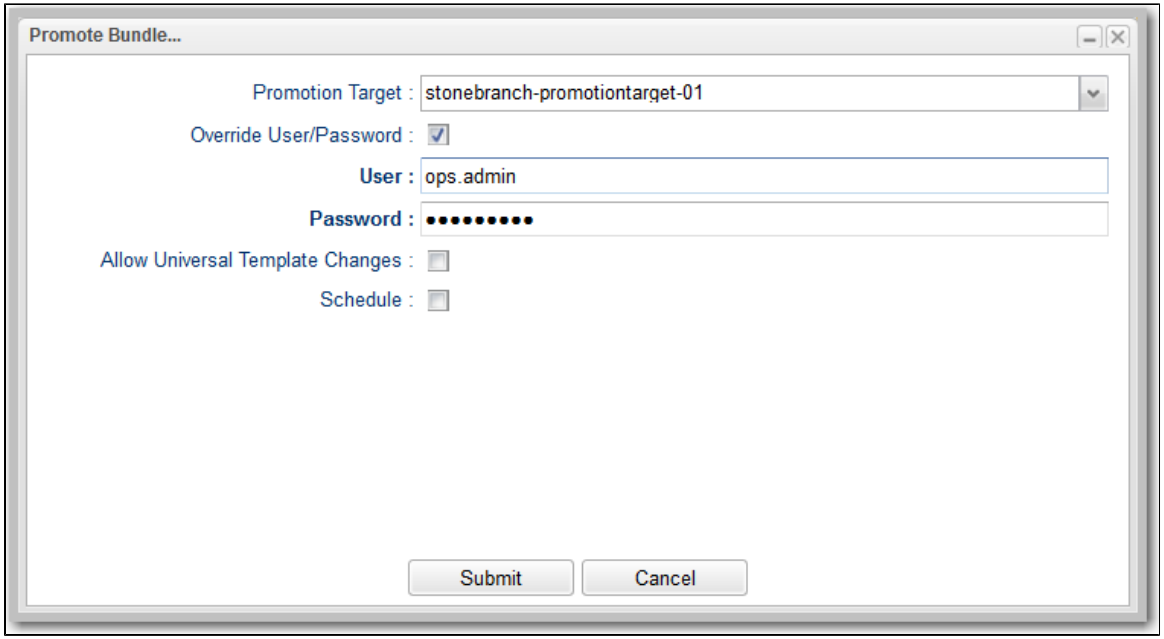
Step 7	Click **Submit**. The Controller logs in to the target machine specified in the URI field of the Promotion Target record and copies the bundled records to the target Controller. Based on the specified Agent mapping, the target Agent replaces the source Agent where required. If you scheduled the promotion to be run at a later time, a record of the promotion is created in the Promotion Schedules list. **Note** The promotion process creates audit records on the source and target machine. On the target machine, the Controller also creates a Promotion History record. For details, see Promotion History and the Restore Option.

Scheduling a Bundle Promotion

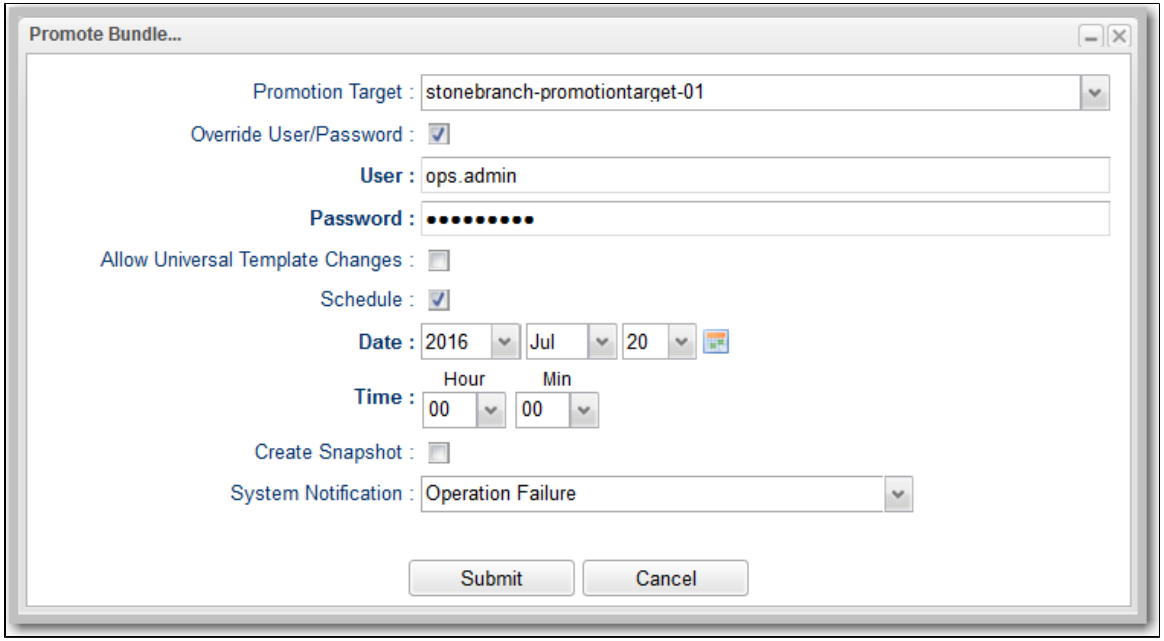
You can create a promotion schedule for a Bundle so that it will automatically be promoted at a specified date and time.

Step 1 From the Bundles & Promotion navigation pane, select **Bundles**. The Bundles list displays.



Step 2	Locate the Bundle that you want to promote and either: • Right-click the Bundle on the list to display an Action menu and click **Promote Bundle...**. • Open the Bundle record and either click the **Promote Bundle...** button or access the Action menu and click **Promote Bundle...**. The Promote Bundle pop-up dialog displays. 
Step 3	The default login ID and password are provided from the Promotion Target record, if specified. If you want to override the default, click **Override User/Password** and type in the new information.
Step 4	If the promotion contains new or modified Universal Templates, click **Allow Universal Template Changes**; otherwise, the promotion will not succeed. See Diagnosing Promotion Failures for details.

Step 5 Click **Schedule**. Additional fields display on the Promote Bundle pop-up dialog that let you create a promotion schedule.



Step 6 Select a **Date** and **Time** when you want the bundle to be promoted.

Step 7 If you want to schedule the promotion using the current Bundle records, select **Create Snapshot**. When you submit the schedule, the current Bundle records are collected immediately and promoted at the scheduled time. Any changes to Bundle records between the time that the promotion was scheduled and the time that the promotion was performed are not promoted.

If you want to schedule the promotion using the Bundle records collected dynamically at the time of the scheduled promotion, do not select **Create Snapshot**.

Step 8 If you want to send a System Notification on the success and/or failure of the promotion, select one of the following from the **System Notification** drop-down list:

- Operation Failure (default)
- Operation Success/Failure
- Operation Success

If you do not want to send a System Notification, select – None --.

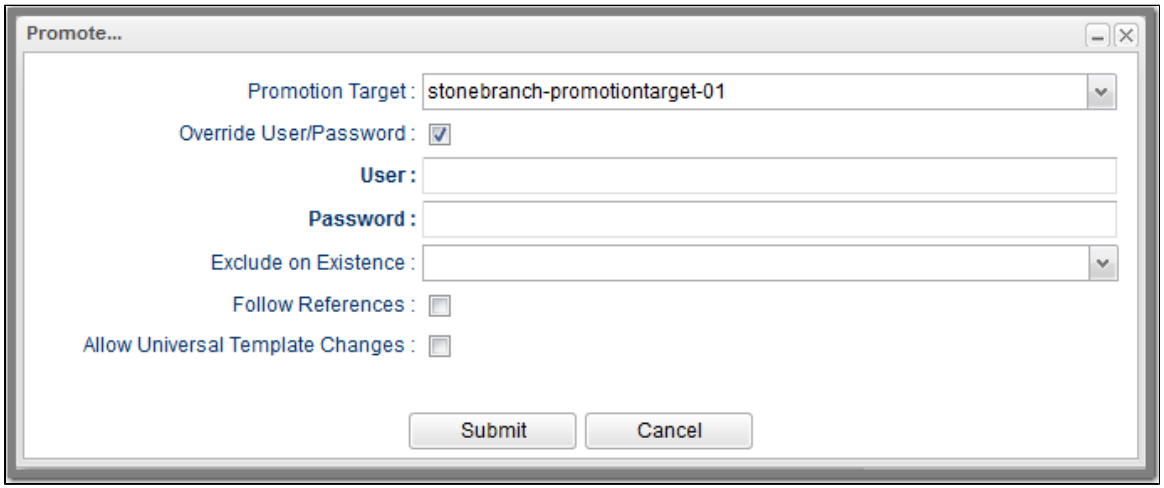
> **Note**
> Promotions without a specified Schedule will run immediately. Real-time notifications will be displayed in the Universal Automation Center Console, rather than through System Notifications.

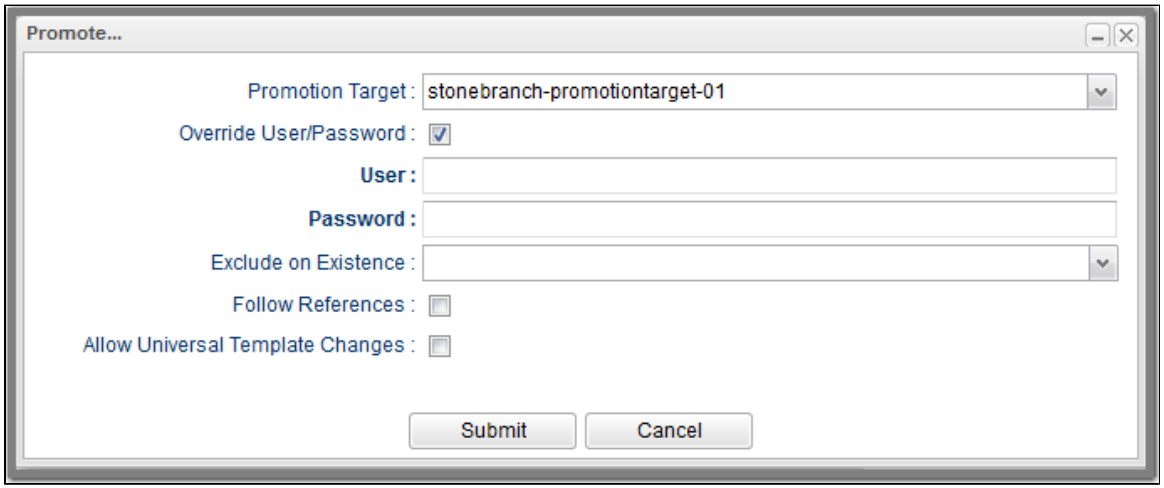
Step 9	Click **Submit**. A record of the promotion schedule is listed in the Promotion Schedules list. After a scheduled promotion has completed, it will remain on the list (where it can be rescheduled to run again) for the number of days specified by the Promotion Schedule Retention Period In Days Universal Controller system property.

Promoting One or More Individual Records

The Controller also allows you to promote records of the same type to a target machine without going through the process of creating a Bundle.

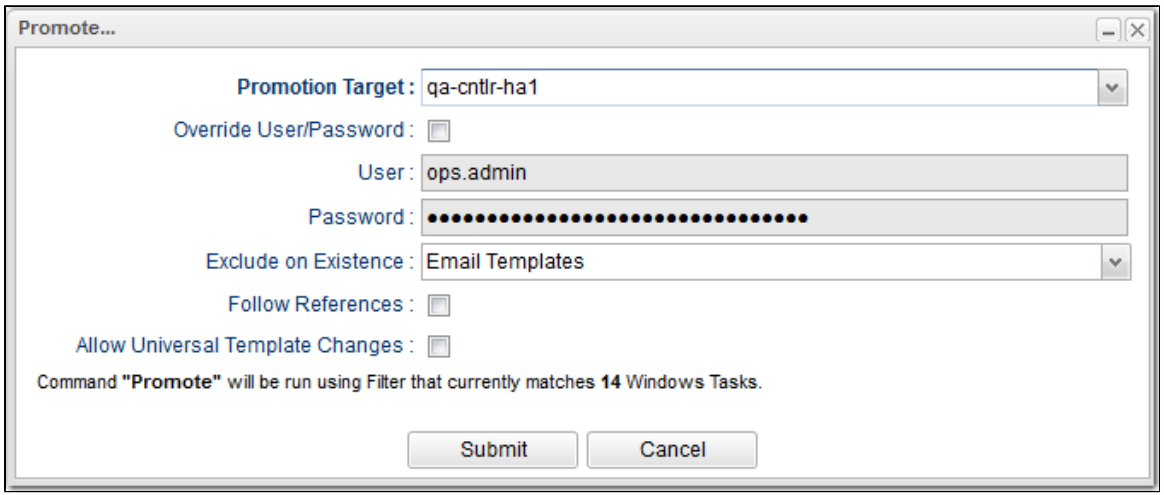
> **Note**
> You can only create a Promotion Schedule for a Bundle of records, not one or more individual records.

Step 1	Display the records list for the type of record that you want to promote.
Step 2	Select the record(s) that you want to promote. **To promote a single record, either:** • Right-click the record to display an Action menu, and then click **Promote**. • Display the record Details, right-click the Details to display an Action menu, and then click **Promote**. The Promote dialog displays, prompting you to select the Promotion Target from a drop-down list. Select the target.  **To promote multiple records, either:** Ctrl-click the records you want to promote, right-click any of the selected records to display an Action menu, and then click **Promote**. The Promote dialog displays, prompting you to select the Promotion Target from a drop-down list. Select the target.



OR

From any tasks list, right-click any column header for the list, display the Action menu, and select Run Command On Filtered > Promote.... The Promote dialog displays, prompting you to

	select the Promotion Target from a drop-down list. Select the target. 
Step 4	The default login ID and password will be provided from the Promotion Target record. If you want to override the default, click **Override User/Password** and type in the new information.
Step 5	Select **Exclude on Existence** if you want to specify record types in the promotion payload that will not be updated if they exist on the target payload. You can: • Select one or more record types from the drop-down list. • Click **Check All** above the list to select all record types. • Click **Uncheck All** above the list to de-select all record types. The Bundle Exclude On Existence Picker Default Universal Controller system property specifies which record types, if any, will be selected by default in the drop-down list.
Step 6	Select **Follow References** if you want to dynamically include records that are referenced by these records. (See Records Promoted When Follow References is Selected or Not Selected.)
Step 7	If the promotion contains new or modified Universal Templates, click **Allow Universal Template Changes**; otherwise, the promotion will not succeed. See Diagnosing Promotion Failures for details.
Step 8	Click **Submit**. The Controller logs in to the target machine specified in the URI field of the Promotion Target Record and copies the selected records to the target machine.

This process creates audit records on the source and target machines. On the target machine, the Controller also creates a Promotion History record.

Promoting Universal Tasks and Universal Templates

The following conditions apply for the promotion of Universal Tasks and Universal Templates:

Subject	Condition
Universal Template	For any Universal Task included in a promotion, its corresponding Universal Template automatically will be included in the promotion.

Universal Template Changes	In order to promote a new Universal Template or a Universal Template change, the promotion must be performed with the Allow Universal Template Changes field enabled on the Promote Bundle... dialog or the Promote... dialog; otherwise, the promotion will fail. See Diagnosing Promotion Failuress for details. The Allow Universal Template Changes field is visible on each dialog only if the user has the ops_admin role role or the ops_universal_template_admin role, and at least one Universal Template is configured within the source system.
Universal Template Changes	Universal Template changes will be listed under under Non-Restorable Items in the Promotion History Report.
Change Restrictions	All Restrictions on Universal Template Changes apply to any change(s) being applied on a target system with a promotion.
Promotion Failure	Any promotion that includes a Universal Task and/or a Universal Template will fail if the target system is not Universal Controller 6.4.0.0 or later.
Promotion Restore	Any promotion that includes Universal Template changes cannot be restored using the Restore Unchanged or Restore All operations of Promotion History. • Promotion History for the promotion will be flagged as not restorable; the Can Restore field in the Promotion History Details for the promotion will not be selected. • Any Universal Template change will be recorded as a Promotion History Item, where the New Version, Previous Version, and Source Version fields are blank.
Follow References	If the **Follow References** field is enabled for a promotion, the following references are followed for Universal Templates: Agent Cluster (or Broadcast Cluster), Credentials, and Credential Field Type (if a default value has been defined). See Records Promoted When Follow References is Selected or Not Selected.
Follow References	If the **Follow References field** is enabled for a promotion, the following references are followed for Universal Tasks: Agent Cluster (or Broadcast Cluster), Credentials, and any fields that match a Universal Template Credential Field Type, in additional to the references inherited by all Task Types. See Records Promoted When Follow References is Selected or Not Selected.
Child Audit	For any promoted Universal Template change, a child audit captures the Universal Template Properties, Fields, and Field Choices in the Before, After, and Difference fields.
Child Audit	For any promoted Universal Task, a child audit captures the Before, After, and Difference fields based on the original, incoming, and combination of original and incoming Universal Templates, respectively.

Diagnosing Promotion Failures

The following error messages are provided for various promotion failure scenarios.

Note
For a Bundle promotion, the beginning of each error message is: *Promotion of bundle "bundle-name" failed with the following error(s):*

For a Bundle-less promotion, the beginning of each error message is: *Promotion failed with the following error(s):*

Error Message	Diagnosis
Acceptance of bundle "<bundle-name>" from <node-id> prohibited because a payload from a bundle with the same name is currently being processed by another Universal Controller process.	Accept Bundle command invoked on the target for a bundle with a bundle name for which another Universal Controller process has already acquired a lock.

Bundle "Member of Business Services" option requires a minimum promotion target release level of 6600.	Attempt to promote a Bundle that is a member of a Business Service to a target that is not 6.6.0.0. or higher.
Cluster node information could not be determined for the promotion target because the host is unknown (hostname).	Invalid hostname.
Cluster node information could not be determined for the promotion target (Connection refused: connect).	Valid hostname, but no service to accept the connection.
Cluster node information could not be determined for the promotion target because the Web Service is unavailable; the target Universal Controller may still be initializing.	Attempt to promote to a target Universal Controller that is still initializing (starting up).
Cluster node information could not be determined for the promotion target because the user is not authorized; please verify the promotion target user and password.	Invalid user name and/or password.
Cluster node information could not be determined for the promotion target because the user is not authorized for Web Service Access; please verify the promotion target user has Web Service Access enabled.	Valid user name and password, but the user is not authorized for Web Service Access.
Cluster node release level for the promotion target could not be determined and one or more items being promoted require a minimum release level of 6300.	Attempt to promote to a pre-6.3.0.0 release from a 6.3.0.0 or later release.
Cluster node release level for the promotion target is 6xxx, which does not meet the required release level of 6xxx.	Attempt to promote a definition, or a definition using a particular feature, that is not recognized by the promotion target. This message will be followed by one or more messages, each detailing a specific definition or specific feature used by a definition that is not recognized by the promotion target. For example: *Cluster node release level for the promotion target is 6403, which does not meet the required release level of 6420.* *Windows Task "Resolve Name Immediately" option requires a minimum promotion target release level of 6420.* *Web Service Tasks require a minimum promotion target release level of 6410.* **OR** *Cluster node release level for the promotion target is 6601, which does not meet the required release level of 6700.* *<task-type> Task "Cluster Broadcast Variable" option requires a minimum promotion target release level of 6700.*
Command Accept Bundle prohibited due to security constraints.	Valid user name and password, but the user is not authorized for the Accept Bundle command, which requires the ops_promotion_admin role.
Command Accept Bundle prohibited due to security constraints. User on target server requires "ops_bundle_admin" role if "Promote Bundle Definition" option is enabled.	Valid user name and password, but the user is not authorized for the Accept Bundle command with the Promote Bundle Definition option enabled, which requires both the ops_promotion_admin role and the ops_bundle_admin role.*

Command Promote (or Promote Bundle) has been routed to the Active server and continues to run in the background.	Promote (or Promote Bundle) command was issued to a Passive server and routed to the Active server, where the Promote (or Promote Bundle) command will run, however, the Promote (or Promote Bundle) command did not complete within approximately 2 minutes. The Promote (or Promote Bundle) command will continue to run in the background and the Audit can be consulted to determine the outcome of the command.
Credential "<credential-name>" cannot be promoted because web service credentials are not permitted; Universal Controller property Web Service Credentials Permitted is not enabled.	Attempt to promote to a target Controller where the Web Service Credentials Permitted Universal Controller system property is set to false.
Promoted {EMAIL CONNECTION: Incoming} with name "Gmail" and id 04e5e1074c1f42908d9b3f62f36fff50 is a different type than the original {EMAIL CONNECTION: Outgoing} with name "Gmail" and id 195fc662df8447dc90dec02ea8be0cb4	Attempt to promote an Incoming email connection type and the email connection on the target system is an Outgoing email connection type.
Promoted {EMAIL CONNECTION: Outgoing} with name "Gmail" and id ab36222512cf4ae4afa7e59a8ccbd684 is a different type than the original {EMAIL CONNECTION: Incoming} with name "Gmail" and id a037048f7c4b4e3f9e8691e3f664e5a7	Attempt to promote an Outgoing email connection type and the email connection on the target system is an Incoming email connection type.
Promoted {TASK: Universal} with name "ABC", id 8ee785079fcc4142873486e921bfe789, and universal template id 04cbe858ba7a4bc8bdb26202f359e318 has a different universal template id than the original "ABC" with id 8ee785079fcc4142873486e921bfe789, and universal template id 04cbe858ba7a4bc8bdb26202f359e319.	Attempt to promote a Universal Task with an associated Universal Template that is not equivalent to the Universal Template associated with the target Universal Task.
Promoted {TASK: Universal, TaskUniversalBean} with name "ABC" and id 8ee785079fcc4142873486e921bfe789 is a different type and/or class than the original {TASK: Timer, TaskSleepBean} with name "ABC" and id dfbd23df8ab24b2a9a0891ae2f8ca22f.	Attempt to promote any item of a specific type (or Java class) that matches another item of a different type (or Java class).
Promotion of bundle "<bundle-name>" with id <bundle-uuid> prohibited because the bundle is in use by another Universal Controller process.	Promote Bundle command invoked on the source for a bundle with a bundle id for which another Universal Controller process has already acquired a lock.
Promotion Schedule operation for bundle "<bundle-name>" with id <bundle-uuid> prohibited because the bundle is in use by another Universal Controller process.	Schedule Promotion command requires the bundle id lock, but another Universal Controller process has already acquired that lock.
Promotion target "promotion-target-name" has routed the promotion payload to the Active server and the Accept Bundle command continues to run in the background.	Upon receiving the promotion payload, the promotion target determined it was a Passive server and routed the payload to the Active server, where the Accept Bundle command will run, however, the Accept Bundle command did not complete within approximately 2 minutes. The Accept Bundle command will continue to run in the background and the Audit can be consulted to determine the outcome of the command.
Promotion to an earlier release only supported for target releases starting with 6300.	Attempt to promote to a pre-6.3.0.0 release from a 6.3.0.0 or later release.
Protocol <protocol name> is not allowed since it is being excluded by Universal Controller property "File Transfer Task Exclude Protocols".	Attempt to promote a File Transfer Task that has a protocol currently being excluded by the target server.
Protocol <protocol name> is not allowed since it is being excluded by Universal Controller property "FTP File Monitor Task Exclude Protocols".	Attempt to promote an FTP File Monitor Task that has a protocol currently being excluded by the target server.
SAP Connection "Client" option requires a minimum promotion target release level of 6700.	Attempt to promote an SAP Connection to a release prior to 6.7.0.0 when the Connection Type is Load Balancing and a Client is specified.
SAP Task "<job-id-field-name>" requires a minimum promotion target release level of 6450 when unspecified.	Attempt to promote an SAP Task with an unspecified SAP Job ID field to a pre-6.4.5.0 release of the Controller.

Script "<script-name>" cannot be promoted because scripts are not permitted; Universal Controller property "Windows/Linux Scripts Permitted" is not enabled.	Attempt to promote a **Script** Script Type from a source server to a target server, where the target server is configured with the Windows/Linux Scripts Permitted Universal Controller system property set to false.
<task-type> Task "Exit Codes" requires a minimum promotion target release level of 6700 when unresolved.	Attempt to promote a task with an unresolved Exit Codes field to a release prior to 6.7.0.0.
<task-type> Task "Retry Exit Codes" requires a minimum promotion target release level of 6700 when unresolved.	Attempt to promote a task with an unresolved Retry Exit Codes field to a release prior to 6.7.0.0.
Unable to promote {APPLICATION: Windows Service} with name "<application-name>" and id 0f84fbb388c04bd09a2c7d5a0ac06c70 because an application cannot be promoted with a name change while generated application control tasks are being excluded.	Attempt to promote an Application with a name change while excluding generated Application Control Tasks.
Unable to promote <credential-type> credential "<credential-name>" since original Resolvable credential is referenced by one or more Universal Tasks.	Attempt to promote a Credential that has been converted from a Resolvable type and at least one reference on the target system by a Universal Task requires it to remain a Resolvable type.
Unable to promote <credential-type> credential "<credential-name>" since original Resolvable credential is specified as a default value for one or more Universal Template Fields.	Attempt to promote a Credential that has been converted from a Resolvable type and at least one reference on the target system by a Universal Template Field default value requires it to remain a Resolvable type.
Unable to promote <credential-type> credential "<credential-name>" since original Web Service credential is referenced by one or more Web Service Tasks.	Attempt to promote a Credential that has been converted from a Web Service type and at least one reference on the target system by a Web Service Task requires it to remain a Web Service type.
Unable to promote {CUSTOM DAY} with name "<custom-day-name>" and id 343f68c60cef48279647a45055349c47 because global custom days are not permitted; Universal Controller property "Custom Day Global Permitted" is not enabled.	Attempt to promote a global Custom Day when the Custom Day Global Permitted system property is set to **false**.
Unable to promote {SCRIPT: Web Service Payload} with name "Data2.txt" and id 1a9f0bbad53b4ca9a6d6076c5970586e since original {SCRIPT: Data} with name "Data2.txt" and id 1a9f0bbad53b4ca9a6d6076c5970586e is referenced by one or more Universal Tasks.	Attempt to promote a non-Data script type and the script on the target system is a Data script type currently referenced by a Universal Task (unless all references are included in the promotion payload).
Unable to promote {SCRIPT: Script} with name "Data1.txt" and id c78a9fe3748549808ac5f6248eb4bcc2 since original {SCRIPT: Data} with name "Data1.txt" and id 4d7d06e87aef4461aeabbb21191b4c61 is specified as a default value for one or more Universal Template Fields.	Attempt to promote a non-Data script type and the script on the target system is a Data script type currently referenced by a Universal Template (via Universal Template Field).
Unable to promote {TASK: Application Control} with name "<application-name> #QUERY#" and id e9632e6024324d619b3122832e84c8b0 because a generated application control task cannot be promoted with a name change while applications are being excluded.	Attempt to promote a generated Application Control Task with a name change while excluding Applications.
Universal Template "<template-name>" cannot be promoted because [it is a new template | the template has changed] and the promotion was performed without the "Allow Universal Template Changes" option enabled. Universal Template changes must be promoted by a user with either the "ops_universal_template_admin" role or the "ops_admin" role and with the Allow Universal Template Changes option enabled.	Attempt to promote a new or changed Universal Template without proper authorization or with proper authorization but without proper option usage.
Universal Template "<template-name>" cannot be promoted because [it is a new template | the template has changed] and the promotion user does not have either the "ops_universal_template_admin" role or the "ops_admin" role required to perform the promotion with the "Allow Universal Template Changes" option enabled.	Attempt to promote a new or changed Universal Template without proper authorization (on Promotion Target) but with proper option usage.

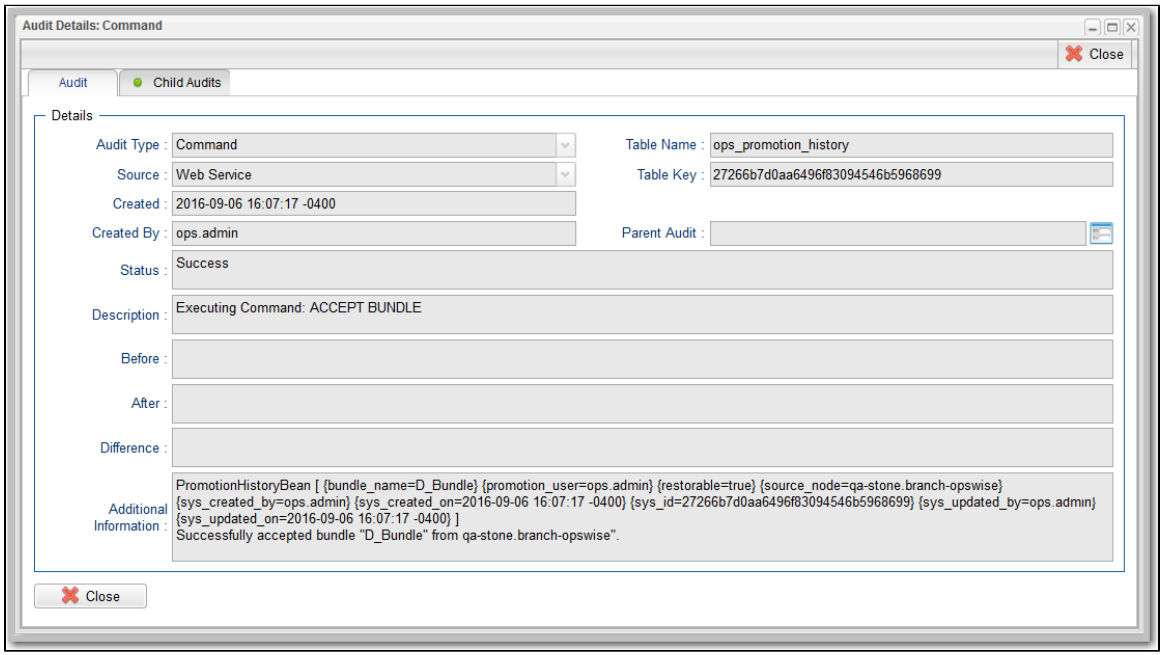
Promotion Audit Records

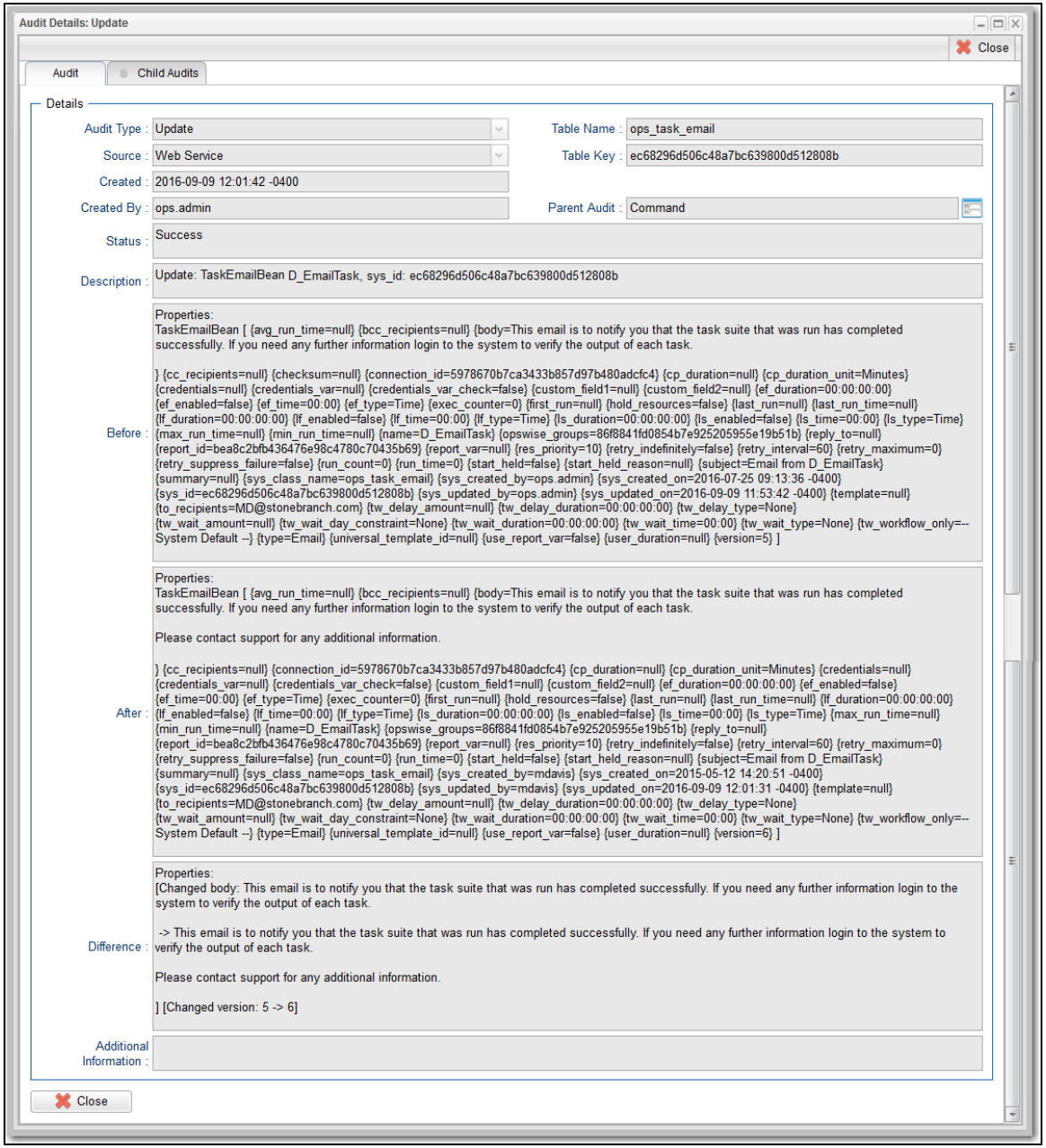
Whenever a Bundle or an individual record is promoted to a target machine, the Controller creates audit records on both the source and target machines.

On the source machine, each time you promote a record or a Bundle, the Controller creates a single audit record for that event. If you promoted a Bundle, the audit description is PROMOTE BUNDLE; if you promoted a single record or multiple records, the audit description is PROMOTE.

On the target machine, the Controller creates an ACCEPT BUNDLE audit record, along with child audit records associated with that promotion (either record[s] or a Bundle). These may include UPDATE commands for records that existed on the target already and CREATE commands for records that did not previously exist.

The following examples show an ACCEPT BUNDLE record on a target machine and a Child Audit record for a task included in the Bundle promotion.





For detailed information on audit record, see Audits.

Promotion Schedules

- Overview
- Viewing Promotion Schedule Details
- Promotion Schedule Details Field Descriptions
- Modifying and/or Rescheduling a Promotion Schedule
- Modifying and/or Rescheduling a Successfully Promoted Promotion Schedule
- Cancelling a Promotion Schedule

Overview

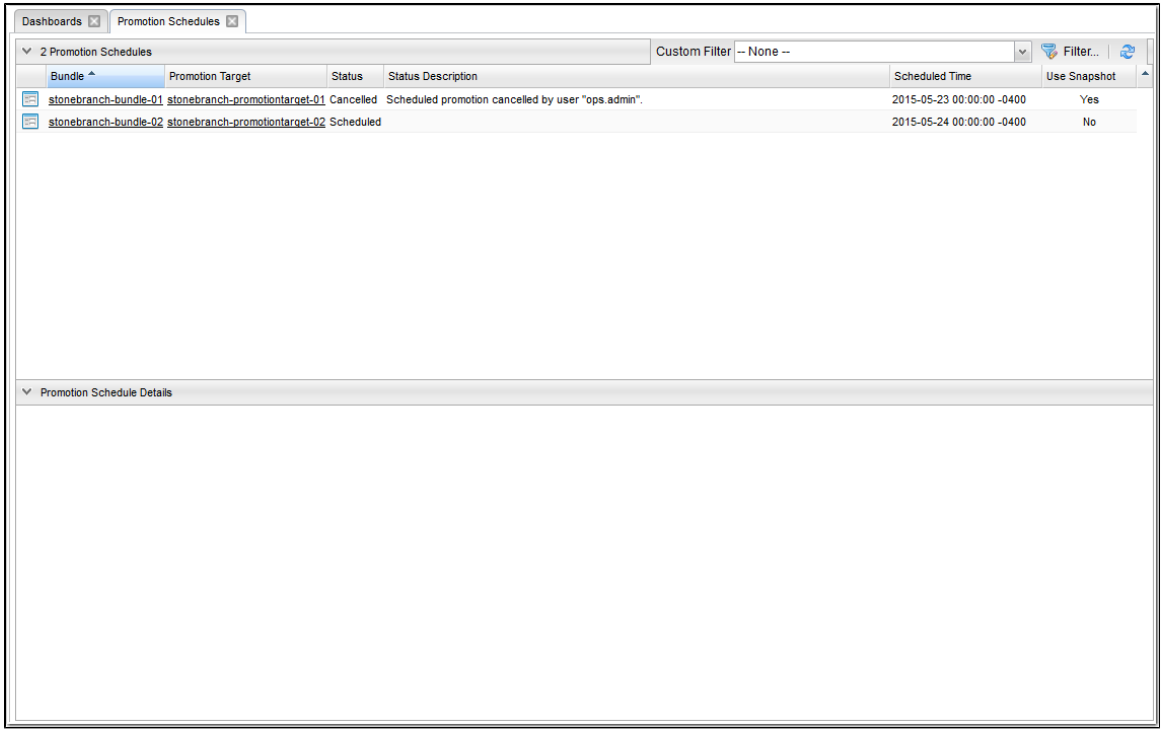
If you schedule a promotion to be run at a later time on the Promote Bundle... dialog, the Controller creates a record for that promotion.

The Promotion Schedules list identifies all scheduled promotions.

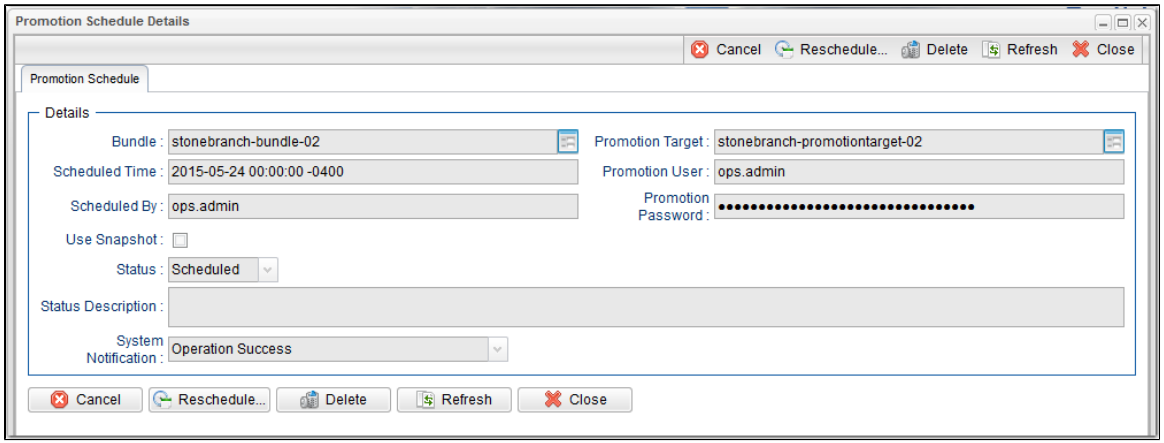
It also lists all scheduled promotions that have completed (where they can be rescheduled to run again) for the number of days specified by the Promotion Schedule Retention Period In Days Universal Controller system property.

Viewing Promotion Schedule Details

Step 1 From the Bundles & Promotion navigation pane, select **Promotion Schedules**. The Promotion Schedules list displays a list of all Bundles that have been scheduled for promotion.



Step 2 Click the Details icon next to a Promotion Schedule in the list, or click anywhere in the Promotion Schedule row, to display Details for that Promotion Schedule.



Although all of the fields in the Promotion Schedule Details display as read-only, you change the values of all fields (except **Status** and **Status Description**) by clicking the **Reschedule...** button (see Modifying and/or Rescheduling a Promotion Schedule, below).

See the field descriptions, below, for details about all fields in the Promotion Schedule Details.

Promotion Schedule Details Field Descriptions

The following table describes the fields and buttons in the Promotion Schedule Details.

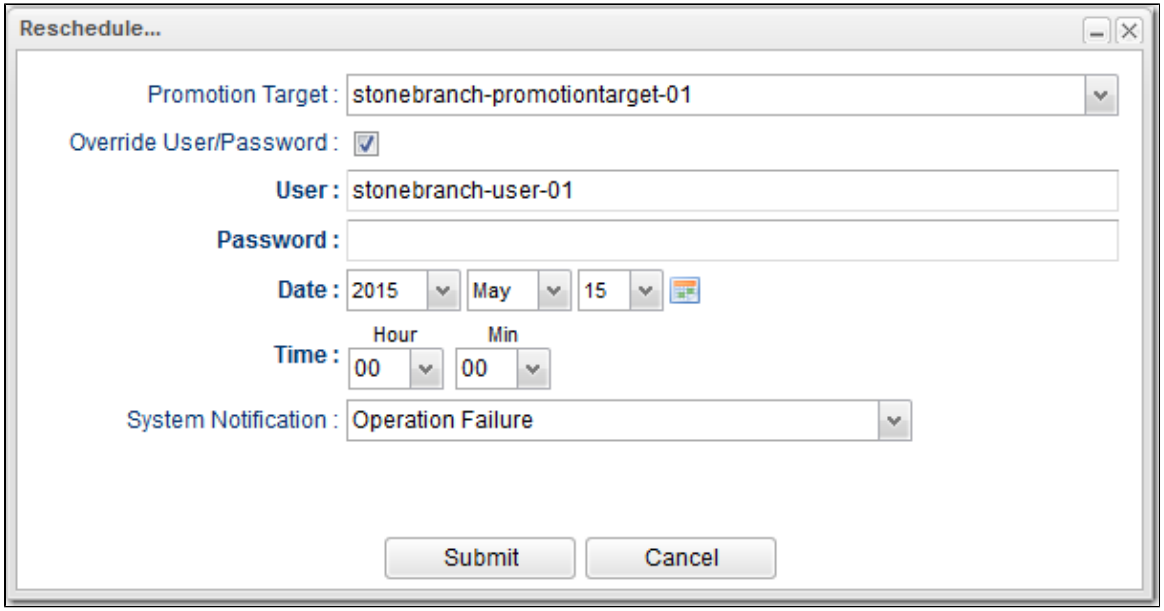
Field Name	Description
Details	This section contains detailed information about the scheduled promotion.
Bundle	Name of the Bundle scheduled for promotion. You can click the icon next to the Bundle name to view (and edit) the Details for that Bundle.
Scheduled Time	Date and time the bundle is scheduled for promotion.
Schedule By	User Id of the user that scheduled the promotion of the bundle.
Promotion Target	Cluster Node of a Universal Controller to which the Bundle is scheduled for promotion. You can click the icon next to the Promotion Target name to view (and edit) the Details for that Promotion Target.
Promotion User	User Id of the promotion user that the scheduled promotion will use to promote the bundle.
Promotion Password	Password of the promotion user that the scheduled promotion will use to promote the bundle.
Use Snapshot	Indication of whether or not the promotion is scheduled to be performed using a snapshot of the Bundle records taken at the time the promotion was scheduled.

Status	System-defined; Current status of this Promotion Schedule. Values: • Scheduled • Cancelled • Running • Failure • Promoted
Status Description	System-defined; Description of the current **Status**.
System Notification	Options for when a System Notification will be sent. Options: • - - None - - • Operation Failure • Operation Success/Failure • Operation Success
Metadata	This section contains Metadata information about this record.
UUID	Universally Unique Identifier of this record.
Updated By	Name of the user that last updated this record.
Updated	Date and time that this record was last updated.
Created By	Name of the user that created this record.
Created	Date and time that this record was created.
Buttons	This section identifies the buttons displayed above and below the Promotion Schedule Details that let you perform various actions.
Cancel	Changes a scheduled promotion **Status** from Scheduled to Cancelled.
Reschedule...	Allows you to edit the Promotion Schedule Details (see Modifying and/or Rescheduling a Promotion Schedule, below).
Delete	Cancels and deletes the Promotion Schedule; **Delete** is prohibited while Status is Running.
Refresh	Refreshes any dynamic data displayed in the Details.
Close	For pop-up view only; closes the pop-up view of these Details.

Modifying and/or Rescheduling a Promotion Schedule

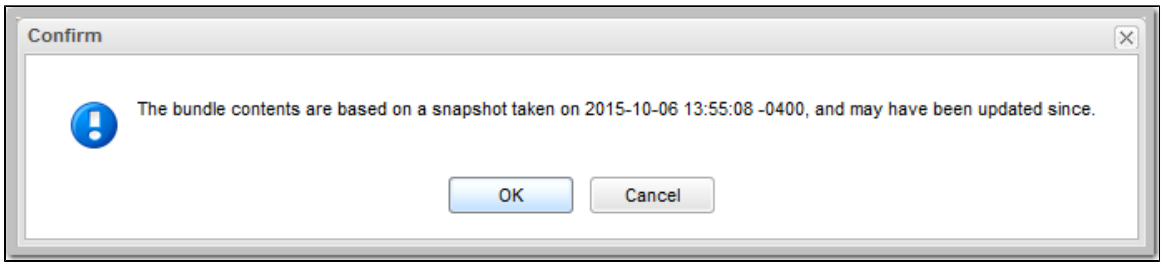
You can modify and/or reschedule a Scheduled, Cancelled, or Failed promotion schedule.

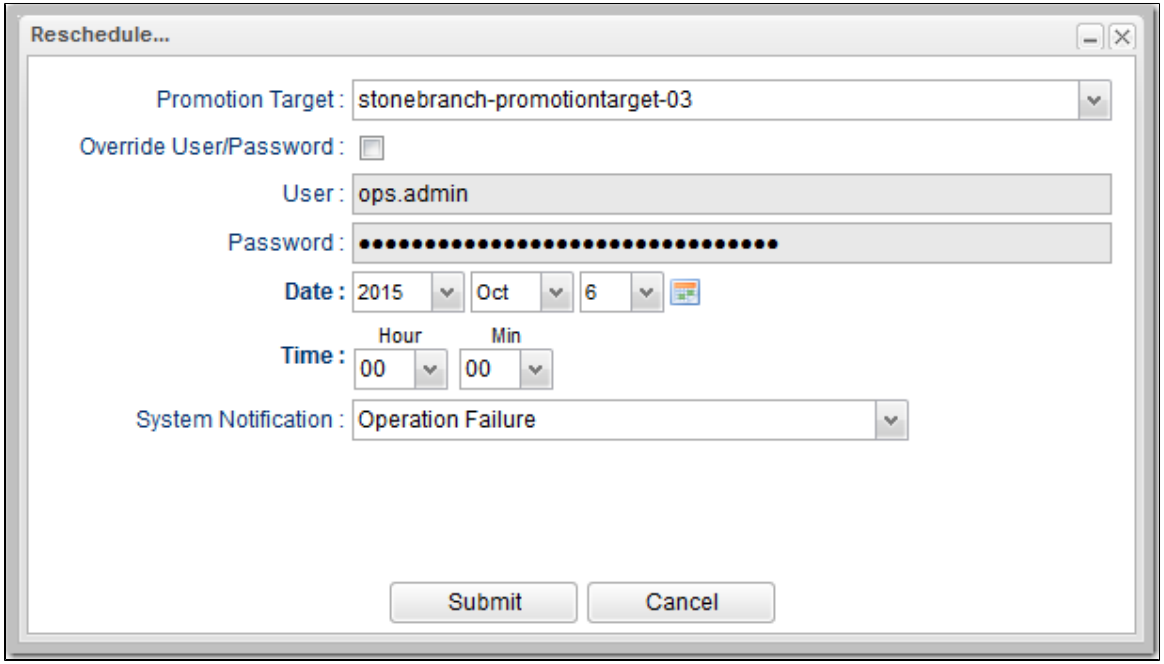
For modifying and/or rescheduling a successfully promoted promotion schedule, see Modifying and/or Rescheduling a Successfully Promoted Promotion Schedule.

Step 1	From the Bundles & Promotion navigation pane, select **Promotion Schedules**. The Promotion Schedules list displays a list of all Bundles that have been scheduled for promotion.
Step 2	Display an action menu for a Promotion Schedule and click **Reschedule...**, or open a Promotion Schedule record and either: • Click the **Reschedule...** button in the Promotion Schedule Details. • Display an action menu for the Promotion Schedule and click **Reschedule...**. The **Reschedule...** pop-up dialog displays.  By default, the following Details for the cancelled Promotion Schedule are changed on the **Reschedule...** pop-up dialog when it displays: • **Date** is reset to the current date. • **Time** is reset to 00:00. The **Reschedule...** pop-up dialog will prompt for the User/Password fields if the promotion was originally scheduled with the Override User/Password option, or if the Promotion Target does not have a default User and/or Password defined.
Step 3	Enter / reenter new specifications for the Promotion Schedule.
Step 4	Click the **Submit** button to apply your re-scheduling changes to the Promotion Schedule. The status of the Promotion Schedule automatically changes to Scheduled (or remains in the Scheduled status) when you submit rescheduling changes.

Modifying and/or Rescheduling a Successfully Promoted Promotion Schedule

You can modify and/or reschedule a successfully promoted promotion schedule only if the promotion schedule was specified to use a snapshot.

Step 1	From the Bundles & Promotion navigation pane, select **Promotion Schedules**. The Promotion Schedules list displays a list of all Bundles that have been scheduled for promotion. You can identify successfully promoted snapshot Bundles by the following columns on the list: • Status = Promoted • Use Snapshot = Yes
Step 2	Display an action menu for a Promotion Schedule on the list and click **Reschedule...**, or open the Promotion Schedule and either: • Click the **Reschedule...** button in the Promotion Schedule Details. • Display an action menu for the Promotion Schedule and click **Reschedule...**. A confirmation pop-up displays. For example: 

Step 3	Click **OK** to confirm that you want to re-promote the selected snapshot Bundle. The **Reschedule...** pop-up dialog displays:  By default, the following Details for the Promotion Schedule are changed on the **Reschedule...** pop-up dialog when it displays: • **Date** is reset to the current date. • **Time** is reset to 00:00. The **Reschedule...** pop-up dialog will prompt for the User/Password fields if the promotion was originally scheduled with the Override User/Password option, or if the Promotion Target does not have a default User and/or Password defined.
Step 4	Enter / reenter new specifications for the Promotion Schedule.
Step 5	Click the **Submit** button to apply your re-scheduling changes to the Promotion Schedule. The status of the Promotion Schedule automatically changes from **Promoted** to **Scheduled** when you submit rescheduling changes.

Cancelling a Promotion Schedule

You can cancel a Promotion Schedule without deleting its Promotion Schedule record.

Cancelled Promotion Schedule records will continue to be listed on the Promotion Schedules list.

Step 1	From the Bundles & Promotion navigation pane, select **Promotion Schedules**. The Promotion Schedules list displays a list of all Bundles that have been scheduled for promotion.
Step 2	Display an action menu for a Promotion Schedule on the list and click **Cancel**, or open the Promotion Schedule and either: • Click the **Cancel** button. • Display an action menu for the Promotion Schedule and click **Cancel**. The **Status** of the Promotion Schedule in the Promotion Schedule list will change from **Scheduled** to **Cancelled**, and a **Status Description** for that cancelled Promotion Schedule will display.

To reschedule a **Cancelled** Promotion Schedule, see Modifying and/or Rescheduling a Promotion Schedule.

Promotion History and the Restore Option

- Overview
- Accessing Promotion History Records
- Promotion History Details Field Descriptions

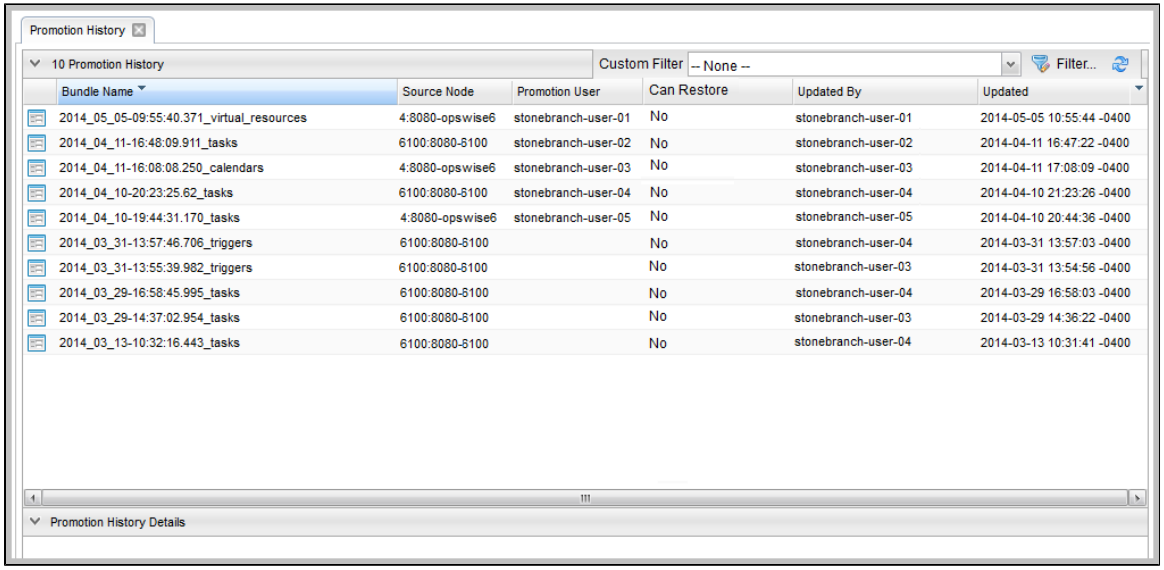
Overview

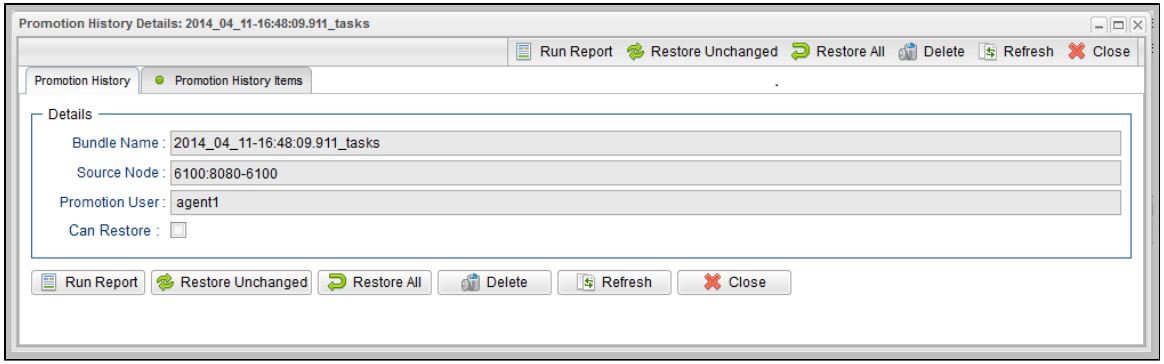
The Controller creates a Promotion History record each time a Bundle (or record) is promoted to a target Controller.

Accessing Promotion History Records

To access a Promotion History record on the target Controller:

Step 1 From the Bundles & Promotion navigation pane, select **Promotion History**. The **Promotion History** list displays.



Step 2	Click anywhere in the row of a Bundle on the list, or click the icon next to the **Bundle Name** of a Bundle, to display Promotion History Details for that Bundle. 
Step 3	To see a list of all records included in the promoted Bundle, click the **Promotion History Items** tab.
Step 4	You can restore records to the state they were in before the promotion. This applies only to records being updated by the promotion, not those being created by a promotion. See the field descriptions below for details.

Promotion History Details Field Descriptions

The fields on the Promotion History Details are system-supplied and read-only.

Field Name	Description
Details	This section contains detailed information about the promoted Bundle (or record).
Bundle Name	Name of this record.
Source Node	Machine name or URI of the machine where the source Universal Controller system is running.
Promotion User	User ID of the user who promoted the bundle or record(s).

Can Restore	Specification for whether or not records in the bundle that already existed on the target server can be restored to their state prior to the promotion. **Note** Any promoted Bundle that includes Universal Template changes cannot be restored. The Promotion History for the promotion will be flagged as not restorable. The Universal Template changes will be listed as Promotion History Items with blank New Version, Previous Version, and Source Version fields.
Metadata	This section contains Metadata information about this record.
UUID	Universally Unique Identifier of this record.
Updated By	Name of the user that last updated this record.
Updated	Date and time that this record was last updated.
Created By	Name of the user that created this record.
Created	Date and time that this record was created.
Buttons	This section identifies the buttons displayed above and below the Promotion History Details that let you perform various actions.
Run Report	Generates a one page summary of the contents of the bundle.
Restore Unchanged	For records that already existed on the target server, you can restore them to their state prior to the promotion. The **Restore Unchanged** button restores only those records that have not been changed since the promotion updated the record. For records that were created on the target machine by the promotion, no changes will occur since no previous version exists. (See Can Restore.)
Restore All	For records that already existed on the target server, you can restore them to their state prior to the promotion. The **Restore All** button restores all records that were updated by the promotion, including records that were modified since the promotion. For records that were created on the target machine by the promotion, no changes will occur since no previous version exists. (See Can Restore.)
Delete	Deletes the current record.
Refresh	Refreshes any dynamic data displayed in the Details.
Close	For pop-up view only; closes the pop-up view of this record.
Tabs	This section identifies the tabs across the top of the Promotion History Details that provide access to additional information about the promotion.

Promotion History Items	Lists all the records promoted as part of this Bundle. Each record in the list provides the name and type of the record, the latest version number on the target, the previous version number on the target, and the source version number.

Records Promoted When Follow References is Selected or Not Selected

Introduction

The following table identifies the Records that automatically will be included in the promotion payload (Bundle or single record) when Follow References is selected and when Follow References is not selected.

The table is in the following format:

Record Type	With Follow References	Without Follow References
The record type being promoted.	For the record type being promoted, the records that automatically will be included in the promotion payload when Follow References is selected for the promotion.	For the record type being promoted, the records that will automatically be included in the promotion payload when the Follow References is not selected for the promotion.

Note
A Reference refers to the reference (or use) of one record by another record; for example, an Email Task references (or uses) an Email Connection.

Record Type	With Follow References	Without Follow References
Agent Clusters	none	none
Applications	• Application Control Tasks (both system-generated and custom Application Control Tasks) • Business Services • Credentials	• Application Control Tasks (system-generated Application Control Tasks)
Business Services	none	none
Calendars	• Business Services • Custom Days	• Custom Days
Credentials	• Business Services	none
Custom Days	none	none

Database Connections	• Business Services • Credentials	none
Email Connections	• Business Services	none
Email Templates	• Business Services • Email Connections	none
SAP Connections	• Business Services	none
Scripts	• Business Services	none
SNMP Managers	• Business Services	none

Tasks	• Action: Email Notification - Email Connections • Action: Email Notification - Email Templates • Action: SNMP Notification - SNMP Managers • Action: System Operation = Set Virtual Resource Limit - Virtual Resources • Action: System Operation = Suspend/Resume Agent Cluster - Agent Clusters or Cluster Broadcast • Action: System Operation = Suspend/Resume Agent Cluster Membership - Agent Clusters or Cluster Broadcast • Action: System Operation = Set Agent Cluster Execution Limit - Agent Clusters or Cluster Broadcast • Action: System Operation = Run Task Instance Command - Tasks • Agent Clusters or Cluster Broadcast • Applications (Application Control tasks only) • Business Services • Child Tasks (Workflow tasks only) • Credentials (Note: Some task types can contain multiple Credentials.) • Database Connections (SQL and Stored Procedure tasks only) • Default Calendars (Workflow tasks only) • Email Connections (Email tasks only) • Email Templates (Email tasks only) • Mutually Exclusive Tasks (Direct) • Run Criteria - Custom Days Choice (Workflow tasks only) • Run Criteria - System Calendar (Workflow tasks only, without a Default Calendar and with Run Criteria specifying a Custom Day Choice) • SAP Connections (for SAP Tasks) • Scripts • Step Action: System Operation = Set Virtual Resource Limit - Virtual Resources (Workflow tasks only) • Step Action: System Operation = Suspend/Resume Agent Cluster - Agent Clusters or Cluster Broadcast (Workflow tasks only) • Step Action: System Operation = Suspend/Resume Agent Cluster Membership - Agent Clusters or Cluster Broadcast (Workflow tasks only) • Step Action: System Operation = Set Agent Cluster Execution Limit - Agent Clusters (Workflow tasks only) • Step Action: System Operation = Task Instance Command - Tasks (Workflow tasks only) • Task to Monitor (Task Monitor tasks only) • Virtual Resources	Child Tasks (Workflow tasks only)
Triggers	• Business Services • Calendars • Tasks	none
Universal Tasks	• Agent Clusters • Credentials • Any fields that match a Universal Template Credential Field Type • (Same as all other task types.)	none
Universal Templates	• Agent Clusters • Credentials • Credential Field Type (if a default value has been defined)	none

Variables	• Business Services	none
Virtual Resources	• Business Services	none