System

Universal Controller 7.8.x

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Universal Controller resources are records that both define your Universal Automation Center system and that you set up to help facilitate operations:

OMS Servers	Network communication provider between Universal Controller 7.8.x and Universal Agent.
Cluster Nodes	Controller instances.
SNMP Managers	Allow you to generate SNMP notifications.
Application Resources	Define the names of applications being monitored.

9 High Availability

9.1 Introduction

High Availability (HA) of Universal Automation Center means that it has been set up to be a redundant system; in addition to the components that are processing work, there are back-up components available to continue processing through hardware or software failure.

This page describes a High Availability environment, how High Availability components recover in the event of such a failure, and what actions, if any, the user must take.

9.2 High Availability System

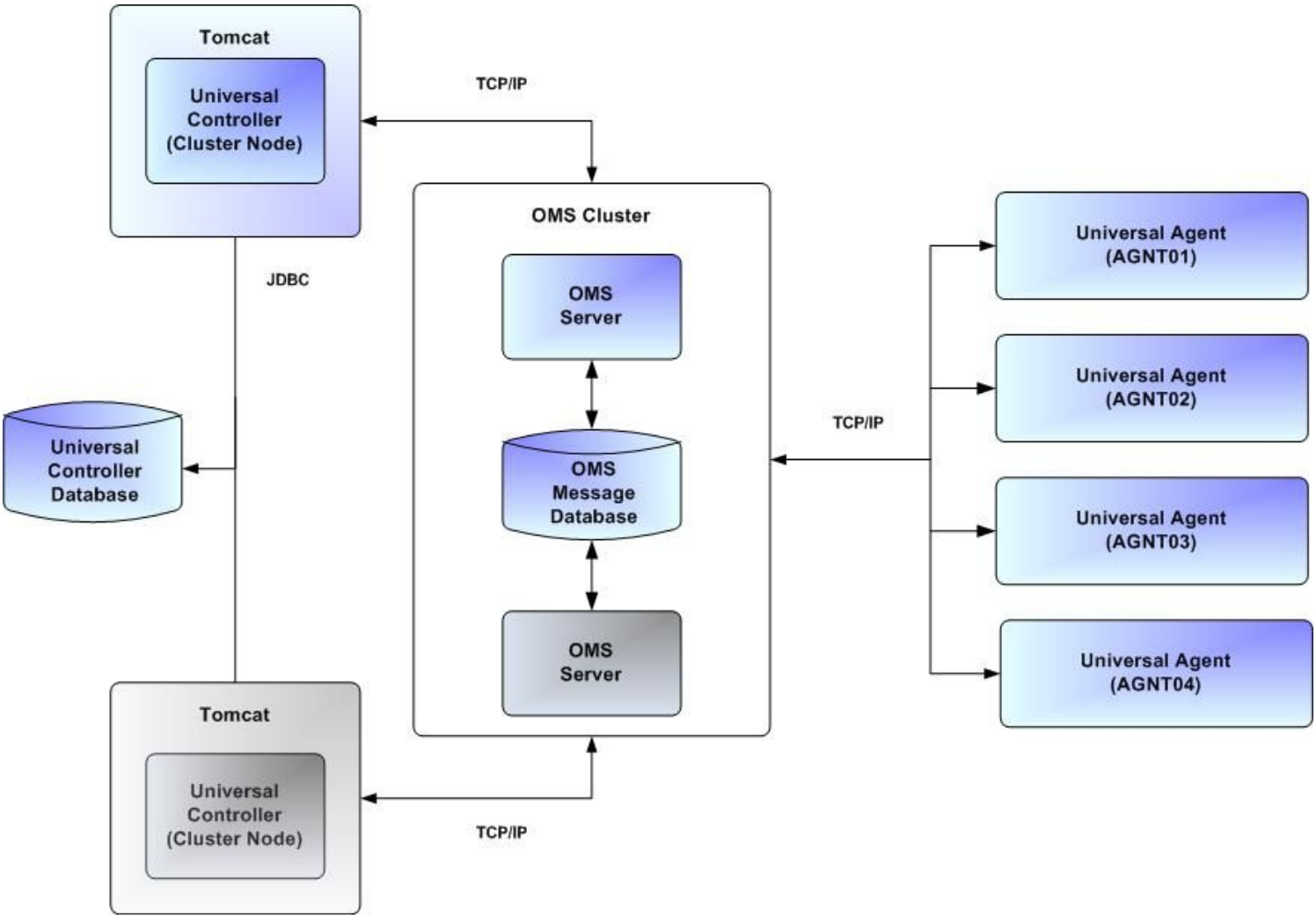
The following illustration is a typical, although simplified, Universal Automation Center system in a High Availability environment.

In this environment, there are:

- Two Universal Controller instances (cluster nodes)
- Two Universal Message Service (OMS) network communications providers in an OMS cluster

- Four Universal Agent (Agent) machines

The components in blue are active and operating. The components in gray are available for operations but currently are inactive (passive).



See High Availability Components for a detailed description of how each component type functions in a High Availability environment.

9.3 High Availability Components

This section provides detailed information on the cluster nodes and Agents in a High Availability environment.

9.3.1 Cluster Nodes

Each Universal Automation Center installation consists of one or more instances of Universal Controller; each instance is a cluster node. Only one node is required in a Universal Automation Center system; however, in order to run a High Availability configuration, you must run at least two nodes.

At any given time under High Availability, one node operates in Active mode and the remaining nodes operate in Passive mode (see Determining Mode of a Cluster Node at Start-up).

An Active node performs all system processing functions; Passive nodes can perform limited processing functions.

9.3.2 Passive Cluster Node Restrictions

Passive cluster nodes cannot execute any automated or scheduled work.

Also, from a Passive node you cannot:

- Perform a workflow instance insert task operation.
- Perform a bulk import or list import.
- Run the LDAP Refresh server operation.
- Update a task instance.
- Update or delete an enabled trigger.
- Update an enabled Data Backup/Purge.
- Update the Task Execution Limit field in Agent records.
- Update the Task Execution Limit field and Distribution field in Agent Cluster records.
- Update the user Time Zone.
- List Composite Trigger component events.

However, Passive nodes do let you perform a limited number of processing functions, such as:

- Launch tasks.
- Monitor and display data.
- Access the database.
- Generate reports.

9.3.3 Agent

The Agent runs as a Windows service or Linux/Unix daemon. A cluster node sends a request to the Agent to perform a function. The Agent processes the request, gathers data about the operation of the client machine, and sends status and results back to the node. It performs these functions by exchanging messages with the node.

Once an Agent has registered with a node, you can view it by selecting that Agent type from the Agents & Connections navigation pane of the user interface. A list displays showing all the registered Agents of that type. See Agents Overview for more information.

If an Agent fails, Universal Broker restarts it. The Agent then attempts to determine what tasks or functions were in process at the time of failure.

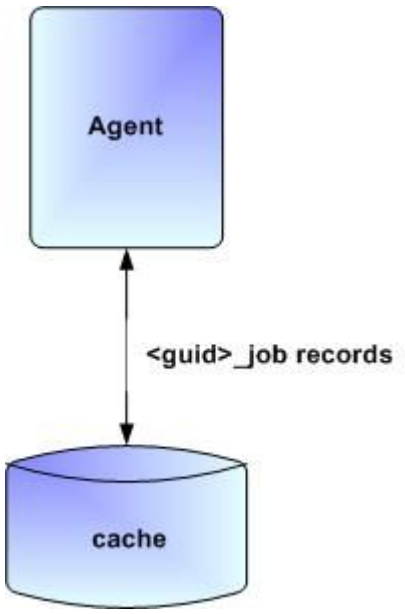
Warm Start Processing is a term used to refer to a process UAG goes through upon startup by which all task instances that were active at the time of the last shutdown (intentional or otherwise) are reviewed and proper action is taken based on state and platform.

- Task instances running on Windows and z/OS platforms are resumed when a Warm Start is attempted.
- Task instances running on Unix and Linux platforms are set to IN-DOUBT status when a Warm Start is attempted.

In order to support such a determination, Agent task processing includes the following steps:

Step 1	Each time the Agent receives a task, it writes to cache a record called `[guid]_job`, where `[guid]` is a unique tracking number assigned to the task instance.
Step 2	As the task runs, the Agent updates the `[guid]_job` record with status information.
Step 3	When the task run completes, the Agent deletes the `[guid]_job` record.
Step 4	If an Agent is restarted, it looks in the cache for `[guid]_job` records. If any are found, the Agent looks at the status. If the record indicates that the job is supposed to be running, the Agent searches the system to locate it. If the Agent is able to locate the task and resume tracking, it continues and marks the task resumed. If the Agent is not able to resume tracking a task, it returns a message to the cluster node, setting the status of the task instance to **IN-DOUBT**. This then requires manual follow-up to determine the state of the process.

As illustrated below, the Agent reads/writes a record to its agent/cache directory for each task instance that it manages.



9.3.4 Universal Message Service (OMS)

Universal Message Service (OMS) sends and receives messages between the cluster nodes and Agents.

OMS consists of an OMS Server and an OMS Administration Utility. The OMS clients - cluster nodes and Agents - establish persistent TCP/IP socket connections with the OMS Server.

OMS provides for reliable message communication by persisting all OMS queued messages to persistent storage. The OMS Server maintains OMS queues in an OMS message database that resides on persistent storage.

See Universal Message Service (OMS) for detailed information on OMS.

9.4 How High Availability Works

In a High Availability environment, passive cluster nodes play the role of standby servers to the active (primary) cluster nodes server. All running cluster nodes issue heartbeats and check the mode (status) of other running cluster nodes, both when they start up and continuously during operations. If a cluster node that currently is processing work can no longer do so, one of the other cluster nodes will take over and continue processing.

Each cluster node connects to the same Universal Controller database; however, only the Active cluster node connects to the configured OMS HA cluster. Likewise, each Agent connects to the same OMS HA cluster.

A Universal Controller HA configuration can use a single OMS server, that is not an HA cluster, with the understanding that a single OMS server would introduce a single point of failure. Using an OMS HA cluster is recommended.

See High Availability Configuration for information on how these connections are made.

9.4.1 Cluster Node Mode

The mode (status) of a cluster node indicates whether or not it is the cluster node that currently is processing work:

Active	Cluster node currently is performing all system processing functions.
Passive	Cluster Node is not connected to OMS but is available to perform all system processing functions, except that it would not be able to exchange data with an Agent.
Offline	Cluster node is not running or is inoperable and needs to be restarted.

Note

Cluster nodes in Passive mode can perform limited system processing functions.

9.4.2 High Availability Start-Up

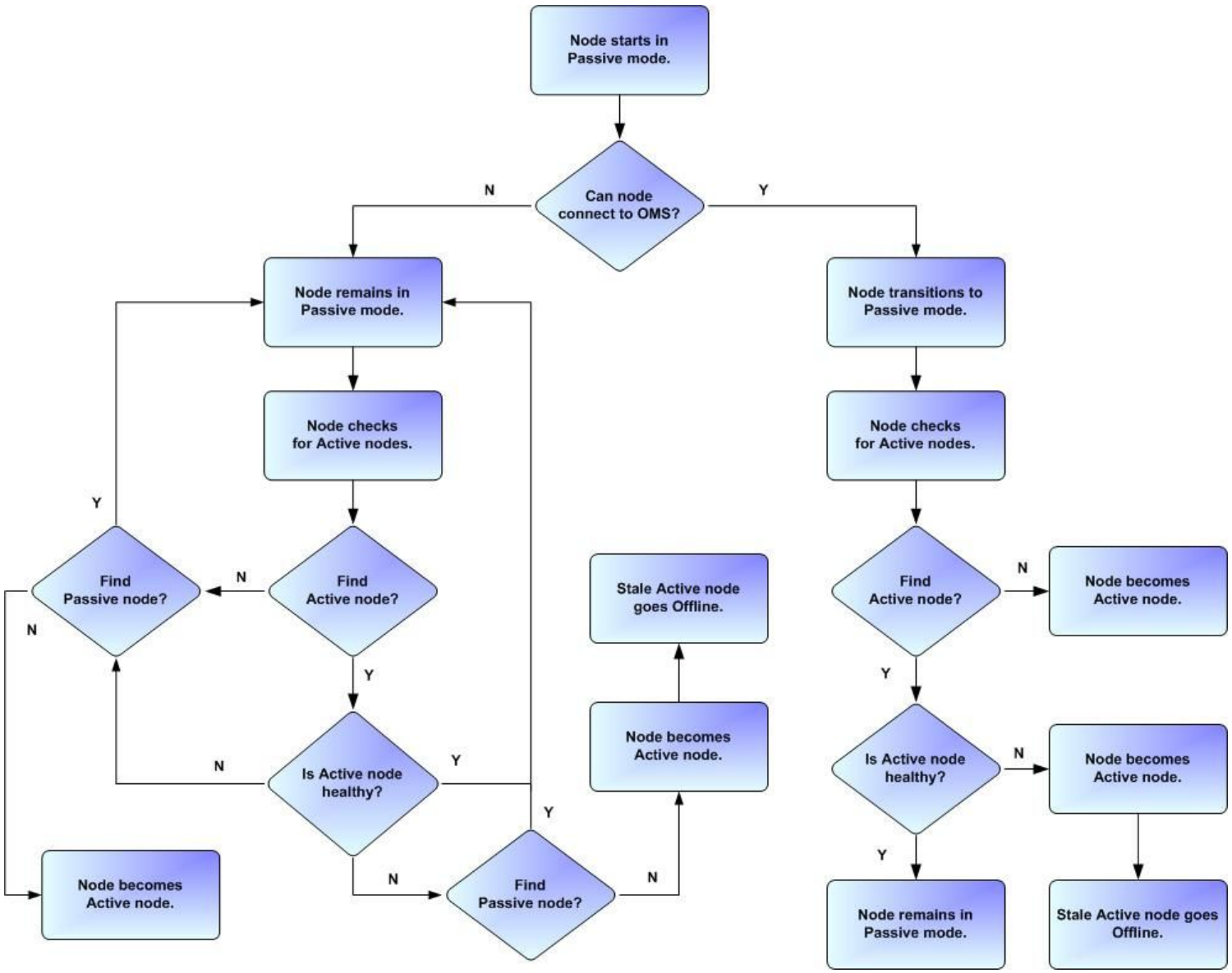
The following steps describe how a High Availability environment starts up:

Step 1	User starts the Cluster Nodes.
Step 2	Each cluster node reads its `uc.properties` file.
Step 3	Each cluster node locates and connects to the database and retrieves information about the Universal Automation Center environment.
Step 4	Each cluster node connects to an OMS server.
Step 5	Each Agent connects to an OMS server.

9.4.3 Determining Mode of a Cluster Node at Start-up

A cluster node starts in Passive mode. It then determines if it should remain in Passive mode or switch to Active mode.

The following flow chart describes how a cluster node determines its mode at start-up:



Note

A cluster node is considered "healthy" or "stale" based on its heartbeat timestamp.

9.4.4 Checking the Active Cluster Node During Operations

When all cluster nodes have started, each one continuously monitors the heartbeats of the other running cluster nodes.

If a Passive cluster node determines that the Active cluster node is no longer running, the Passive cluster node automatically takes over as the Active cluster node based upon the same criteria described above.

This determination is made as follows:

Step 1	The Active cluster node sends a heartbeat by updating a timestamp in the database. The heartbeat interval is 10 (seconds).
Step 2	All Passive cluster nodes check the Active cluster node's timestamp to determine if it is current. (This check runs every 60 seconds.)
Step 3	If a Passive cluster node determines that the Active cluster node's timestamp is stale, failover occurs: the Passive cluster node changes the mode of the Active cluster node to Offline and takes over as the Active cluster node. If more than one cluster node is operating in Passive mode, the first cluster node eligible to become Active that determines that the Active cluster node is not running becomes the Active cluster node. A stale cluster node is one whose timestamp is older than 5 minutes.

9.4.5 Checking OMS Connectivity During Operations

When a cluster node is not processing work, it is possible that its OMS Server connection can be silently dropped.

To detect this, a cluster node issues a heartbeat through the OMS server, and back to itself, every 30 seconds if no outgoing activity to the OMS server has occurred. The difference between the time the Controller issues the heartbeat and the time it receives the heartbeat is logged in the **uc.log**.

9.5 What To Do If a Failover Occurs

A Passive cluster node taking over as an Active cluster node is referred to as failover. If failover occurs, the event is invisible unless you are using the Active cluster node in a browser.

If you are using the Active cluster node in a browser and the cluster node fails, you will receive a browser error. In this case, take the following steps to continue working:

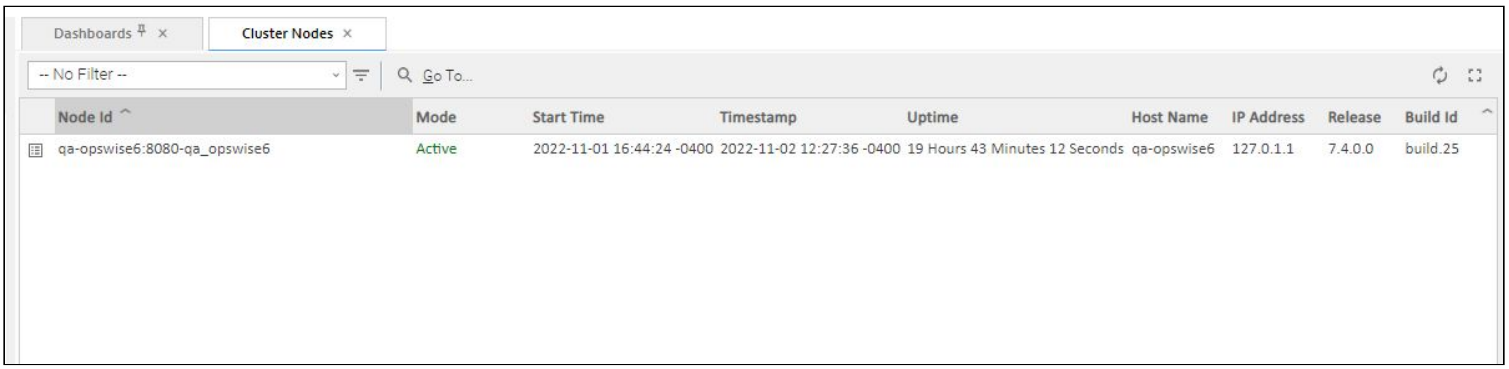
Step 1	Access the new Active cluster node in your browser. To determine which cluster node is now Active, check the **Mode** column on the Cluster Nodes list in the user interface (see Viewing Cluster Node Status, below).
Step 2	If you were adding, deleting, or updating records at the time of the failure, check the record you were working on. Any data you had not yet saved will be lost.

Note

Running the Pause Cluster Node Server Operation does not induce a failover event. You cannot pause an Active cluster node to create a failover to a Passive cluster node.

9.5.1 Viewing Cluster Node Status

To view a list of all cluster nodes, from the Agents & Connections navigation pane select **System > Cluster Nodes**. The Cluster Nodes list identifies all registered cluster nodes. The **Mode** column on the list identifies the current mode (status) of all cluster nodes.



Note

A cluster node becomes registered the first time it starts. From then on, it always appears in the Cluster Nodes list, regardless of its current mode.

Click any cluster node on the list to display Details for that cluster node below the list. (See Cluster Nodes for a description of the fields in the Details.)

9.6 High Availability Configuration

To achieve High Availability for your Universal Automation Center system, you must configure the cluster nodes, OMS, and Agents.

9.6.1 Configuring Cluster Nodes

All cluster nodes in a High Availability environment must point to the same database by making sure the following entries in their `uc.properties` files are the same.

For example:

9.6.2 Configuring OMS

OMS HA cluster configuration is described in the OMS Reference Guide.

The Universal Controller OMS Server definitions specify an OMS HA cluster as an ordered, comma-separated list of OMS Server addresses, one for each member of the OMS HA cluster.

OMS configuration

Do not define multiple OMS Server records for individual OMS HA cluster members. An OMS HA cluster must be defined as a single OMS Server record with an OMS address list containing each OMS HA cluster member.

As an example, if an OMS HA cluster contains three OMS Servers, `oms1.acme.com`, `oms2.acme.com`, and `oms3.acme.com`, the Universal Controller OMS Server definition would be defined with an OMS Server address value of `oms1.acme.com,oms2.acme.com,oms3.acme.com`.

9.6.3 Configuring Agents

If you want to configure an Agent to be able to access an OMS HA cluster, you must configure the Universal Automation Center Agent (UAG) OMS_SERVERS configuration option.

9.6.4 Configuring Notifications Based on Component Status

You can configure the Controller to generate Email Notifications or SNMP Notifications based on the mode of your cluster nodes, OMS Servers, and Agents.

9.7 Load Balancer

If you are using a load balancer in your High Availability environment, it can utilize the following HTTP requests:

`http(s)://serverhost:[Port]/uc/is_active_node.do`	If a cluster node is active, this URL returns the status **200** (OK) and a simple one word content of **ACTIVE**. If a cluster node is not active, this URL returns the status **403** (cluster node is not active) and lists the actual mode of the cluster node: **PASSIVE** or **OFFLINE**. **Note** In most cases, you should be able to use the status code for load balancer configuration; however, if you need to scan the response text, you may need to use the following variation of the request: http(s)://serverhost:[Port]/uc/is_active_node.do**?api_version=2**
`http(s)://serverhost:[Port]/uc/ops_node_info.do`	This URL returns information about a cluster node: • Node: serverhost.com:8080-uc • Release: 6.1.1.0* • Build Id: 10-10-2014_1129 • Mode: Active • Host Name: serverhost.com • Host IP: 192.168.50.50 • Uptime: 7 Days 3 Hours 22 Minutes 37 Seconds

10 Application Monitoring and Control

10.1 Application Monitoring and Control

10.2 Application Monitoring and Control Overview

10.2.1 Application Monitoring and Control

The Application Monitoring and Control feature of Universal Controller allows you to use it as a network control and monitoring tool. You can use Application Monitoring and Control to start, stop, and query any application running on any machine where you have Universal Agent installed and running.

Application Monitoring and Control is comprised of three components:

- Application resource records allow you to define the name and location of your applications, along with the specific commands to control (Start, Stop, and Query) the applications. The Applications list displays a status for the application that is defined in each Application resource record.
- Three Application Control tasks are automatically generated when you create an Application resource record: one each for executing the Start, Stop, and Query commands (which you specified in the Application resource record) against the application. You can use these control tasks to schedule the Start, Stop, and Query commands in Workflows and triggers. You also can manually create customized Application Control tasks.

> **Note**
>
> You can manually run an Application Control task to execute a command specified in an Application resource record, but it is simpler to just execute the command from the Applications list or Application resource record.

- Optional Application Monitor triggers allow you to launch other tasks based on the status of an application being monitored.

10.2.2 Processing Flow

The following steps show a sample process flow for the manual monitoring (that is, not via a trigger or Workflow) of an application:

Step 1	From the Agents & Connections navigation pane, select **System > Applications** and create an Application resource record, specifying the name of an application and the start, stop, and query commands to control it. The Controller will automatically create three Application Control tasks that you can use in Workflows and triggers for starting, stopping, and querying the application.
Step 2	Start the application defined in the Application resource record either by: • Right-clicking the Application resource record in the Applications list and clicking **Start** on the displayed Action menu. • Opening the Application resource record and clicking the **Start** button in the Application Details.
Step 3	The Controller executes the Start Command provided by the user in the Application Details. It puts the application into Starting status, and saves the Start Time. The Start Command has two functions: 1. Starts the application. 2. Starts the query process that monitors the application.
Step 4	After 30 seconds, the Controller automatically executes the Query Command provided by the user in the Application Details to determine the status of the application. The Controller continues executing the Query Command every 120 seconds thereafter until the user stops the monitoring by issuing a Stop command from the Controller.
Step 5	The purpose of the Query is to determine whether or not the application is Active. The Controller uses the specifications provided by the user in the Query Exit Code Processing fields in Application Details to make this determination. • If the response from the application indicates a successful start-up, the Controller puts the application into Active status. • If the response indicates the Application has not started, the Controller continues executing the Query (keeping track in the Startup Query Attempts field) until it reaches the maximum attempts specified by the user in the Startup Query Maximum field. If the maximum number is reached before achieving an Active status, the Controller puts the application into Impaired status. However, the Controller continues monitoring the application. If the appropriate exit code parameters are eventually returned, the Controller will put the application into Active status. The purpose of the Startup Query Attempts field is to avoid having the application go straight into Impaired status if it takes awhile to start. The Controller writes any Exit Code captured by the Query in the Query Exit Code field of the Application resource record.
Step 6	After starting the application, the Controller continues monitoring by sending out the Query Commands every 120 seconds. • If the Controller detects a problem based on the Exit Code parameters, it puts the application into Impaired status. If this occurs, you have several options for handling the problem, with increasing levels of automation: a. The Applications list displays the status of all applications being monitored. You can create a filter for the Applications list that displays only those applications in a specific status, such as Impaired. If you see a problem, troubleshoot the issue and restart the application from outside the Controller. b. Set up an Application Monitor trigger that monitors the application for Impaired and other problem statuses. When the trigger is satisfied, it launches an Email task that sends emails to support personnel, notifying them of the problem. Several built-in variables are supported that allow you to pass required data into the email message: the application name, type, and status. c. You also could create a Workflow launched by an Application Monitor trigger looking for Impaired or other problem statuses. The Workflow can include Application Control tasks that attempt to resolve the problem by stopping and then restarting the application. You could also include any other tasks that are specific to troubleshooting the application. • If the Controller fails to get a response to a Query for three minutes, it puts the application into <status>/Query Overdue status, where <status> is the last known status of the application, either Starting, Active, or Impaired. For example, you may see a <status>/Query Overdue status if the Agent went down or there was some other problem on the machine unrelated to the application itself. If this occurs, you should troubleshoot the issue. When you have fixed the problem, the continued queries from the Controller will then return an Active status for the application.
Step 7	To stop monitoring an application, issue the Stop command against it. the Controller stops the application and puts it into Inactive status, which means it is no longer monitoring.

10.3 Application Resources

10.3.1 Overview

Application resource records are the core component of the Universal Controller Application Monitoring and Control feature.

These records define:

- Names of the applications being monitored.
- Name and location of the machines where they are running.
- Start, Stop, and Query commands needed to perform the monitoring and control functions.

You can also use Application records and their associated Application Control tasks to start, stop, and query applications as part of your scheduling processes. You can execute Application Control tasks as you would execute any other task and include them in Workflows where applicable. In addition, you can define Application Monitor triggers to automatically launch one or more tasks of any type, depending on the status of one or more applications. For example, you might set up an Application Monitor trigger that sends an email to Windows technical support personnel if any Windows application goes to Impaired or Inactive status.

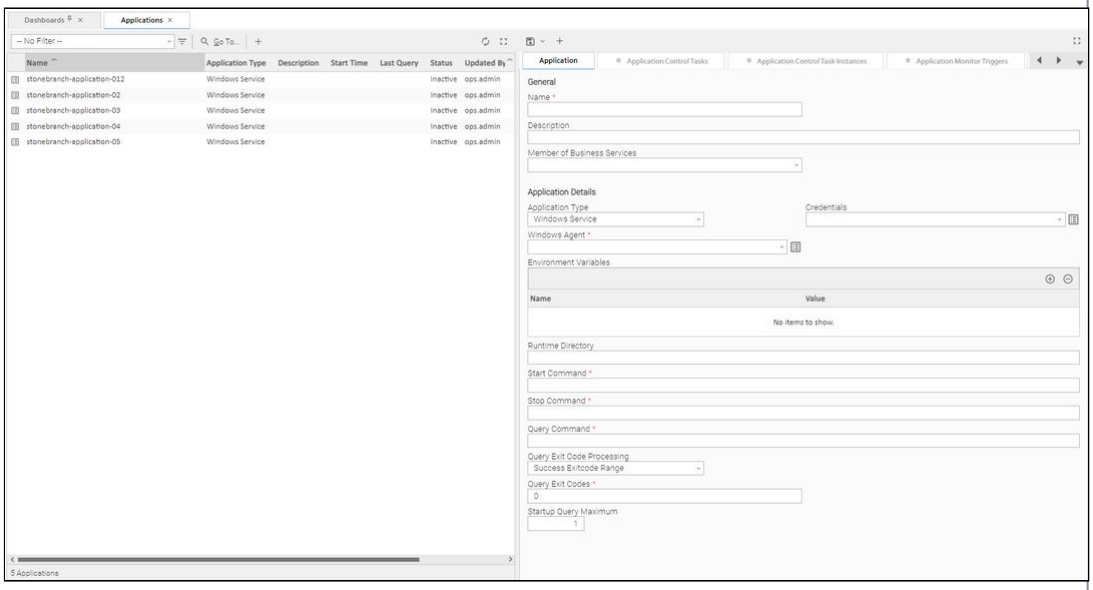
In order for the Controller to access the application, the application must be installed on a machine where Universal Agent (for Windows, Linux/Unix, or z/OS) is running.

If you set up the Controller to monitor your applications, you should always start and stop the applications from within the Controller. If you stop an application outside the Controller, you must also restart it from outside the Controller. If the Controller detects a problem with an application (the application goes to Impaired status), you should troubleshoot the problem and restart the application outside the Controller. The Controller will continue monitoring and when it detects that the application is back up, it will put the application back into Active status.

10.3.2 Built-In Variables

Application Monitor Trigger built-in variables are provided to pass information about an application being monitored into the task or tasks being launched by the trigger. You can pass the information into the launched tasks by including the variables in a text field in the task definition.

10.3.3 Creating an Application Resource Record

Step 1	From the Agents & Connections navigation pane, select **System > Applications**. The Applications list displays a list of all currently defined Application resource records. To the right of the list, Application Details for a new Application resource record displays. 
Step 2	Enter/select Details for a new Application resource record, using the field descriptions below as a guide. • Required fields display an asterisk (*) after the field name. • 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 + button above the list to display a pop-up version of the Details.
Step 3	Click a  button. The record is added to the database, and all buttons and tabs in the Application Details are enabled. When you save a new Application resource record, the Controller also automatically creates three related Application Control Tasks, one each for starting, stopping, and querying the application.
Step 4	If appropriate, repeat these steps for any additional Application resource records that you want to add.

Note

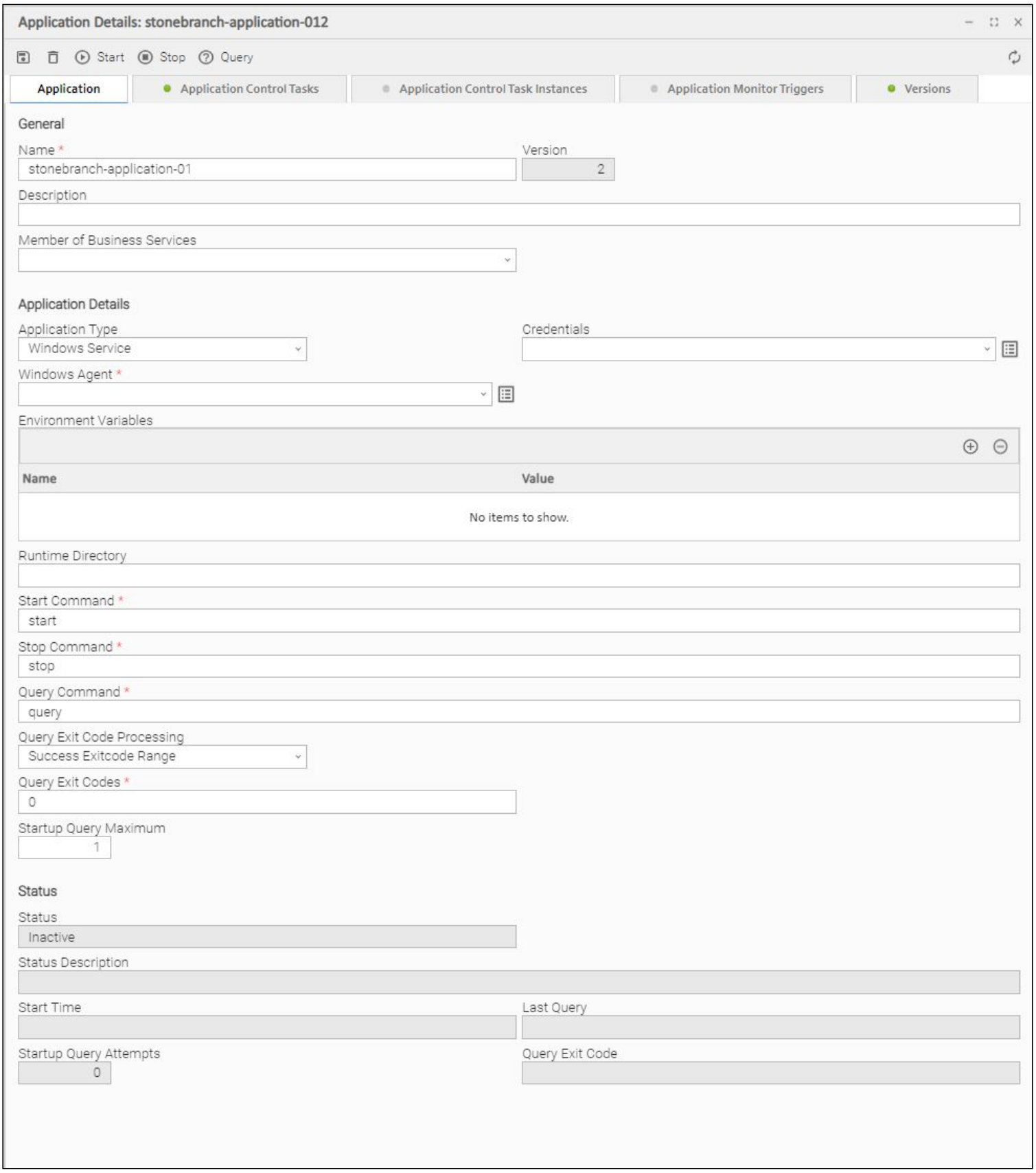
To open an existing record on the list, either:

- 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).

10.3.3.1 Application Details

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



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

10.3.3.2 Application Details Field Descriptions

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

Field Name	Description
General	This section contains general information about the application.
Name	Name used within the Controller to identify this resource. Up to 40 alphanumerics. It is the responsibility of the user to develop a workable naming scheme for resources.
Version	Version number of the current record, which is incremented by the Controller every time a user updates a record. Click on the Versions tab to view previous versions. For details, see Record Versioning.
Description	Description of this record. Maximum length is 255 characters.
Member of Business Services	User-defined; allows you to select one or more Business Services that this Application resource belongs to. Click on the lock icon to unlock the field and select a Business Service.
Application Details	This section contains assorted detailed information about the application.
Application Type	User-defined; Type of application. Options: • Windows Service • Linux/Unix Daemon • z/OS Started Task
Credentials	Login credentials that the Controller will use to access the remote machine. For z/OS application resources, make sure the credentials are in upper case. Required if the Agent Credentials Required Universal Controller system property is true.
Windows Agent	If Application Type = Windows Service; Name of the Windows agent where the application will run.
Linux/Unix Agent	If Application Type = Linux/Unix Daemon; Name of the Linux/Unix agent where the application will run.
z/OS Agent	If Application Type = z/OS Started Task; Name of the z/OS agent where the application will run.
Environment Variables	If Application Type = Windows Service or Linux/Unix Daemon; Allows you to enter environment variables needed by the program to run. To add a variable, click the + icon and enter a Name and Value. To delete a variable, select in the list of variables and click the - icon. You can add a maximum of 4,000 characters for the combined Names and Values of all variables. The variable is listed in the space underneath.
Run as sudo	If Application Type = Linux/Unix Daemon; Instruction to run the command as Sudo (superuser do).
Runtime Directory	Directory where the application executes. Variables supported.
Start Command	Command used to start the application. This can be any process or command that starts the application. If you try to start an application monitor that is already started, you will see the message: Application already monitored with <status> status.
Stop Command	Command used to stop the application. This can be any process or command that stops the application.

Query Command	Command used to query the application. This can be any process or command that queries the application. You must first start the application monitor from the Controller before you can query the application.
Query Exit Code Processing	Specifies how the Controller should determine whether or not the application is running. Options: • Success Exitcode Range - Application goes to or remains in Active status if its exit code falls within the range specified in the Query Exit Codes field (see below). Otherwise it has Impaired status. • Failure Exitcode Range - Application goes to or remains in Impaired status if its exit code falls within the range specified in the Exit Codes field (see below). Otherwise it has Active status. • Success Output Contains - Application goes to or remains in Active status if its output contains the text specified in the Scan Output For field (see below). Otherwise it has Impaired status. • Failure Output Contains - Application goes to or remains in Impaired status if its output contains the text specified in the Scan Output For field (see below). Otherwise it has Active status.
Query Exit Code	System-supplied if Query Exit Code Processing = **Success Exitcode Range** or **Failure Exitcode Range**; the most recent exit code returned by the application in response to a query.
Output Type	If Query Exit Code Processing = **Success Output Contains** or **Failure Output Contains**; type of output. Options: • Standard Output (STDOUT) • Standard Error (STDERR) • File
Scan Output For	If Query Exit Code Processing = **Success Output Contains** or **Failure Output Contains**; string that the Controller should scan for in the output.
Output File	If Output Type = **File**; path and name of the file.
Startup Query Maximum	Maximum number of Query attempts to be made on the specified application.
Status	This section contains information about the current status of the task application.
Status	System-supplied; indicates the current status of the application. Options: • Inactive - Application is not being monitored by the Controller. • Start Failure - Application failed to start. This may occur, for example, if you have problems with credentials or the start command itself is incorrect. When this occurs, the Controller is not monitoring the application. You should troubleshoot the problem and restart the application from the Controller. • Starting - Start command has been executed. • Active - Application has successfully started and is running, based on the parameters specified in the Exit Code processing fields. • Impaired - An application that is being monitored returned a response that, based on the specified exit code parameters, indicates it is not running. If this occurs, you should troubleshoot the problem and restart the application from outside the Controller. Unless you issue a stop command, the Controller continues monitoring during this process. When the application comes back up, the query process will recognize this and return the application to Active status.
Status Description	System-supplied; a more detailed status message describing why a status change occurred, in the format: "Query exit code <in-not in> <success-failure> exit code range. Query <success-failure> output not found."
Start Time	System-supplied; Date and time that the application was last started by the Controller.
Last Query	System-supplied; date and time of the last query response received from the application.

Startup Query Attempts	System-supplied; Number of queries that were executed before the Application went into Active or Impaired status.
Query Exit Code	Required if Query Exit Code Processing = Success Exitcode Range or Failure Exitcode Range; range of exit codes. Format is numeric. Use commas to list a series of discontinuous exit codes; use hyphens to specify a series of continuous exit codes. For example: 1,5,11, 22-30.
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 Application 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.
Start	Executes the Start command associated with this Application resource and begins querying.
Stop	Executes the Stop command associated with this Application resource. the Controller stops the application and stops querying (monitoring).
Query	Executes the Query command associated with this Application resource. This allows you to get immediate status of the application instead of waiting for the next automated query.
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 the Details.
Tabs	This section identifies the tabs across the top of the Application Details that provide access to additional information about this Application resource.
Application Control Tasks	Lists all Application Control tasks associated with this Application resource.
Application Control Task Instances	Lists all Application Control task instances associated with this Application resource.
Application Monitor Triggers	Lists all Application Monitor triggers associated with this Application resource.

10.4 Application Control Tasks

10.4.1 Overview

Application Control tasks allow you to execute a Start, Stop, or Query command against an application in the Universal Controller network.

Three Application Control tasks are created automatically when you create an Application record – one each for starting, stopping, and querying the application. (The Application Control tasks list below shows automatically created tasks for five different Application records.)

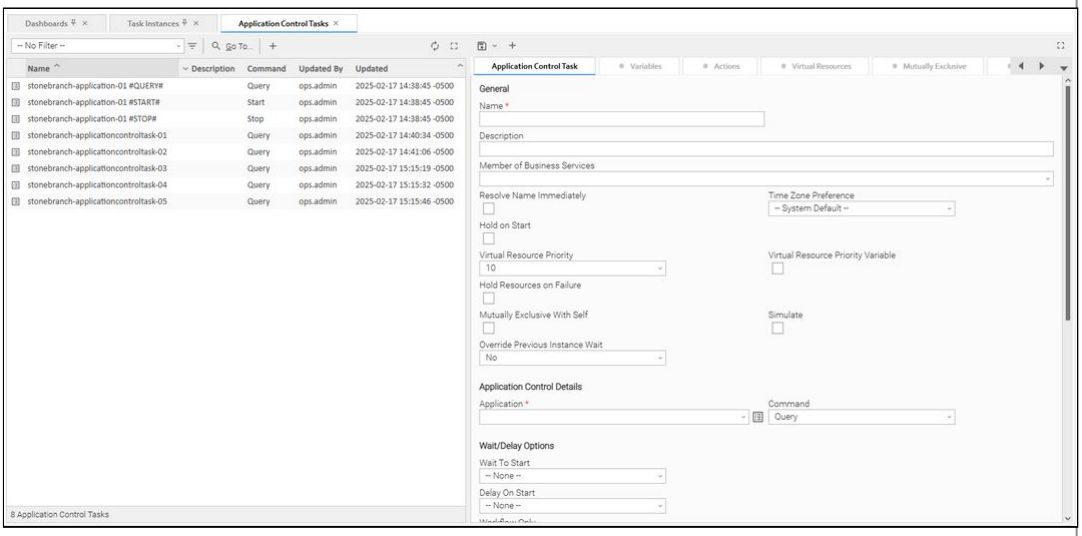
Each of these automatically created tasks is stored as a separate record in the Controller database and can be executed independently or added to a workflow, as with any other task. These tasks cannot be deleted.

10.4.2 Built-In Variables

The following built-in variables can be used in an Application Control task to pass data where appropriate. However, variable resolution does not extend to the Application record itself; therefore, built-in variables cannot be used within the Application record Start Command, Stop Command, or Query Command, for example.

- Task Instance variables

10.4.3 Creating an Application Control Task

Step 1	From the Automation Center navigation pane, select **Tasks > Application Control Tasks**. The Application Control Tasks list displays a list of all currently defined Application Control tasks. To the right of the list, Application Control Task Details for a new Application Control task displays. 
Step 2	Enter/select Details for a new Application Control task, using the field descriptions below as a guide. • Required fields display an asterisk (*) after the field name. • 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 + button above the list to display a pop-up version of the Details.
Step 3	Click a save button. The task is added to the database, and all buttons and tabs in the Task Details are enabled.

Note

To open an existing record on the list, either:

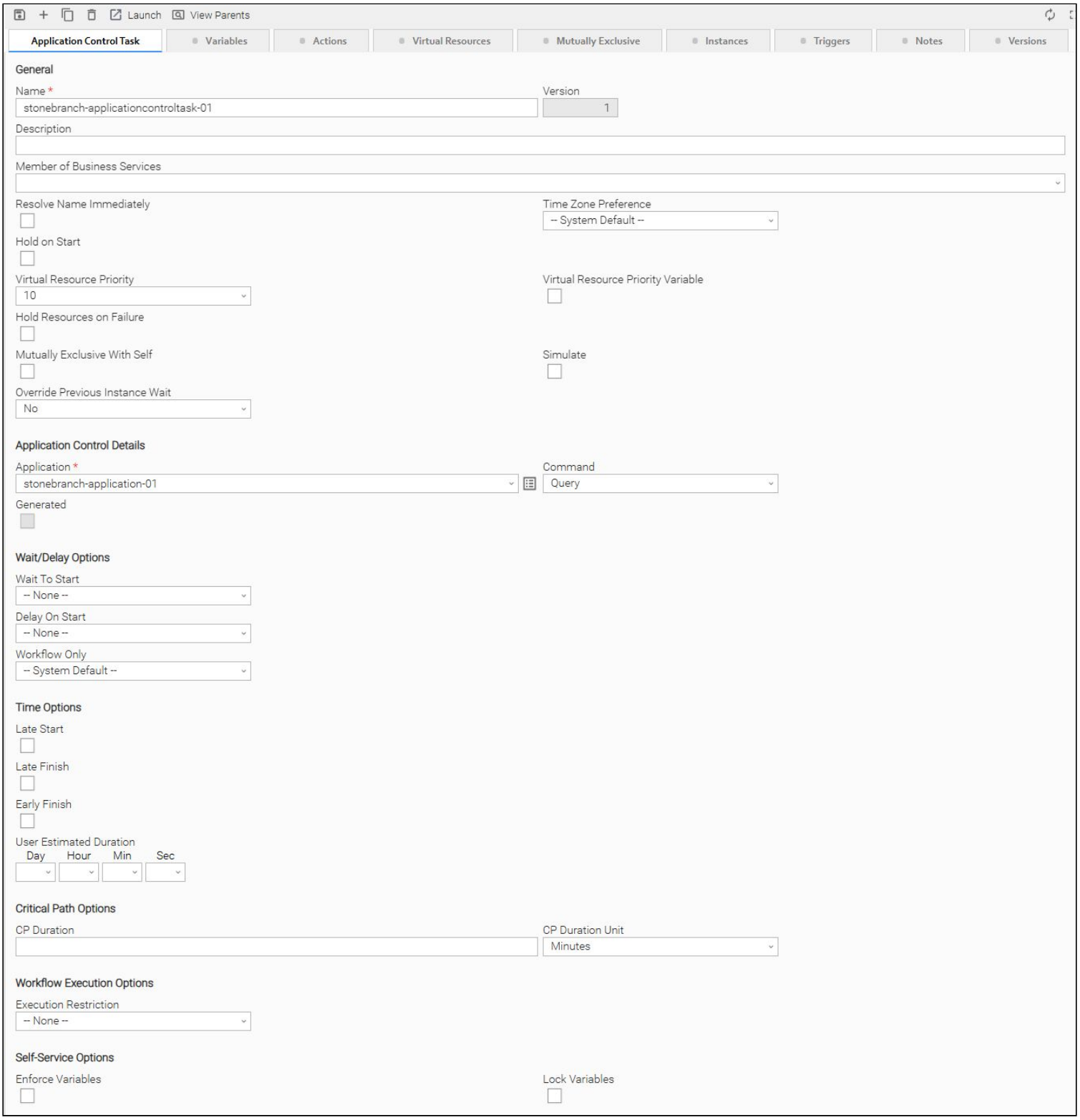
- Click a record in the list to display its record Details below the list. (To clear record Details below the list, click the **New** button that displays above and below the Details.)
- Clicking the Details icon next to a record name in the list, or right-click a record in the list and then click **Open** 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).

10.4.3.1 Application Control Task Details

The following Application Control Task Details is for an automatically generated Application Control task.

Some of the fields are protected and the **Generated** field is pre-selected, indicating that this task was generated automatically.

Depending on the values that you enter / select for these fields, and whether or not the Application Control task has ever been launched, more (or less) fields may display. See the field descriptions, below, for a description of all fields that may display in the Application Control Task Details.



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

10.4.3.2 Application Control Task Details Field Descriptions

The following table describes the fields, buttons, and tabs that display in the Application Control Task Details.

Field Name	Description
General	This section contains general information about the task.
Name	User-defined name of this task (Maximum = 255 alphanumeric characters); variables supported. It is the responsibility of the user to develop a workable naming scheme for tasks.
Version	System-supplied; version number of the current record, which is incremented by the Controller every time a user updates a record. Click the Versions tab to view previous versions. For details, see Record Versioning.
Description	Description of this record. Maximum length is 255 characters.
Member of Business Services	User-defined; Allows you to select one or more Business Services that this record belongs to. (You also can Check All or Uncheck All Business Services for this record.) You can select up to 62 Business Services for any record type, and enter a maximum of 2048 characters for each Business Service. 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.
Resolve Name Immediately	If enabled, the Instance Name of the task instance will be resolved immediately at trigger/launch time.
Time Zone Preference	User-defined; Allows you to specify the time zone that will be applied to the task. Options: • – System Default – Time zone is based on the value of the Task Time Zone Preference Universal Controller system property: Server or Inherited. • Server (xxx) Where (xxx) is the time zone ID of the server; time zone is evaluated in the time zone of the server. • Inherited Time zone is evaluated in the time zone of the Parent Workflow or Trigger / Launch specification in the case there is no Parent Workflow.
Hold on Start	If enabled, when the task is launched it appears in the Activity Monitor with a status of **Held**. The task runs when the user releases it.
Hold Reason	Information about why the task will be put on hold when it starts.
Virtual Resource Priority	Priority for acquiring a resource when two or more tasks are waiting for the resource. This priority applies to all resources required by the task. Options: 1 (high) - 100 (low). Default is 10.
Virtual Resource Priority Variable	Indication of whether the **Virtual Resource Priority** field is a number select field for choosing the Virtual Resource Priority (unchecked) or a text field for specifying the Virtual Resource Priority as a variable (checked). Use the format: ${variable name}. The variable must be a supported type as described in Variables and Functions.
Hold Resources on Failure	If enabled, the task instance will continue to hold Renewable resources if the task instance fails. Renewable resources will be returned only if the task instance status is either Complete, Finished, or Skipped.

Mutually Exclusive With Self	If enabled, the task will not be allowed to run concurrently with itself. Task will not start until the instance that is running finishes. An instance will transition to Exclusive Wait status if it cannot start due to another instance already running.
Simulate	Specifies if the instance should execute under simulation mode.
Override Previous Instance Wait	Specifies whether or not to override the parent workflow's **Previous Instance Wait** configuration. This option only applies for an instance running within a workflow. Options: • No Behavior determined by the parent workflow configuration. • Yes / -- None -- Regardless of the parent workflow configuration, the task instance will never wait for a previous instance to complete. • Yes / Wait for Last Regardless of the parent workflow configuration, the task instance will remain in **Instance Wait** until the most recent prior instance of the same task has completed. • Yes / Wait for Last / Same Workflow Regardless of the parent workflow configuration, the task instance will remain in **Instance Wait** until the most recent prior instance of the same task, within an instance of the same workflow, have completed. • Yes / Wait for All Regardless of the parent workflow configuration, the task instance will remain in **Instance Wait** until all prior instances of the same task has completed. • Yes / Wait for All / Same Workflow Regardless of the parent workflow configuration, the task instance will remain in **Instance Wait** until all prior instances of the same task, within an instance of the same workflow, have completed.
Application Control Details	This section contains assorted detailed information about the task.
Application	Protected if auto-generated; name of the Application resource record. The Application resource defines where the software application is running; it also defines the start, stop, and query commands for the application. Enter the name of an existing Application, select an Application from the drop-down list, of all existing Applications, or click the Details icon to create a new Application.
Command	Protected if auto-generated; command that this task is executing against the software application. Options: • Query • Start • Stop
Generated	System-supplied; protected. If selected, indicates that this Application Control task was generated automatically when the Application resource record was submitted.
Wait / Delay Options	This section contains specifications for waiting to start and/or delaying on start the task.
Wait To Start	Amount of time to wait before starting a task from the time that it was launched. Options are: • – None – • Time • Relative Time • Duration • Seconds
Wait Time	If Wait To Start = Time or Relative Time; Time of day (in 24-hour time) to wait until before starting the task.

Wait Day Constraint	If Wait To Start = Time or Relative Time; Specification for whether or not to advance the wait time to another day.
	Valid values:
	• -- None --
	  • If Wait To Start = Time; Advance to the next day if the specified wait time is before the time that the task instance is eligible to start; that is, all dependencies have been met. For example: it is not being held, and it is not waiting on any predecessors.
	  • If Wait To Start = Relative Time; Advance to the next day if the specified wait time is before the task instance Trigger Time or, if there is no Trigger Time, before the task instance Launch Time. In the latter case, when a task instance is within a workflow, it will inherit the Launch Time of the top-level parent workflow task instance.
	• Same Day
	Do not advance day.
	• Next Day
	Advance to the next day.
	• Next Business Day
	Advance to the next business day.
	• Sunday
	If today is not Sunday, advance to next Sunday.
	• Monday
	If today is not Monday, advance to next Monday.
	• Tuesday
	If today is not Tuesday, advance to next Tuesday.
	• Wednesday
	If today is not Wednesday, advance to next Wednesday.
	• Thursday
	If today is not Thursday, advance to next Thursday.
	• Friday
	If today is not Friday, advance to next Friday.
	• Saturday
	If today is not Saturday, advance to next Saturday.
	Default is – None –.

Wait Duration	If Wait To Start = Duration; Number of days, hours, minutes, and seconds to wait before starting the task.
Wait Duration In Seconds	If Wait To Start = Seconds; Number of seconds to wait before starting the task.
Delay On Start	Amount of time to delay the start of a task, after it has been launched, from the time that it is eligible to start; that is, all dependencies have been met. For example: it is not being held, it is not waiting on any predecessors, or there is no wait time specified. Options are: • – None – • Duration • Seconds
Delay Duration	If Delay On Start = Duration; Number of days, hours, minutes, and seconds to delay after starting the task.
Delay Duration In Seconds	If Delay On Start = Seconds; Number of seconds to delay after starting the task.

Workflow Only	Specification for whether or not to apply the Wait To Start and Delay On Start specifications only if the task is in a Workflow. Options are: • - - System Default - - Apply the Wait To Start and Delay On Start specifications as defined by the System Default Wait/Delay Workflow Only system property. (Default is **yes**.) • Yes Apply the Wait To Start and Delay On Start specifications only if the task is in a Workflow. • No Apply the Wait To Start and Delay On Start specifications whether or not the task is in a Workflow.
Time Options	This section contains time-related specifications for the task.
Late Start	If enabled, and if the task instance starts after the time or period specified, the task instance is flagged as late. You can specify a time or duration to determine a late start (see Late Start Type). To determine whether a task instance started late, open the task instance and locate the Started Late field; the field is checked if the instance started after the specified time. The Started Late field displays in the task instance Details only if the user specified a Late Start in the task Details.
Late Start Type	Required if Late Start is enabled. Options: • Time - Flag the task if it starts after the specified time. • Duration - Flag the task if it starts a certain amount of time after the programmed start time. The task must have a specific start time.
Late Start Time	If Late Start Type = Time; Time after which the task start time is considered late. Use HH:MM, 24-hour time.
Late Start Day Constraint	If Late Start Type = Time; Specification for whether or not to advance the late start time to another day. Valid values: • -- None -- Advance to the next day if the specified late start time is before the Created time of the task instance. • Same Day Do not advance day. • Next Day Advance to the next day. • Next Business Day Advance to the next business day. • Sunday If today is not Sunday, advance to next Sunday. • Monday If today is not Monday, advance to next Monday. • Tuesday If today is not Tuesday, advance to next Tuesday. • Wednesday If today is not Wednesday, advance to next Wednesday. • Thursday If today is not Thursday, advance to next Thursday. • Friday If today is not Friday, advance to next Friday. • Saturday If today is not Saturday, advance to next Saturday. • Nth Day Advance to a specific number of days in the future. Default is – None –.
Late Start Nth Amount	If Late Start Day Constraint = Nth Day; Number of days to advance.

Late Start Duration	If Late Start Type = Duration; Duration (amount of relative time) after which the task is considered to have started late. For a task within a workflow, the duration is the period between the time the workflow starts and the time the task itself starts. For example, a task might have a Late Start Duration of 60 minutes. If the workflow starts at 9:00 a.m. but the task itself does not start until 10:30, the task has started late. For a task that is not within a workflow, Late Start Duration has meaning only if the task has been held upon starting. For example, if a task has a Late Start Duration of 60 minutes and the Hold on Start field is enabled, if the task is not released from hold within the amount of time specified in the Late Start Duration field, the task has started late.
Late Finish	If enabled, and if the task instance finishes after the time or period specified, the task instance is flagged as late. You can specify a time or duration to determine a late finish (see Late Finish Type). To determine whether a task instance finished late, open the task instance and locate the Finished Late field; the field is checked if the instance finished after the specified time or lasted longer than expected. This field only appears on the task instance if the user specified a Late Finish in the task definition.
Late Finish Type	Required if Late Finish is enabled. Options: • Time - Flag the task if it finishes after the specified time (see Late Finish Time). • Duration - Flag the task if it finishes a certain amount of time after the programmed finish time (see Late Finish Duration). The task must have a specific finish time. • Average Duration - Flag the task if it finishes before the average duration (see Average Instance Time) for the task, less an offset (see Late Finish Offset Type), if specified.
Late Finish Offset Type	If Late Finish Type = Average Duration; Options: • Percentage • Duration
Late Finish Percentage Offset (+)	Required if Late Finish Offset Type = *Percentage*; Percentage of **Average Duration** to use as an offset. The late finish time is calculated by adding the offset to the **Average Duration**. (Minimum = 0 and Maximum = 1000)
Late Finish Duration Offset (+)	Required if Late Finish Offset Type = *Duration*; Duration to use as an offset. The late finish time is calculated by adding the offset to the **Average Duration**.
Late Finish Duration Offset Unit	If Late Finish Offset Type = Duration; Options: • Seconds • Minutes • Hours
Late Finish Time	If Late Finish Type = Time; Time after which the task finish time is considered late. Use HH:MM, 24-hour time.

Late Finish Day Constraint	If Late Finish Type = Time; Specification for whether or not to advance the late finish time to another day. Valid values: • -- None -- Advance to the next day if the specified late finish time is before the Created time of the task instance. • Same Day Do not advance day. • Next Day Advance to the next day. • Next Business Day Advance to the next business day. • Sunday If today is not Sunday, advance to next Sunday. • Monday If today is not Monday, advance to next Monday. • Tuesday If today is not Tuesday, advance to next Tuesday. • Wednesday If today is not Wednesday, advance to next Wednesday. • Thursday If today is not Thursday, advance to next Thursday. • Friday If today is not Friday, advance to next Friday. • Saturday If today is not Saturday, advance to next Saturday. • Nth Day Advance to a specific number of days in the future. Default is – None –.
Late Finish Nth Amount	If Late Finish Day Constraint = Nth Day; Number of days to advance.
Late Finish Duration	If Late Finish Type = Duration; Longest amount of time this task instance should take to run.
Early Finish	If enabled, and if the task instance finishes before the time or period specified, the task instance is flagged as early. You can specify a time or duration to determine an early finish (see Early Finish Type). To determine whether a task instance finished early, open the task instance and locate the Finished Early field; the field is checked if the instance finished before the specified time or did not last as long as expected. This field only appears on the task instance if the user added Early Finish specifications to the task definition.
Early Finish Type	Required if Early Finish is enabled. Options: • Time - Flag the task if it finishes before the specified time (see Early Finish Time). • Duration - Flag the task if it finishes a certain amount of time before the programmed finish time (see Early Finish Duration). The task must have a specific finish time. • Average Duration - Flag the task if it finishes before the average duration (see Average Instance Time) for the task, less an offset (see Early Finish Offset Type), if specified.
Early Finish Offset Type	If Early Finish Type = Average Duration; Options: • Percentage • Duration
Early Finish Percentage Offset (-)	Required if Early Finish Offset Type = *Percentage*; Percentage of **Average Duration** to use as an offset. The early finish time is calculated by subtracting the offset from the **Average Duration**. (Minimum = 0 and Maximum = 100)
Early Finish Duration Offset (-)	Required if Early Finish Offset Type = *Duration*; Duration to use as an offset. The early finish time is calculated by subtracting the offset from the **Average Duration**.

Early Finish Duration Offset Unit	If Early Finish Offset Type = Duration; Options: • Seconds • Minutes • Hours
Early Finish Time	If Early Finish Type = Time; Time before which the task finish time is considered early. That is, enter a time at which the task should still be running. Use HH:MM, 24-hour time.
Early Finish Day Constraint	If Early Finish Type = Time; Specification for whether or not to advance the early finish time to another day. Valid values: • -- None -- Advance to the next day if the specified early finish time is before the Created time of the task instance. • Same Day Do not advance day. • Next Day Advance to the next day. • Next Business Day Advance to the next business day. • Sunday If today is not Sunday, advance to next Sunday. • Monday If today is not Monday, advance to next Monday. • Tuesday If today is not Tuesday, advance to next Tuesday. • Wednesday If today is not Wednesday, advance to next Wednesday. • Thursday If today is not Thursday, advance to next Thursday. • Friday If today is not Friday, advance to next Friday. • Saturday If today is not Saturday, advance to next Saturday. • Nth Day Advance to a specific number of days in the future. Default is – None –.
Early Finish Nth Amount	If Early Finish Day Constraint = Nth Day; Number of days to advance.
Early Finish Duration	If Early Finish Type = Duration; Shortest amount of time this task instance should take to run.
User Estimated Duration	Required if Early Finish Type or Late Finish Type = Average Duration; Estimated amount of time it should normally take to run this task. The Controller uses this information to calculate the User Estimated End Time on a task instance record. **User Estimated Duration** is used when the Average Duration is not available; for example, on the first launch of a task.
Critical Path Options	This section contains Critical Path-related specifications for the task.
CP Duration	Optional; Allows you to override the estimated Critical Path Duration of the task when running in a Workflow; used in conjunction with the CP Duration Unit field. In most cases, this field should be left blank, which implies that the Controller will estimate the Critical Path Duration based on historical executions. Valid values are any integer equal to or greater than 0. Variables and Functions are supported.
CP Duration (Resolved)	Displays the current resolved value of the CP Duration field, which may contain variables or functions that will be displayed as unresolved until the task instance starts. The CP Duration (Resolved) field can continue to change value until the task instance starts, at which time CP Duration will display as resolved and CP Duration (Resolved) will no longer be visible unless there was an issue resolving the variables and/or functions contained within CP Duration. If the Controller is unable to resolve CP Duration or it resolves to an invalid value, CP Duration will be ignored and the Controller will estimate the Critical Path Duration based on historical executions.

CP Duration Unit	Type of CP Duration; used in conjunction with the CP Duration field. For example, for a CP Duration of two minutes, specify 2 in the CP Duration field and select **Minutes** in this field. Options: • Seconds • Minutes • Hours Default is Minutes.
Workflow Execution Options	This section contains Critical Path-related specifications for the task.
Execution Restriction	Specification for whether or not there is a restriction for this task to be run, skipped, or held. Options are: • -- None -- No restriction for this task. • Run Restriction for when this task will be run. • Skip Restriction for when this task will be skipped. • Hold Restriction for when this task will be held. If Execution Restriction on a task is Run or Skip, then when it is part of a Workflow that is being launched, the Restriction Period is evaluated. The task instance will be skipped if Execution Restriction is Skip and the date is within the Restriction Period or Execution Restriction is Run and the date is not within the Restriction Period. Execution Restriction can be set to Skip with a Restriction Period of - None -, meaning the restriction is always active and the task will be skipped when it is part of a Workflow.
Restriction Period	If Execution Restriction = Run, Skip, or Hold; Period of time when the task is restricted. Options are: • – None – No period of restriction for this task. • Before Restriction is valid if the date is before the Before Date value. • After Restriction is valid if the date is after the After Date value. • Span Restriction is valid if the date is before the Before Date value and after After Date value. • On Restriction is valid if the date is one of the Date List values.
Before Date	If Restriction Period = Before or Span; Date before which the restriction is valid.
Before Time	If Restriction Period = Before or Span; Time on the selected date before which the restriction is valid.
After Date	If Restriction Period = After or Span; Date after which the restriction is valid.
After Time	If Restriction Period = After or Span; Time on the selected date after which the restriction is valid.
Date List	If Restriction Period = On; Date(s) on which the restriction is valid.
Self-Service Options	This section contains Self-Service specifications for the task.
Enforce Variables	Specifies whether or not to enforce **Launch with Variables...** when launching a task using the User Interface.
Lock Variables	Specifies whether or not to prevent editing variables when using **Launch with Variables...** from the User Interface.
Statistics	This section contains time-related statistics for task instances of the task.
First Execution	System-supplied; End Time of the first instance of this task to complete.

Last Execution	System-supplied; End Time of the last instance of this task to complete.
Last Instance Duration	System-supplied; Amount of time the task took to run the last time it ran.
Lowest Instance Time	System-supplied; Lowest amount of time this task has taken to run.
Average Instance Time	System-supplied; Average amount of time this task takes to run.
Highest Instance Time	System-supplied; Highest amount of time this task has taken to run.
Number of Instances	System-supplied; Number of instances in the database for this task.
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 Task Details that let you perform various actions.
Save	Saves a new task 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 task.
Update	Saves updates to the record.
Launch	Manually launches the task.
View Parents	Displays a list of any parent Workflow tasks for this task.
Copy	Creates a copy of this task, which you are prompted to rename.
Refresh	Refreshes any dynamic data displayed in the Details.
Close	For pop-up view only; closes the pop-up view of this task.
Tabs	This section identifies the tabs across the top of the Task Details that provide access to additional information about the task.
Variables	Lists all user-defined variables associated with this record; that is, variables that have been defined for this specific record.

<table>
<tr><td>Actions</td><td>Allows you to specify actions that the Controller will take automatically based on events that occur during the execution of this task.
Events are:
Task instance status
Exit codes
Late start
Late finish
Early finish
Actions are:<table><tr><td>Abort Action</td><td>Abort the task if certain events occur. For details, see Abort Actions.</td></tr><tr><td>Email Notification</td><td>Send an email if certain events occur. For details, see Email Notification Actions.</td></tr><tr><td>Set Variable</td><td>Used in tasks and workflows to set a variable based on the occurrence of certain events. For details, see Creating a Set Variable Action within a Task or Workflow.</td></tr><tr><td>SNMP Notification</td><td>Send an email if certain events occur. For details, see SNMP Notification Actions.</td></tr><tr><td>System Operation</td><td>Run an Universal Controller system operation based on specified conditions. For details, see System Operation Actions.</td></tr></table></td></tr>
<tr><td>Virtual Resources</td><td>Lists all Virtual Resources to which this task is assigned.

If you want to create a Task Virtual Resource for this task, you can select an existing Virtual Resource (or, optionally, first create a new Virtual Resource and then select it as the Task Virtual Resource) or enter a Virtual Resource variable. The variable must be a supported type as described in Variables and Functions.</td></tr>
<tr><td>Mutually Exclusive</td><td>Lists all tasks that have been set to be mutually exclusive of this task.</td></tr>
<tr><td>Instances</td><td>Lists all instances of the task.</td></tr>
<tr><td>Triggers</td><td>List of all triggers that reference this task in the Task(s) field of the trigger Details; that is, a list of all triggers that have been defined to launch this task. Also allows you to add new triggers. If you add a new trigger from this location, the Controller automatically constructs a default trigger name as follows: <current task name>#TRIGGER#. You can change the default name if desired. For instructions on creating triggers, see Triggers.</td></tr>
<tr><td>Notes</td><td>Lists all notes associated with this record.</td></tr>
<tr><td>Versions</td><td>Stores copies of all previous versions of the current record. See Record Versioning.</td></tr>
</table>

10.4.4 Viewing an Application Control Task Instance

When an Application Control task is launched, the Controller creates a task instance record of that task.

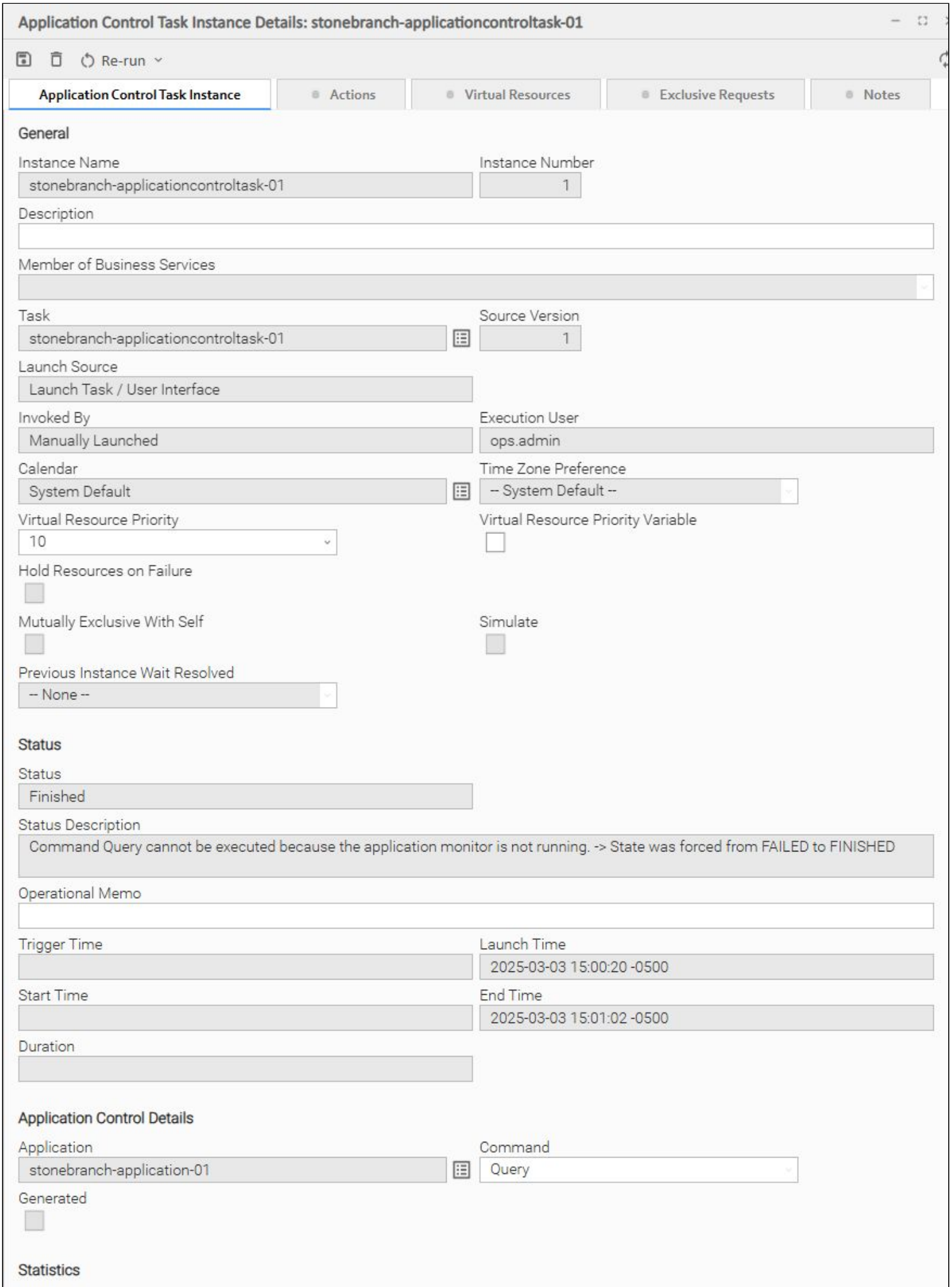
A task instance contains detailed information about a single execution of that task.

You can access a task instance from:

- **Instances tab** on the Application Control Task Details for that task
- Activity list
- Task Instances list

10.4.4.1 Application Control Task Instance Details

The following Application Control Task Instance Details contains information on the execution of the task shown in the Application Control Task Details.


Application Control Task Instance Details: stonebranch-applicationcontroltask-01
Re-run
Application Control Task Instance
Actions
Virtual Resources
Exclusive Requests
Notes
General
Instance Name
stonebranch-applicationcontroltask-01
Instance Number
1
Description
Member of Business Services
Task
stonebranch-applicationcontroltask-01
Source Version
1
Launch Source
Launch Task / User Interface
Invoked By
Manually Launched
Execution User
ops.admin
Calendar
System Default
Time Zone Preference
-- System Default --
Virtual Resource Priority
10
Virtual Resource Priority Variable
Hold Resources on Failure
Mutually Exclusive With Self
Simulate
Previous Instance Wait Resolved
-- None --
Status
Status
Finished
Status Description
Command Query cannot be executed because the application monitor is not running. -> State was forced from FAILED to FINISHED
Operational Memo
Trigger Time
Launch Time
2025-03-03 15:00:20 -0500
Start Time
End Time
2025-03-03 15:01:02 -0500
Duration
Application Control Details
Application
stonebranch-application-01
Command
Query
Generated
Statistics

10.4.4.2 Application Control Task Instance Details Field Descriptions

The following table describes the fields, buttons, and tabs that display in Application Control Task Instance Details.

Field Name	Description
General	This section contains general information about the task instance.
Instance Name	Name of this task instance.
Instance Number	System-supplied; Sequentially assigned number, maintained per task, representing the creation order of the instance.
Description	Description of this record. Maximum length is 255 characters.
Member of Business Services	User-defined; Allows you to select one or more Business Services that this record belongs to. (You also can Check All or Uncheck All Business Services for this record.) You can select up to 62 Business Services for any record type, and enter a maximum of 2048 characters for each Business Service. 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.
Task	Name of the task that was run to create this task instance. Click the icon to display Task Details for the task.
Source Version	Version of the task that was run to create this task instance.

Launch Source	System-supplied; Source from which this task was launched. Options: • Scheduled Trigger If the instance was directly launched by a scheduled trigger, the Trigger (trigger_id) column is assigned the UUID of the scheduled trigger. • Trigger Monitor If the instance is a monitor associated with monitor trigger, the Trigger (trigger_id) column is assigned the UUID of the monitor trigger. • Trigger Now / User Interface If the instance was directly launched by a Trigger Now command, the Trigger (trigger_id) column is assigned the UUID of the trigger. • Trigger Now / System Operation If the instance was directly launched by a Trigger Now command, the Trigger (trigger_id) column is assigned the UUID of the trigger and the Source Instance (source_instance) column will be assigned the UUID of the instance invoking the System Operation. • Trigger Now / Web Service If the instance was directly launched by a Trigger Now command, the Trigger (trigger_id) column is assigned the UUID of the trigger. • Trigger Now / Command Line If the instance was directly launched by a Trigger Now command, the Trigger (trigger_id) column is assigned the UUID of the trigger. • Workflow If the instance was launched by a workflow, the Workflow (workflow_id) column is assigned the UUID of the workflow instance. Likewise, the Source Instance (source_instance) column will also be assigned the UUID of the workflow instance. • Launch Task / User Interface If the instance was directly launched by the Launch Task command, the Source Instance (source_instance) column will be null. • Launch Task / System Operation If the instance was directly launched by the Launch Task command, the Source Instance (source_instance) column will be assigned the UUID of the instance invoking the System Operation. • Launch Task / Web Service If the instance was directly launched by the Launch Task command, the Source Instance (source_instance) column will be null. • Launch Task / Command Line If the instance was directly launched by the Launch Task command, the Source Instance (source_instance) column will be null. • Recurring If the instance was directly launched by a Recurring Task Instance, the Source Instance (source_instance) column will be assigned the UUID of the Recurring Task Instance.
Source Instance	System-supplied; UUID of the source instance. • If the instance was directly launched by a **Trigger Now** command; the UUID of the instance invoking the System Operation. • If the instance was launched by a workflow; the UUID of the workflow instance. • If the instance was directly launched by the **Launch Task** command; the UUID of the instance invoking the System Operation. • If the instance was directly launched by a **Recurring Task Instance;** the UUID of the **Recurring Task Instance**.
Invoked by	System-supplied; how the task instance was launched. Options: • Trigger: (Trigger Name) Instance was launched by the named trigger. • Workflow: (Workflow Name) Instance was launched by the named workflow. • Manually Launched Instance was launched by a user. To identify the user, check the Execution User column for that task instance on the Task Instances screen or, on most task instance screens, the Execution User field.

Execution User	System-supplied; If the task was launched manually; ID of the user who launched it.
Calendar	Calendar associated with the task instance.
Time Zone Preference	User-defined; Allows you to specify the time zone that will be applied to the task. Options: • – System Default – Time zone is based on the value of the Task Time Zone Preference Universal Controller system property: Server or Inherited. • Server (xxx) Where (xxx) is the time zone ID of the server; time zone is evaluated in the time zone of the server. • Inherited Time zone is evaluated in the time zone of the Parent Workflow or Trigger / Launch specification in the case there is no Parent Workflow.
Virtual Resource Priority	Priority for acquiring a resource when two or more tasks are waiting for the resource. This priority applies to all resources required by the task. Options: 1 (high) - 100 (low). Default is 10.
Virtual Resource Priority Variable	Indication of whether the **Virtual Resource Priority** field is a number select field for choosing the Virtual Resource Priority (unchecked) or a text field for specifying the Virtual Resource Priority as a variable (checked). Use the format: ${variable name}. The variable must be a supported type as described in Variables and Functions.
Hold Resources on Failure	If enabled, the task instance will continue to hold Renewable resources if the task instance fails. Renewable resources will be returned only if the task instance status is either Complete, Finished, or Skipped.
Mutually Exclusive With Self	If enabled, the task will not be allowed to run concurrently with itself. Task will not start until the instance that is running finishes. An instance will transition to Exclusive Wait status if it cannot start due to another instance already running.
Simulate	Specifies if the instance should execute under simulation mode.
Previous Instance Wait Resolved	System-supplied; If the Override Previous Instance Wait field for the task is set to No, the Previous Instance Wait Resolved field will be set to the value of the Previous Instance Wait field of the parent workflow. Otherwise, it will be set to the value specified by the Override Previous Instance Wait. Options: • -- None -- • Wait for Last Every task instance directly within the workflow instance will remain in **Instance Wait** until the most recent prior instance of the same task has completed. • Wait for Last / Same Workflow Every task instance directly within the workflow instance will remain in **Instance Wait** until the most recent prior instance of the same task, within an instance of the same workflow, have completed. • Wait for All Every task instance directly within the workflow instance will remain in **Instance Wait** until all prior instances of the same task has completed. • Wait for All / Same Workflow Every task instance directly within the workflow instance will remain in **Instance Wait** until all prior instances of the same task, within an instance of the same workflow, have completed.
Status	This section contains information about the current status of the task instance.
Status	System-supplied; see Task Instance Statuses.

Exit Code	System-supplied; the exit code captured by the Agent when executing the task (for example, a command or script).
Status Description	System-supplied; additional information, if any, about the status of the task instance.
Operational Memo	User-defined operational memo.
Evaluation Time	If time zone of user is different than time zone of task instance; Time at which Execution Restrictions and Run Criteria were evaluated based upon the requested time zone. (Time zone of task instance displays in parentheses.)
Critical	Indicates that this task is in the Critical Path of a workflow.
Wait Until Time	Amount of time calculated to wait before the task was started, based on Wait To Start and Delay On Start times.
Queued Time	System-supplied; Date and time the task was queued for processing.
Trigger Time	System-supplied; Date and time the task instance was triggered.
Launch Time	System-supplied; Date and time the task instance was launched.
Start Time	System-supplied; Date and time the task instance started.
End Time	System-supplied; Date and time the task instance completed.
Duration	System-supplied; amount of time the task instance took to run.
Application Control Details	This section contains assorted detailed information about the task instance.
Application	Protected if auto-generated; Name of the Application resource record. The Application resource defines where the software application is running; it also defines the start, stop, and query commands for the application.
Command	Protected if auto-generated; command that this task is executing against the software application. Options: • Query • Start • Stop
Generated	System-supplied; protected. If selected, indicates that this Application Control task was generated automatically when the Application resource record was submitted.
Wait / Delay Options	This section contains specifications for waiting to start and/or delaying on start the task.
Wait To Start	Amount of time to wait before starting a task from the time that it was launched. Options are: • – None – • Time • Relative Time • Duration • Seconds
Wait Time	If Wait To Start = Time or Relative Time; Time of day (in 24-hour time) to wait until before starting the task.

Wait Day Constraint	If Wait To Start = Time or Relative Time; Specification for whether or not to advance the wait time to another day.
	Valid values:
	• -- None --
	  • If Wait To Start = Time; Advance to the next day if the specified wait time is before the time that the task instance is eligible to start; that is, all dependencies have been met. For example: it is not being held, and it is not waiting on any predecessors.
	  • If Wait To Start = Relative Time; Advance to the next day if the specified wait time is before the task instance Trigger Time or, if there is no Trigger Time, before the task instance Launch Time. In the latter case, when a task instance is within a workflow, it will inherit the Launch Time of the top-level parent workflow task instance.
	• Same Day
	Do not advance day.
	• Next Day
	Advance to the next day.
	• Next Business Day
	Advance to the next business day.
	• Sunday
	If today is not Sunday, advance to next Sunday.
	• Monday
	If today is not Monday, advance to next Monday.
	• Tuesday
	If today is not Tuesday, advance to next Tuesday.
	• Wednesday
	If today is not Wednesday, advance to next Wednesday.
	• Thursday
	If today is not Thursday, advance to next Thursday.
	• Friday
	If today is not Friday, advance to next Friday.
	• Saturday
	If today is not Saturday, advance to next Saturday.
	Default is – None –.

Wait Duration	If Wait To Start = Duration; Number of days, hours, minutes, and seconds to wait before starting the task.
Wait Duration In Seconds	If Wait To Start = Seconds; Number of seconds to wait before starting the task.
Delay On Start	Amount of time to delay the start of a task, after it has been launched, from the time that it is eligible to start; that is, all dependencies have been met. For example: it is not being held, it is not waiting on any predecessors, or there is no wait time specified. Options are: • – None – • Duration • Seconds
Delay Duration	If Delay On Start = Duration; Number of days, hours, minutes, and seconds to delay after starting the task.
Delay Duration In Seconds	If Delay On Start = Seconds; Number of seconds to delay after starting the task.
Time Options	This section contains time-related specifications for the task instance.
Late Start	If enabled, and if the task instance starts after the time or period specified, the task instance is flagged as late. You can specify a time or duration to determine a late start (see Late Start Type). To determine whether a task instance started late, open the task instance and locate the Started Late field; the field is checked if the instance started after the specified time. The Started Late field displays in the task instance Details only if the user specified a Late Start in the task Details.

Started Late	System-supplied; this field is flagged if the task started later than the time specified in the Late Start fields.
Late Start Type	Required if Late Start is enabled. Options: • Time - Flag the task if it starts after the specified time. • Duration - Flag the task if it starts a certain amount of time after the programmed start time. The task must have a specific start time.
Late Start Time	If Late Start Type = Time; Time after which the task start time is considered late. Use HH:MM, 24-hour time.
Late Start Day Constraint	If Late Start Type = Time; Specification for whether or not to advance the late start time to another day. Valid values: • -- None -- Advance to the next day if the specified late start time is before the Created time of the task instance. • Same Day Do not advance day. • Next Day Advance to the next day. • Next Business Day Advance to the next business day. • Sunday If today is not Sunday, advance to next Sunday. • Monday If today is not Monday, advance to next Monday. • Tuesday If today is not Tuesday, advance to next Tuesday. • Wednesday If today is not Wednesday, advance to next Wednesday. • Thursday If today is not Thursday, advance to next Thursday. • Friday If today is not Friday, advance to next Friday. • Saturday If today is not Saturday, advance to next Saturday. • Nth Day Advance to a specific number of days in the future. Default is – None –.
Late Start Nth Amount	If Late Start Day Constraint = Nth Day; Number of days to advance.
Late Start Duration	If Late Start Type = Duration; Duration (amount of relative time) after which the task is considered to have started late. For a task within a workflow, the duration is the period between the time the workflow starts and the time the task itself starts. For example, a task might have a Late Start Duration of 60 minutes. If the workflow starts at 9:00 a.m. but the task itself does not start until 10:30, the task has started late. For a task that is not within a workflow, Late Start Duration has meaning only if the task has been held upon starting. For example, if a task has a Late Start Duration of 60 minutes and the Hold on Start field is enabled, if the task is not released from hold within the amount of time specified in the Late Start Duration field, the task has started late.
Computed Late Start Time	If Late Start is enabled, the computed Date/Time for when the task instance will be Late Started.
Late Finish	If enabled, and if the task instance finishes after the time or period specified, the task instance is flagged as late. You can specify a time or duration to determine a late finish (see Late Finish Type). To determine whether a task instance finished late, open the task instance and locate the Finished Late field; the field is checked if the instance finished after the specified time or lasted longer than expected. This field only appears on the task instance if the user specified a Late Finish in the task definition.

Finished Late	System-supplied; this field is flagged if the task finished later than the time or duration specified in the Late Finish fields.
Late Finish Type	Required if Late Finish is enabled. Options: • Time - Flag the task if it finishes after the specified time (see Late Finish Time). • Duration - Flag the task if it finishes a certain amount of time after the programmed finish time (see Late Finish Duration). The task must have a specific finish time. • Average Duration - Flag the task if it finishes before the average duration (see Average Instance Time) for the task, less an offset (see Late Finish Offset Type), if specified.
Late Finish Offset Type	If Late Finish Type = Average Duration; Options: • Percentage • Duration
Late Finish Percentage Offset (+)	Required if Late Finish Offset Type = *Percentage*; Percentage of **Average Duration** to use as an offset. The late finish time is calculated by adding the offset to the **Average Duration**. (Minimum = 0 and Maximum = 1000)
Late Finish Duration Offset (+)	Required if Late Finish Offset Type = *Duration*; Duration to use as an offset. The late finish time is calculated by adding the offset to the **Average Duration**.
Late Finish Duration Offset Unit	If Late Finish Offset Type = Duration; Options: • Seconds • Minutes • Hours
Late Finish Time	If Late Finish Type = Time; Time after which the task finish time is considered late. Use HH:MM, 24-hour time.
Late Finish Day Constraint	If Late Finish Type = Time; Specification for whether or not to advance the late finish time to another day. Valid values: • -- None -- Advance to the next day if the specified late finish time is before the Created time of the task instance. • Same Day Do not advance day. • Next Day Advance to the next day. • Next Business Day Advance to the next business day. • Sunday If today is not Sunday, advance to next Sunday. • Monday If today is not Monday, advance to next Monday. • Tuesday If today is not Tuesday, advance to next Tuesday. • Wednesday If today is not Wednesday, advance to next Wednesday. • Thursday If today is not Thursday, advance to next Thursday. • Friday If today is not Friday, advance to next Friday. • Saturday If today is not Saturday, advance to next Saturday. • Nth Day Advance to a specific number of days in the future. Default is – None –.
Late Finish Nth Amount	If Late Finish Day Constraint = Nth Day; Number of days to advance.

Late Finish Duration	If Late Finish Type = Duration; Longest amount of time this task instance should take to run.
Computed Late Finish Time	If Late Finish is enabled, the computed Date/Time for when the task instance will be Late Finished.
Early Finish	If enabled, and if the task instance finishes before the time or period specified, the task instance is flagged as early. You can specify a time or duration to determine an early finish (see Early Finish Type). To determine whether a task instance finished early, open the task instance and locate the Finished Early field; the field is checked if the instance finished before the specified time or did not last as long as expected. This field only appears on the task instance if the user added Early Finish specifications to the task definition.
Finished Early	System-supplied; this field is flagged if the task finished earlier than the time specified in the Early Finish fields.
Early Finish Type	Required if Early Finish is enabled. Options: • Time - Flag the task if it finishes before the specified time (see Early Finish Time). • Duration - Flag the task if it finishes a certain amount of time before the programmed finish time (see Early Finish Duration). The task must have a specific finish time. • Average Duration - Flag the task if it finishes before the average duration (see Average Instance Time) for the task, less an offset (see Early Finish Offset Type), if specified.
Early Finish Offset Type	If Early Finish Type = Average Duration; Options: • Percentage • Duration
Early Finish Percentage Offset (-)	Required if Early Finish Offset Type = *Percentage*; Percentage of **Average Duration** to use as an offset. The early finish time is calculated by subtracting the offset from the **Average Duration**. (Minimum = 0 and Maximum = 100)
Early Finish Duration Offset (-)	Required if Early Finish Offset Type = *Duration*; Duration to use as an offset. The early finish time is calculated by subtracting the offset from the **Average Duration**.
Early Finish Duration Offset Unit	If Early Finish Offset Type = Duration; Options: • Seconds • Minutes • Hours
Early Finish Time	If Early Finish Type = Time; Time before which the task finish time is considered early. That is, enter a time at which the task should still be running. Use HH:MM, 24-hour time.

Early Finish Day Constraint	If Early Finish Type = Time; Specification for whether or not to advance the early finish time to another day. Valid values: • -- None -- Advance to the next day if the specified early finish time is before the Created time of the task instance. • Same Day Do not advance day. • Next Day Advance to the next day. • Next Business Day Advance to the next business day. • Sunday If today is not Sunday, advance to next Sunday. • Monday If today is not Monday, advance to next Monday. • Tuesday If today is not Tuesday, advance to next Tuesday. • Wednesday If today is not Wednesday, advance to next Wednesday. • Thursday If today is not Thursday, advance to next Thursday. • Friday If today is not Friday, advance to next Friday. • Saturday If today is not Saturday, advance to next Saturday. • Nth Day Advance to a specific number of days in the future. Default is – None –.
Early Finish Nth Amount	If Early Finish Day Constraint = Nth Day; Number of days to advance.
Early Finish Duration	If Early Finish Type = Duration; Shortest amount of time this task instance should take to run.
Projected Late	System-provided if Late Start Time, Late Start Duration, or Late Finish Time is specified; This field is flagged if the task instance is projected to be late based on critical path projected end times (see Critical Path Projected Late Action Maximum and Critical Path Projected Late Threshold In Minutes Universal Controller system properties). .
Critical Path Options	This section contains Critical Path-related specifications for the task.
CP Duration	Optional; Allows you to override the estimated Critical Path Duration of the task when running in a Workflow; used in conjunction with the CP Duration Unit field. In most cases, this field should be left blank, which implies that the Controller will estimate the Critical Path Duration based on historical executions. Valid values are any integer equal to or greater than 0. Variables and Functions are supported.
CP Duration (Resolved)	Displays the current resolved value of the CP Duration field, which may contain variables or functions that will be displayed as unresolved until the task instance starts. The CP Duration (Resolved) field can continue to change value until the task instance starts, at which time CP Duration will display as resolved and CP Duration (Resolved) will no longer be visible unless there was an issue resolving the variables and/or functions contained within CP Duration. If the Controller is unable to resolve CP Duration or it resolves to an invalid value, CP Duration will be ignored and the Controller will estimate the Critical Path Duration based on historical executions.

CP Duration Unit	Type of CP Duration; used in conjunction with the CP Duration field. For example, for a CP Duration of two minutes, specify 2 in the CP Duration field and select **Minutes** in this field. Options: • Seconds • Minutes • Hours Default is Minutes.
Workflow Execution Options	This section contains Critical Path-related specifications for the task.
Execution Restriction	Specification for whether or not there is a restriction for this task to be run, skipped, or held. Options are: • -- None -- No restriction for this task. • Run Restriction for when this task will be run. • Skip Restriction for when this task will be skipped. • Hold Restriction for when this task will be held. If Execution Restriction on a task is Run or Skip, then when it is part of a Workflow that is being launched, the Restriction Period is evaluated. The task instance will be skipped if Execution Restriction is Skip and the date is within the Restriction Period or Execution Restriction is Run and the date is not within the Restriction Period. Execution Restriction can be set to Skip with a Restriction Period of - None -, meaning the restriction is always active and the task will be skipped when it is part of a Workflow.
Restriction Period	If Execution Restriction = Run, Skip, or Hold; Period of time when the task is restricted. Options are: • – None – No period of restriction for this task. • Before Restriction is valid if the date is before the Before Date value. • After Restriction is valid if the date is after the After Date value. • Span Restriction is valid if the date is before the Before Date value and after After Date value. • On Restriction is valid if the date is one of the Date List values.
Before Date	If Restriction Period = Before or Span; Date before which the restriction is valid.
Before Time	If Restriction Period = Before or Span; Time on the selected date before which the restriction is valid.
After Date	If Restriction Period = After or Span; Date after which the restriction is valid.
After Time	If Restriction Period = After or Span; Time on the selected date after which the restriction is valid.
Date List	If Restriction Period = On; Date(s) on which the restriction is valid.
Statistics	This section contains time-related statistics for the task instance.
User Estimated End Time	System-supplied; If the user entered information into the User Estimated Duration field in the task Details, the Controller uses this information to calculate an end time for the task instance, based on the date/time the task instance started.
Lowest Estimated End Time	System-supplied; Lowest estimated end time of the task instance, calculated by the Controller based on the date/time the task instance started.

Average Estimated End Time	System-supplied; Average estimated end time of the task instance, calculated by the Controller based on the date/time the task instance started.
Highest Estimated End Time	System-supplied; Highest estimated end time of the task instance, calculated by the Controller based on the date/time the task instance started.
Projected End Time	System-supplied; projected end time of the task instance, calculated by the Controller based on the projected end time of its predecessor (or the maximum projected end time of all its predecessors, if more than one path exists to that task instance) plus its estimated critical path duration.
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.
Status History	History of all statuses that the task instance has gone through.
Operational Memo History	History of all Operational Memos for the task.
Buttons	This section identifies the buttons displayed above and below the Task Instance Details that let you perform various actions.
Update	Saves updates to the record.
Force Finish	See Force Finishing a Task.
Hold	Places the task instance on Hold (see Putting a Task on Hold).
Skip	For tasks loaded into the schedule that have not yet run; allows you to tell the Controller to skip this task. See Skipping a Task.
Re-run	See Re-running a Task Instance. **Note** If the Re-run (Suppress Intermediate Failures) Permitted Universal Controller system property is set to true, the Re-run button is a drop-down list containing the following options: • Re-run • Re-run (Suppress Intermediate Failures) The Re-run button does not display if the task instance does not qualify for Re-run. If the task instance qualifies for Re-run, but already has Retry Options enabled, Re-run (Suppress Intermediate Failures) displays as disabled in the drop-down list.
View Parent	Displays the task instance Details for the parent Workflow of this task instance.
Retrieve Output	See Retrieving Output.
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 task instance.
Tabs	This section identifies the tabs across the top of the Task Instance Details that provide access to additional information about the task instance.
Virtual Resources	Lists all Virtual Resources to which this task is assigned. If you want to create a Task Virtual Resource for this task, you can select an existing Virtual Resource (or, optionally, first create a new Virtual Resource and then select it as the Task Virtual Resource) or enter a Virtual Resource variable. The variable must be a supported type as described in Variables and Functions.
Exclusive Requests	Lists all records in the Exclusive Requests table (`ops_exclusive_order`) for this task instance.
Notes	Lists all notes associated with this record.

10.4.5 Running an Application Control Task

You can run an Application Control task:

- Manually, by clicking the Launch or Launch with Variables button in the Application Control Tasks list or Application Control Task Details Action menu.
- As part of a Workflow.
- Specify triggers that run the task automatically based on times or events.

10.4.6 Monitoring Task Execution

You can monitor all system activity from the Activity Monitor and can view activity history from the History list.

10.5 Application Monitor Triggers

10.5.1 Overview

The Application Monitor Trigger allows you to trigger one or more tasks based on the status of:

- A specific application resource.
- One or more application resources, based on selection criteria you supply.

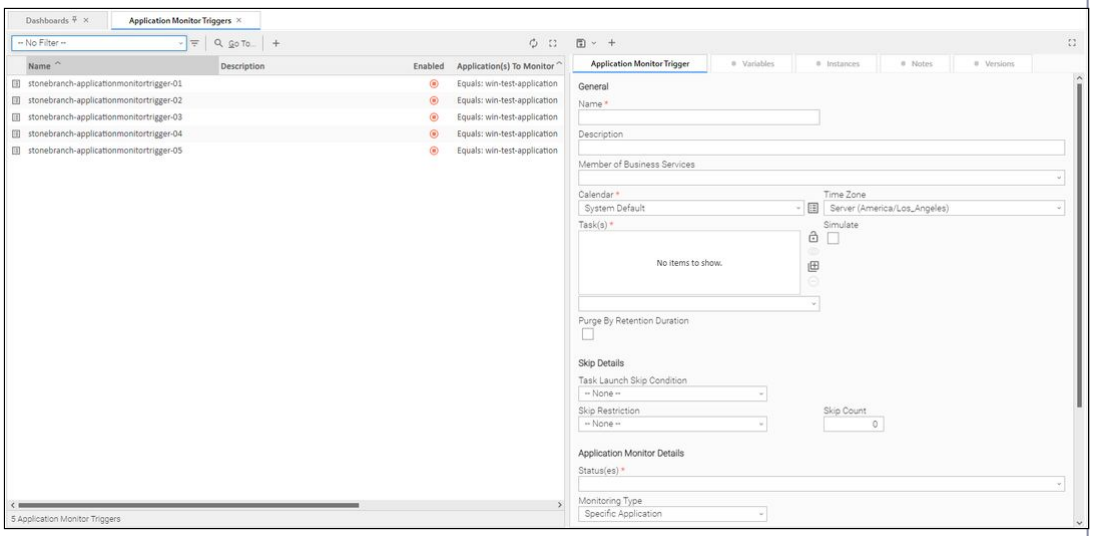
You can launch any number of tasks when the conditions in the trigger are satisfied.

When creating a trigger, if you specify Application Monitor Condition = All, and select all Application types, the trigger monitors all Application resource records you have defined. Any time any one of them goes to any of the statuses you specified in the Status(es) field, the trigger launches the task(s) specified in the Task(s) field. For example, you might use this trigger to send an email notification to technical support if any of the monitored applications goes into the Start Failure status.

10.5.2 Built-In Variables

Application Monitor Trigger built-in variables are provided to pass information about the Application being monitored into the task(s) being launched by the trigger. You can pass the information into the launched tasks by including the variables in a text field in the task definition.

10.5.3 Creating an Application Monitor Trigger

Step 1	From the Automation Center navigation pane, select **Triggers > Application Monitor Triggers**. The Application Monitor Triggers list displays. Below the list, Application Monitor Trigger Details for a new Application Monitor trigger displays. (You also can click the **New** button to display Application Monitor Trigger Details for a new Application Monitor trigger.) 
Step 2	Enter/select Details for a new Application Monitor trigger, using the field descriptions below as a guide. • Required fields display an asterisk (*) after the field name. • 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 + button above the list to display a pop-up version of the Details.
Step 3	Click a button. The trigger is added to the database, and all buttons and tabs in the Trigger Details are enabled.
Step 4	If appropriate, repeat these steps for any additional triggers you want to add.
Step 5	Enable the trigger(s) as desired.

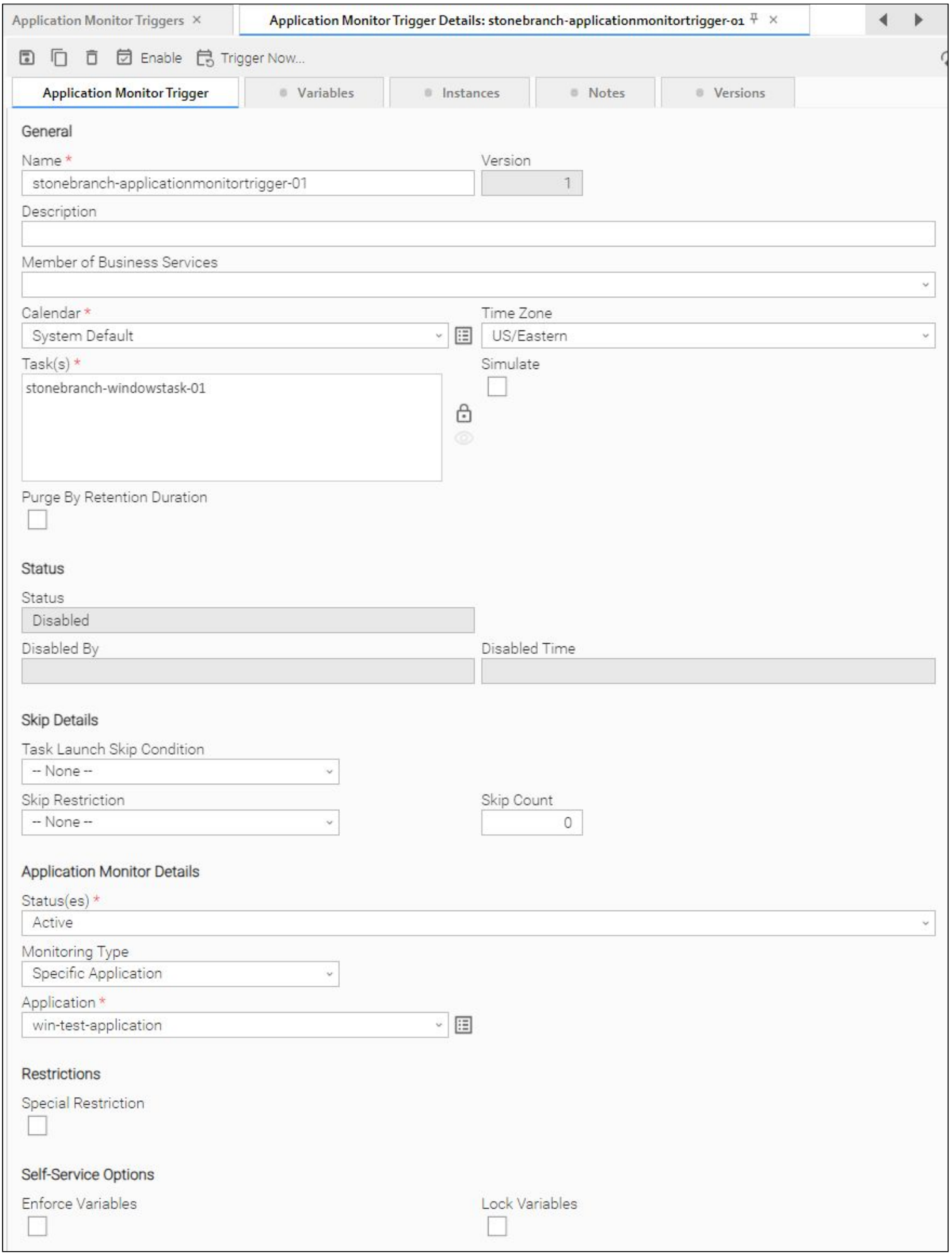
Note

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 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).

10.5.3.1 Application Monitor Trigger Details

The following Application Monitor Trigger Details is for an existing Application Monitor trigger. See the field descriptions, below, for a description of the fields that display in the Application Monitor Trigger Details.


Application Monitor Triggers
Application Monitor Trigger Details: stonebranch-applicationmonitortrigger-01
Enable
Trigger Now...
Application Monitor Trigger
Variables
Instances
Notes
Versions
General
Name *
stonebranch-applicationmonitortrigger-01
Version
1
Description
Member of Business Services
Calendar *
System Default
Time Zone
US/Eastern
Task(s) *
stonebranch-windowstask-01
Simulate
Purge By Retention Duration
Status
Status
Disabled
Disabled By
Disabled Time
Skip Details
Task Launch Skip Condition
-- None --
Skip Restriction
-- None --
Skip Count
0
Application Monitor Details
Status(es) *
Active
Monitoring Type
Specific Application
Application *
win-test-application
Restrictions
Special Restriction
Self-Service Options
Enforce Variables
Lock Variables

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

10.5.3.2 Application Monitor Trigger Details Field Descriptions

The following table describes the fields, buttons, and tabs that display in the Application Monitor Trigger Details.

Field Name	Description
General	This section contains general information about the trigger.
Name	Name used within the Controller to identify this trigger. It can contain a maximum of 255 alphanumerics. It is the responsibility of the user to develop a workable naming scheme for triggers.
Version	System-supplied; version number of the current record, which is incremented by the system every time a user updates a record. Click the Versions tab to view previous versions. For details, see Record Versioning.
Description	Description of this record. Maximum length is 255 characters.
Member of Business Services	User-defined; Allows you to select one or more Business Services that this record belongs to. (You also can Check All or Uncheck All Business Services for this record.) You can select up to 62 Business Services for any record type, and enter a maximum of 2048 characters for each Business Service. 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.
Calendar	Calendar that defines the business days, holidays, and other special days that determine the run dates for the task(s) specified in the trigger. Select a Calendar from the drop-down list of all existing Calendars. To display detailed information about a selected calendar, click the Details icon next to the Calendar field.
Time Zone	User-defined; allows you to specify the time zone that will be applied to the time(s) specified in the trigger. For example, if you specify 23:00 and a time zone of Canada/Central, the task will run at 11:00 p.m. Central Canada time.
Task(s)	Name of the task(s) being triggered when this trigger is satisfied. When selecting tasks from the Details, click on the lock icon to unlock the field and select tasks.
Simulate	Specifies if the instances generated by this trigger should execute under simulation mode, in which none of the tasks execute. Alternatively, simulation mode can be enabled from the **Trigger Now…** command (see Triggering with Variables and Triggering by Date and Time).
Purge By Retention Duration	Specification for whether triggered task instances can be purged by retention duration.
Exclude Backup	If Purge By Retention Duration is selected; Specification for whether qualifying task instances can be excluded from the backup when being purged by retention duration.
Retention Duration	If Purge By Retention Duration is selected; Minimum retention duration for the selected Retention Duration Unit before triggered task instances can qualify for purge. If Retention Duration Unit = Days, valid values are 1 to 366. If Retention Duration Unit = Hours, valid values are 1 to 24.

Retention Duration Unit	If Purge By Retention Duration is selected; Retention duration unit. Options: • Hours • Days
Execution User	Read-only; Execution user that has been selected (via the Assign Execution User action) to override the execution user of task instances being launched by the trigger.
Status	This section contains information about the current status of the trigger.
Status	System-defined; Specification for whether the trigger is Enabled or Disabled. The user enables and disables the trigger by clicking the Enable / Disable buttons. Only enabled triggers are processed by the Controller.
Next Scheduled Time	System-supplied; for time-based triggers. If Status = Enabled, the next date and time this trigger will be satisfied. See Displaying Trigger Forecast Information.
Enabled By	System-supplied. If Status = Enabled, ID of the user who most recently enabled this trigger.
Disabled By	System-supplied; If Status = Disabled, ID of the user who most recently disabled this trigger. (By default, all new triggers are disabled.)
Enabled Time	System-supplied. If Status = Enabled, Date and time that the trigger was enabled.
Disabled Time	System-supplied. If Status = Disabled, Date and time that the trigger was disabled.
Skip Details	This section contains detailed information about skipping the trigger.
Task Launch Skip Condition	User-defined; Controls when launching a target task for recurrence will be skipped. The Recurring Task Launch Skip Condition Default Universal Controller system property value is used as the default value for this field. Options: • None Do not skip the target task launch. • Active Skip the target task launch if there are any target task instances running. • Active By Recurring Task Instance Skips the target task launch if there are any target task instances running for the same Recurring task.

Skip Restriction	User-defined; Specification for when this trigger should skip and not launch the task(s). Options: • - - None - - No skip restrictions • Before Trigger will skip if the current date and time is before the specified Skip Before Date and Skip Before Time values. • After Trigger will skip if the current date and time is after the specified Skip After Date and Skip After Time values. • Span Trigger will skip if the date and time qualifies based upon the specified Skip After Date, Skip After Time, Skip Before Date, and Skip After Date values. **Note** If Skip After Date and Skip After Time are prior to the Skip Before Date and Skip Before Time, the Span is a "between" period. In this case, if the triggered time is after the Skip After Date and Skip After Time **as well as** before the Skip Before Date and Skip Before Time, the Trigger will skip and not launch the configured Task(s). If the Skip Before Date and Skip Before Time are prior to the Skip After Date and Skip After Time, the Span is a "not between" period. In this case, if the triggered time is **either** after the Skip After Date and Skip After Time **or** before the Skip Before Date and Skip Before Time, then the trigger will skip and not launch the configured Task(s). • On Trigger will skip on any of the dates specified in the Skip Date LIst. Default is - - None - -.
Skip Count	User-defined; Allows you to specify that the Controller should skip the next *N* times this task is triggered. Skip Count is not applicable when using the **Trigger Now...** command and will be ignored.
Skip Before Date	If Skip Restriction is Before or Span; Date before which the Trigger will skip.
Skip Before Time	If Skip Restriction is Before or Span; Time before which the Trigger will skip on the specified Skip Before Date.
Skip After Date	If Skip Restriction is After or Span; Date after which the Trigger will Skip.
Skip After Time	If Skip Restriction is After or Span; Time after which the Trigger will skip on the specified Skip After Date.
Skip Date List	If Skip Restriction is On; List of dates on which the trigger will skip.
Application Monitor Details	This section contains assorted detailed information about the trigger time.
Status(es)	System-supplied; application status being monitored for. One or more of the following: • **Inactive** - The initial state of the Application. The Application is stopped and unmonitored. • **Start Failure** - The Agent experienced a failure while attempting to execute the Start command. • **Starting** - The Start command was executed and the Controller is waiting for Query command response. • **Active** - The Query command response is reporting that the Application is Active. • **Impaired** - The Query command response is reporting that the Application is experiencing a problem and is possibly down. • **Query Overdue** - The Agent is late sending the Controller an updated Query command response.

Monitoring Type	Indicates whether you are monitoring one specific Application resource or want to provide selection parameters to monitor multiple Application resources. See Applications for information about setting up Application resources. Options: • **Specific Application** Use the Application field to browse for and select the Application resource you want to monitor. • **General Applications** Use the Application Monitor Condition and Application Type(s) fields to provide parameters for selecting which Application resources you want to monitor.
Application	If Monitoring Type = Specific Application, name of a specific application resource to be monitored.
Application Monitor Condition	If Monitoring Type = General Application(s), allows you to specify selection parameters: • **All** - Monitor all Application resources. • **Starts With** - Monitor all Application resources whose name starts with the string you provide in the Condition Value field. • **Contains** - Monitor all Application resources whose name contains the string you provide in the Condition Value field. • **Ends With** - Monitor all Application resources whose name ends with the string you provide in the Condition Value field.
Condition Value	If Application Monitor Condition = Starts With, Contains, or Ends With; specifies the search string.
Application Type(s)	If Monitoring Type = General Application(s), type(s) of applications to monitor. Options: • Windows Service • Linux/Unix Daemon • z/OS Started Task
Restrictions	This section specifies any restrictions that apply to the trigger.
Special Restriction	Enable this field in order to specify additional parameters that tell the Controller how to handle exceptions, such as when the trigger is satisfied on a holiday or non-business day. You can specify simple and/or complex restrictions. For example, you can specify a Simple Restriction that disables the trigger if it is satisfied on a holiday identified in the calendar and/or a Complex Restriction that disables the trigger on the last business day of every month.
Action	If Special Restriction is enabled, allows you to select an action to take on a non-business day or holiday (see Situation field). Options: • Do Not Trigger • Next Day (run on the next day) • Next Business Day (run on the next business day, as defined in the calendar) • Previous Day (run on the previous day) • Previous Business Day (run on the previous business day, as defined in the calendar)
Simple Restriction	If enabled, allows you to specify an action (see Action field) such as Do Not Trigger on a non-business day or holiday (see Situation field). For example, do not trigger on a non-business day.
Situation	If Simple Restriction is enabled, allows you to select the situation that causes the system to initiate the action specified in the Action field. Options: • On Non Business Day • On Holiday

Complex Restriction	If enabled, allows you to specify a set of parameters that determine one or more situations when this trigger should not be satisfied. Used in conjunction with the following fields: Restriction Mode, Restriction Adjective, Restriction Noun, Restriction Qualifier. For example, you may specify that you do not want to satisfy this trigger on the last business day of the year or the first day of each month.
Restriction Mode	If both Simple Restriction and Complex Restriction are enabled, specifies whether you want to use both restriction types (AND) or one or the other (OR). Options: • And • Or
Restriction Adjective	If Complex Restriction is enabled, the type of selection. Options: • Every • 1st • 2nd • 3rd • 4th • Last • Nth Example: The **last** business day of the month.
Restriction Noun	If Complex Restriction is enabled, the day you want to select. Options: • Sunday through Saturday • Day • Business Day • Custom Day Example: The last **business day** of the month.
Restriction Qualifier	If Complex Restriction is enabled, the period you are selecting from. Options: • Month • Year • Week • January through December • Custom period Example: The last quarter of the **year**.
Restriction Nth Amount	If Restriction Adjective is Nth, allows you to specify the value of N. If Restriction Qualifier is Week, Restriction Nth Amount must be <= 7.
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 Trigger Details that let you perform various actions.
Save	Saves a new task 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.
Enable	Activates this trigger and writes your User ID to the Enabled By field.
Disable	Deactivates this trigger.
Trigger Now...	Unable to render include or excerpt-include. Could not retrieve page.
Copy	Creates a copy of this trigger, which you are prompted to rename.
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 trigger.
Tabs	This section identifies the tabs across the top of the Trigger Details that provide access to additional information about the trigger.
Variables	Lists all user-defined variables associated with this record; that is, variables that have been defined for this specific record.
Instances	Lists all task instances that were triggered directly by this trigger.
Versions	Stores copies of all previous versions of the current record. See Record Versioning.

11 Cluster Nodes

11.1 Introduction

Cluster Nodes are Universal Controller instances in a Universal Automation Center system.

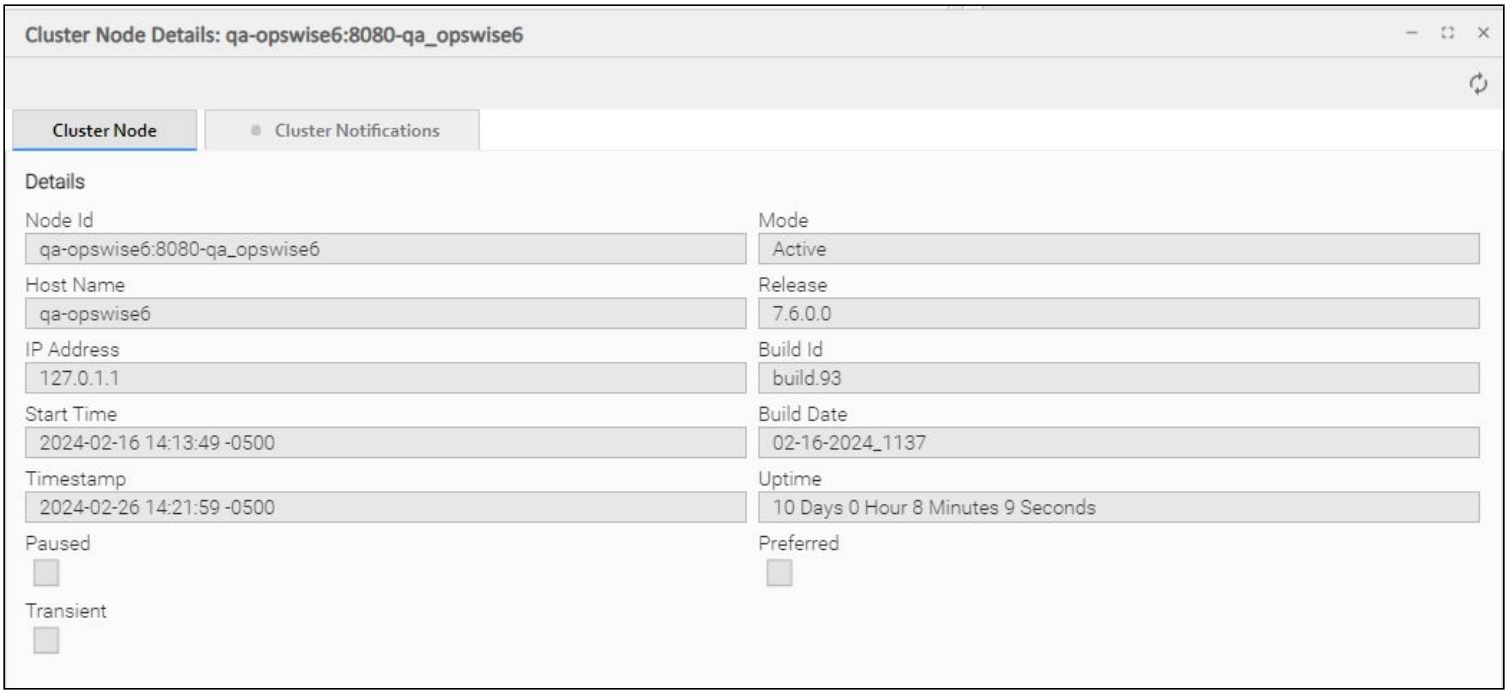
Universal Automation Center contains more than one cluster node only if it is operating in a High Availability environment.

11.2 Displaying Information About Cluster Nodes

When you start a cluster node for the first time, the Controller automatically creates a database record for that cluster node. You can view these records for details and status information.

Step 1	From the Agents & Connections navigation pane, select **System > Cluster Nodes**. The Cluster Nodes list displays: 
Step 2	To display the Details for a cluster node on the list, click the Details icon next to the **Node Id**, or click anywhere in the row.

11.2.1 Cluster Node Details



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

11.2.2 Cluster Node Details Field Descriptions

The following table describes the fields on the Cluster Nodes Details

Field Name	Description
Details	This section contains detailed information about the cluster node.
Node ID	hostname:port-database_name of the cluster node.

Mode	Current mode of the cluster node:
	• **Active**: Cluster node processes events and messages and interfaces with the database. It is the active node for automated operations.\\
	• **Passive**: Cluster node is running but is not connected to its OMS Server. It performs the following tasks:
	  • Accepts HTTP requests for data. It can access the database, generate reports, monitor and display data.
	  • Does not process any events or messages.
	  • Takes over as Active node if it determines that the Active node is not running.
	• **Offline**: Cluster node is not running.
	(See Passive Cluster Node Restrictions for further information on Passive cluster node capabilities.)

Host Name	User-provided during installation; IP address or domain/name of the host machine where the resource resides.
Release	System-supplied; release number for this node. Support purposes only.

IP Address	System-supplied; IP address of this node.
Build ID	System-supplied; build ID for this node. Support purposes only.
Start Time	System-supplied; date and time this node was last started.
Build Date	System-supplied; build date for this node. Support purposes only.
Timestamp	System-supplied; date and time of this node's last heartbeat.
Uptime	System-supplied; amount of time this node has been running.
Paused	Indication that this node has been paused.
Preferred	Indication that this node is set as Preferred.
Transient	Indication that this node is set as Transient.
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 Cluster Node Details that let you perform various actions.
Refresh	Refreshes any dynamic data displayed in the Details.
Tabs	This section identifies the tabs across the top of the Cluster Node Details that provide access to additional information about the cluster node.
Cluster Notifications	Lists all notifications that have been defined for this cluster node.

11.3 Starting/Stopping Cluster Nodes

For instructions on starting and stopping cluster nodes, see Starting and Stopping Universal Controller.

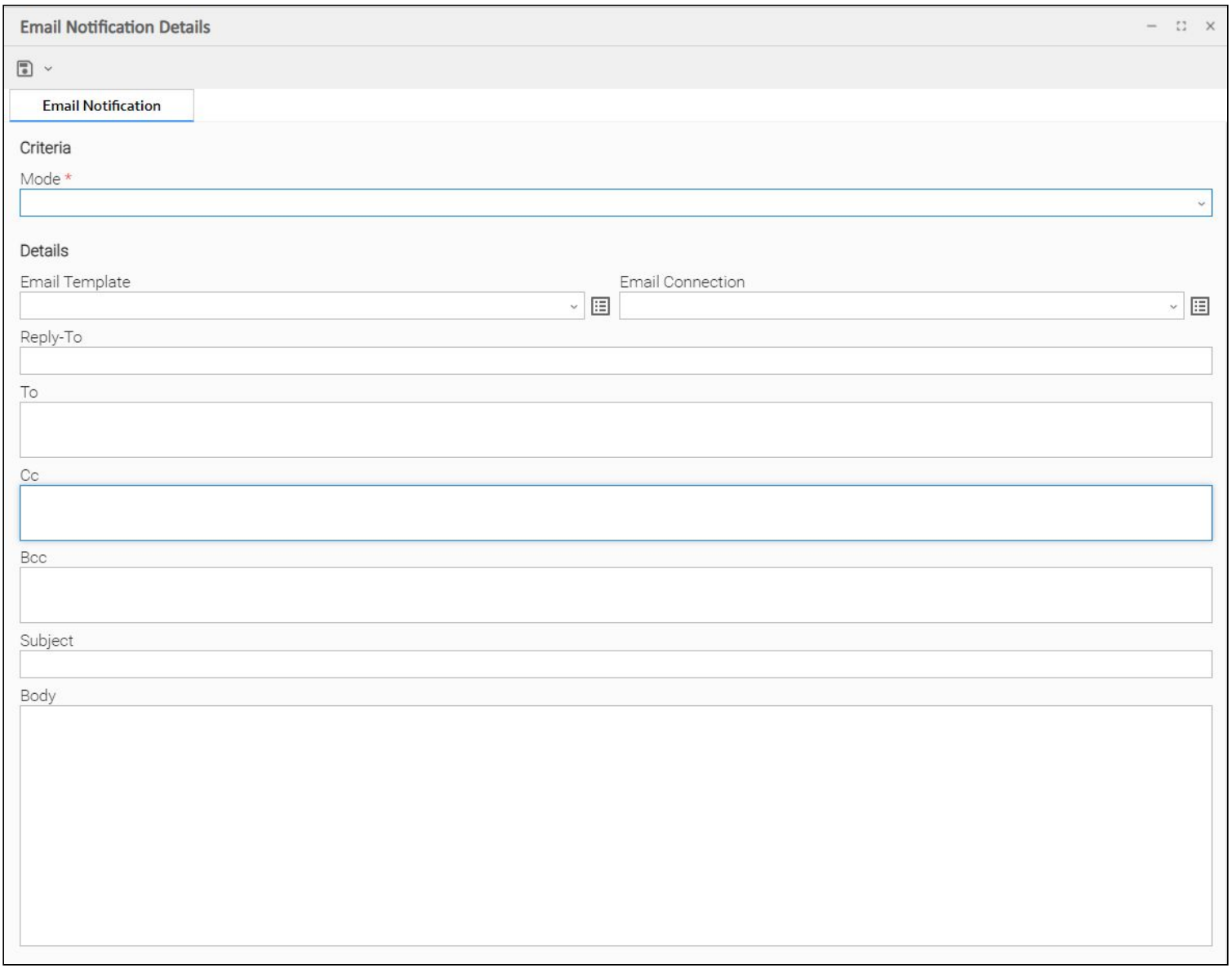
11.4 Sending Notifications on Status of a Cluster Node

You can configure Cluster Nodes to send a notification via email or SNMP when the resource goes Offline or becomes Active.

Step 1	From the **Agents and Connections** navigation pane, select **System > Cluster Nodes**. The Cluster Nodes list displays.
Step 2	Click the Details icon next to the **Node ID** of a Cluster Node, or click anywhere in the Cluster Node row, to display Details about the Cluster Node.

Step 3	Click the **Cluster Notifications** tab to display a list of any Email and SNMP notifications configured for the Cluster Node.
Step 4	Select the type of notification you want the Cluster Node to send, and then click **New**. Notification Details for a new Notification displays (see Email Notification Details and SNMP Notification Details, below).
Step 5	Complete the fields as needed (see Email Notification Details Field Descriptions and SNMP Notification Details Field Descriptions, below). **Note** Cluster Node built-in variables are available to pass data about the Cluster Node into the notification. (User-defined variables, including Global variables, are not available for use in Cluster Node email notifications).
Step 6	Click a **Save** button to save the record.

11.4.1 Email Notification Details



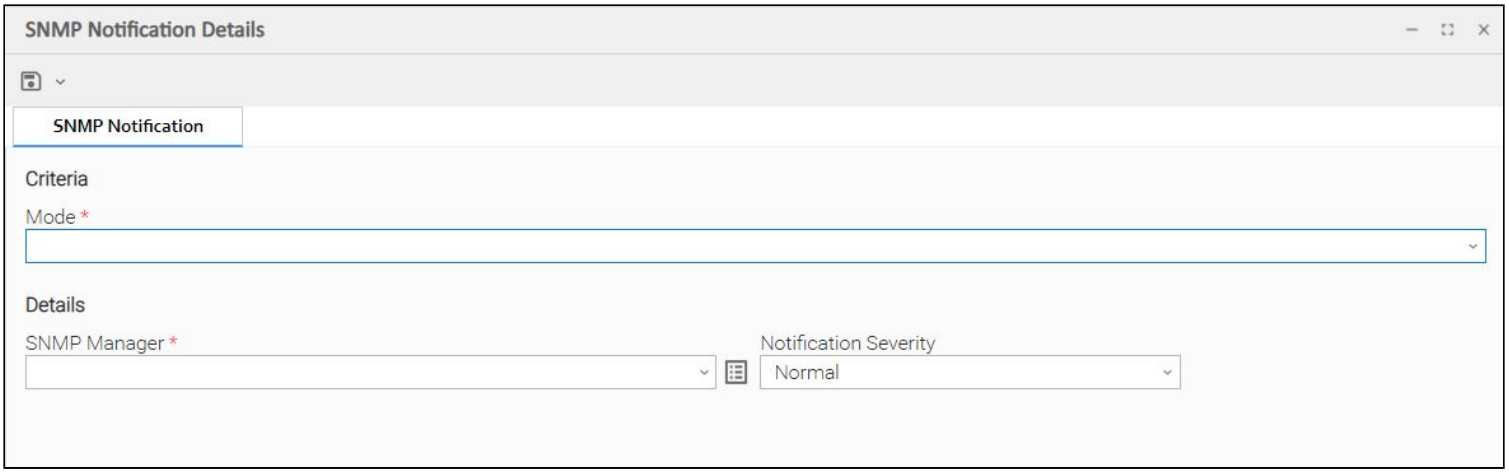
11.4.2 Email Notification Details Field Descriptions

The following table describes the fields and buttons on Email Notification Details.

Field Name	Description
Criteria	This section contains criteria for sending the notification.
Mode	Options: • Offline = Trigger the notification when the cluster node goes offline. • Active = Trigger the notification when the cluster node becomes active. • Passive = Trigger the notification when the cluster node becomes passive.
Details	This section contains assorted detailed information about the notification.

Email Template	Name of an Email template defined in an Email Template Details. An Email template allows you to specify standard recipients and text for outgoing emails. Enter the name of an existing Email template, select an Email template from the drop-down list, or click the Details icon to create a new Email template. Every Email template specifies an Email connection. If you do not specify an Email template in this field, you must specify an Email connection in the Email Connection field. If you specify both an Email template (in this field) and an Email Connection, the Email server specified in the Email Connection field overrides the Email server specified in this field. (Any information specified in an Email task overrides what is specified in an Email template.)
Email Connection	Required if an Email Template is not specified in the Email Template field; Name of an outgoing Email Connection (Type = Outgoing). An Email Connection specifies information about an outgoing or incoming email server. Enter the name of an existing outgoing Email Connection, select an existing outgoing Email Connection from the drop-down list, or clear the Email Connection field and click the Details icon to create a new Email Connection (Outgoing will be pre-selected in the Type field). If you specify both an Email Template and an Email Connection (in this field), the Email Connection specified in this field overrides the Email Connection specified in the Email Template field.
Reply-To	Email address of the sender. Use commas to separate multiple recipients. Variables and functions supported.
To	Email address of the recipient. Use commas to separate multiple recipients. Variables and functions supported.
CC	Email address of the party being sent a copy of the email, if any. Use commas to separate multiple recipients. Variables and functions supported.
BCC	Email address of the party being sent a blind (hidden) copy of the email, if any. Use commas to separate multiple recipients. Variables and functions supported.
Subject	Subject line of the email. Variables and functions supported.
Body	Text of the email message. Variables and functions supported. **Note** If both the Email Template and the Email Task (or Email Notification) contain text in the Body, the text in the Email Template is appended to the text in the Email Task (or Email Notification).
Buttons	This section identifies the buttons displayed above and below the Notification Details that let you perform various actions.
Save	Submits the new record to the 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.
Update	Saves updates to the record.
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 notification.

11.4.3 SNMP Notification Details



11.4.4 SNMP Notification Details Field Descriptions

The following table describes the fields and buttons on SNMP Notification Details.

Field Name	Description
Criteria	This section contains criteria for sending the notification.
Mode	Options: • Offline = Trigger the notification when the cluster node goes offline. • Active = Trigger the notification when the cluster node becomes active. • Passive = Trigger the notification when the cluster node becomes passive.
Details	This section contains assorted detailed information about the notification.
SNMP Manager	The SNMP Manager that will receive the SNMP notification. Enter the name of an existing SNMP Manager, select an existing SNMP Manager from the drop-down list, or clear the SNMP Manager field and click the Details icon to create a new SNMP Manager.
Notification Severity	Severity of this notification. Options: • Normal (1) • Warning (2) • Minor (3) • Major (4) • Critical (5)
Buttons	This section identifies the buttons displayed above and below the Notification Details that let you perform various actions.
Save	Submits the new record to the 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.
Update	Saves updates to the record.

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 notification.

11.5 Designating a Cluster Node as Preferred

You can designate a particular Cluster Node as preferred so that it will always be the Active node if it is running.

In a clustered environment, there may be one node in the cluster that you want to always be the Active node. Designating one node in the cluster as Preferred will cause that node to always assume the role of the Active node when it is running.

Step 1	From the Services navigation pane, select **System > Cluster Nodes** to display the Cluster Nodes list.
Step 2	Locate the Cluster Node you want to designate as Preferred.
Step 3	Right-click the **Cluster Node Name** on the list or right-click on the **Cluster Node Details** to access the Action Menu.
Step 4	Click **Set Node Preferred.**

12 OMS Servers

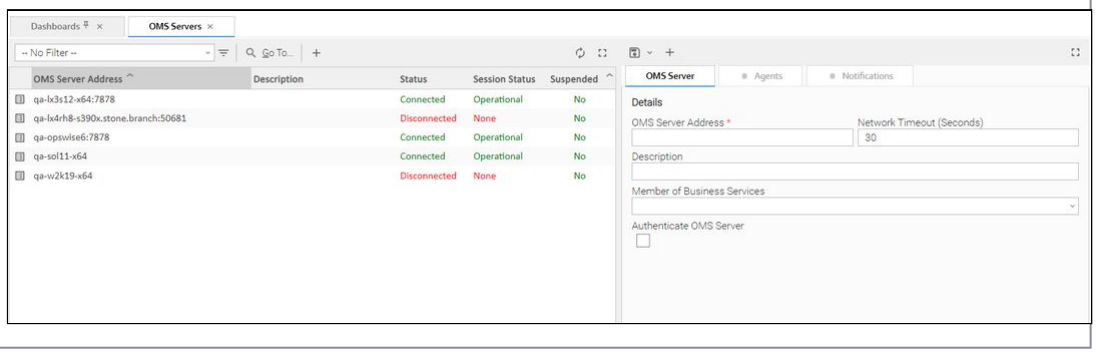
12.1 Introduction

OMS (Universal Message Service) Servers are the network communication providers between Universal Controller and Universal Agent.

12.2 Creating OMS Server Records

You must create a record for each OMS Server and OMS HA cluster (two or more OMS Servers in an HA / High Availability environment) that will be used as the network communications provider between the Controller and Agents.

Do not create individual records for each member (OMS Server) of an OMS HA cluster. You must define an OMS HA cluster as a single record, with the OMS Server Address containing a comma-separated list of each OMS Server in the cluster.

Step 1	From the Agents & Connections navigation pane, select **System > OMS Servers**. The OMS Servers list displays. To the right of the list, OMS Server Details for a new OMS Server record displays. 

Step 2	Enter / select Details for a new OMS Server, using the field descriptions below as a guide. • Required fields display an asterisk (*) after the field name. • Default values for fields, if available, display automatically. • Use the scroll bar. • Temporarily hide the list above the Details. • Click the  button above the list to display a pop-up version of the Details.
Step 3	Click a  button. The OMS Server record is added to the database, and all buttons and tabs in the OMS Server Details are enabled.

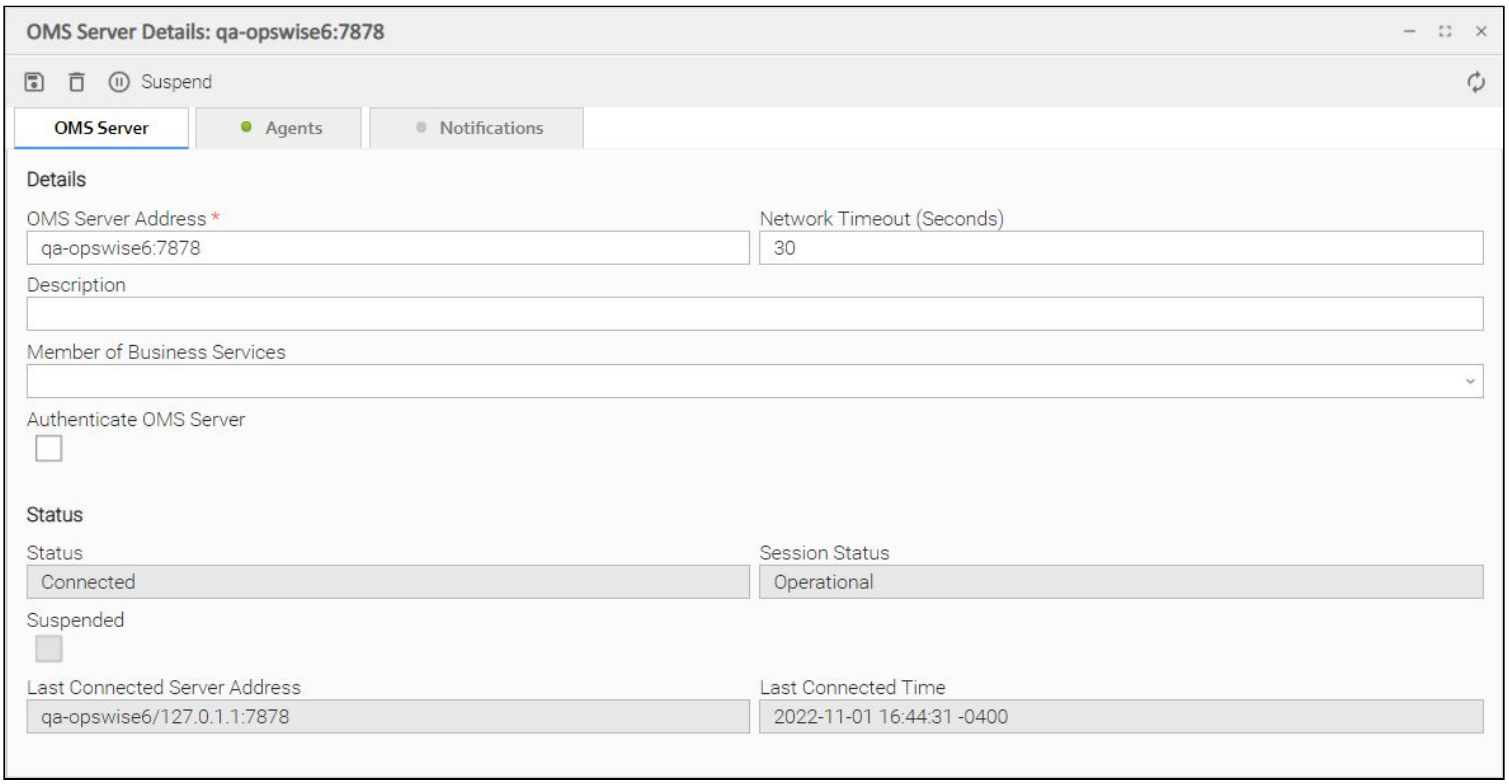
Note

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).

12.2.1 OMS Server Details

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



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

12.2.2 OMS Server Details Field Descriptions

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

Field Name	Description
Details	This section contains detailed information about the OMS Server.
OMS Server Address	IP address or host name of an OMS Server, or a comma-separated list of OMS Servers configured as an OMS Server cluster. **Note** The OMS Server Address supports SNI, using the structure `<host>:<port>:<sni>`, where both `port` and `sni` are optional. See OMS_SERVERS - UAG configuration option for more details.
Network Timeout (Seconds)	Network socket time-out value used for TCP/IP receive and connect operations.
Description	Description of this record. Maximum length is 255 characters.

Member of Business Services	User-defined; Allows you to select one or more Business Services that this record belongs to. (You also can Check All or Uncheck All Business Services for this record.) You can select up to 62 Business Services for any record type, and enter a maximum of 2048 characters for each Business Service. 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.
Authenticate OMS Server	If enabled, the Controller authenticates the OMS server digital certificate.
Status	This section contains detailed information about the status of the OMS Server. (This section does not display if you are creating a new OMS Server record.)
Status	Current status of the OMS server: Connected or Disconnected.
Session Status	Current status of the OMS server messaging sessions: heartbeat, input, and output sessions. Options: • **Operational** - All OMS Server messaging sessions are operational. • **Impaired** - Ability of OMS clients to produce and/or consume messages is impaired. • **None** - OMS Server is disconnected.
Suspended	If enabled, indication that the OMS Server has been Suspended (temporarily disconnected).
Last Connected Server Address	OMS Server, in a High Availability environment of multiple cluster nodes, that is connected to the Controller or was last connected to the Controller.
Last Connected Time	Time when the Universal Controller last connected to the server at the Last Connected Server Address.
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 OMS Server Details that let you perform various actions.
Save	Saves a new record in the Controller database.
Save & New	Saves a new OMS Server record in the Controller database and redisplays empty Details so that you can create another new record.
Save & View	Saves a new OMS Server 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.
Suspend	Temporarily disconnects the OMS Server.
Resume	Resumes the connection of a Suspended OMS Server.

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 OMS Server Details that provide access to additional information about the OMS Server.
Agents	Lists all Agents for which this OMS Server is the network communication provider between the Controller.
Notifications	Lists all notifications that have been defined for this OMS Server.

12.3 Starting and Stopping OMS

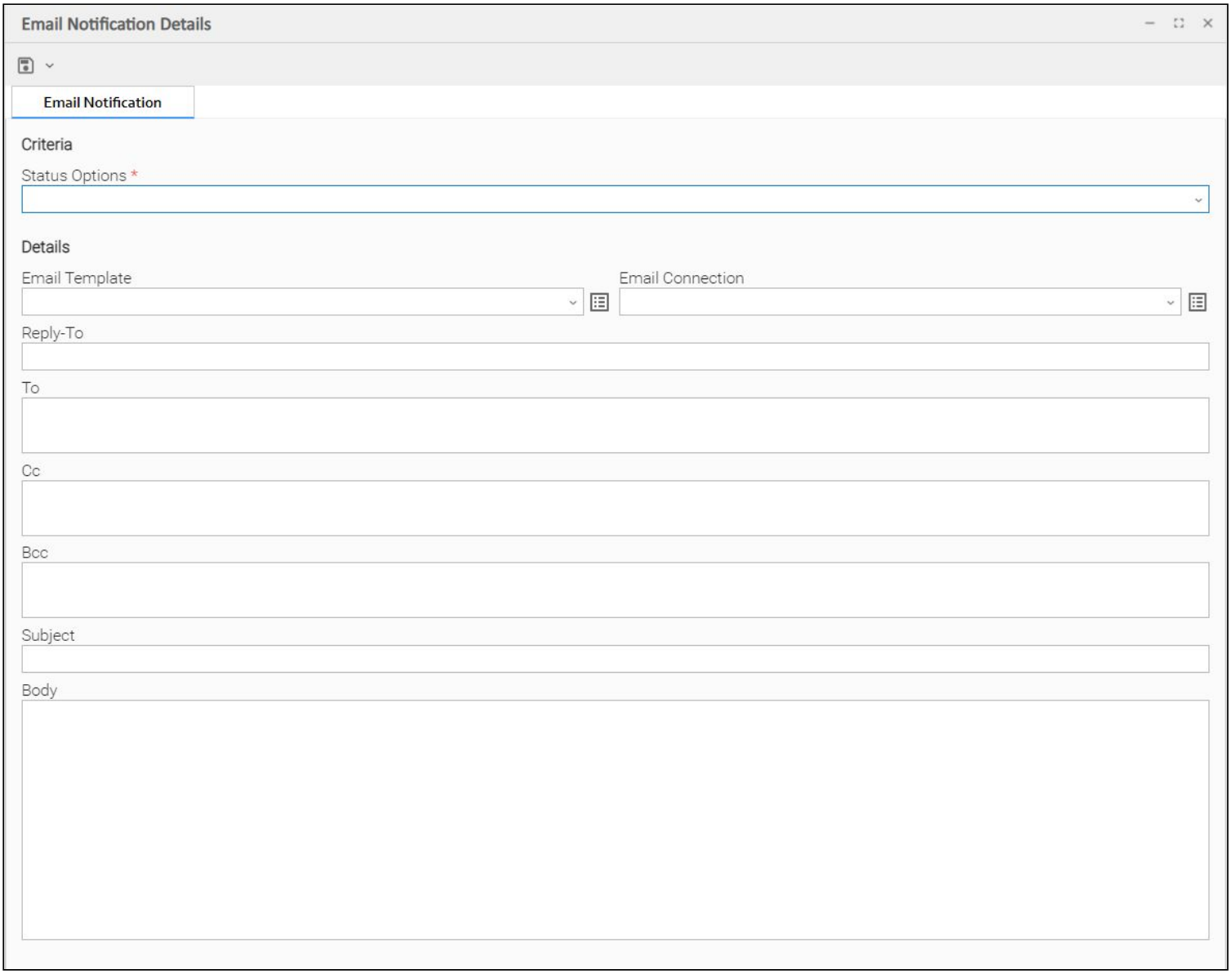
For instructions on starting and stopping OMS Servers, see Starting and Stopping Agent Components.

12.4 Sending Notifications on Status of an OMS Server

You can configure OMS Servers to send a notification via email or SNMP if that OMS Server status changes from Connected to Disconnected or Disconnected to Connected.

Step 1	From the **Agents and Connections** navigation pane, select **System > OMS Servers**. The OMS Servers list displays.
Step 2	Open the record of an OMS Server on the list.
Step 3	Click the **Notifications** tab to display a list of any Email and SNMP notifications configured for the OMS Server.
Step 4	Select the type of notification you want the OMS Server to send, and then click **New**. Notification Details for a new Notification displays (See Email Notification Details and SNMP Notification Details, below.
Step 5	Complete the fields as needed (see Email Notification Details Field Descriptions and SNMP Notification Details Field Descriptions, below). **Note** OMS Server built-in variables are available to pass data about the OMS Server into the notification. (User-defined variables, including Global variables, are not available for use in OMS Server email notifications.)
Step 6	Click the **Save** button to save the record.

12.4.1 Email Notification Details



12.4.2 Email Notification Details Field Descriptions

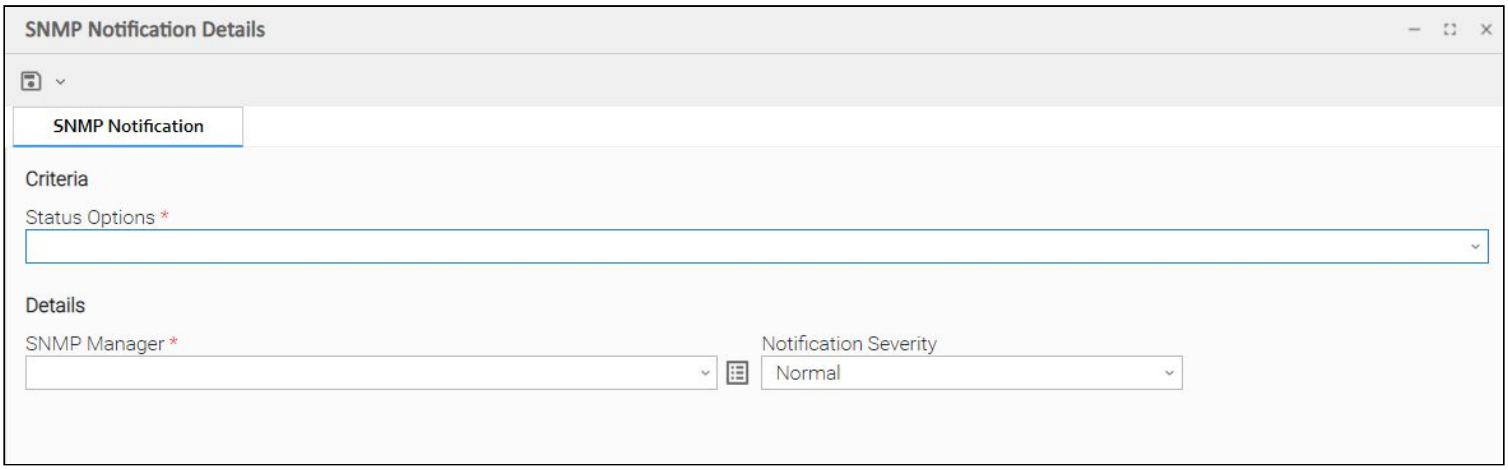
The following table describes the fields and buttons on Email Notification Details.

Field Name	Description
Criteria	This section contains criteria for sending the notification.

Status Options	• Disconnected = Trigger the notification when the OMS Server is connected. • Connected = Trigger the notification when the OMS Server is connected **Note** • If you select Disconnected, and the OMS Server status is Connected but the session status becomes Impaired, the notification will qualify and be sent. • If you select Connected, and the OMS Server recovers from an Impaired session status, the notification will qualify and be sent.
Details	This section contains assorted detailed information about the notification.
Email Template	Name of an Email template defined in an Email Template Details. An Email template allows you to specify standard recipients and text for outgoing emails. Enter the name of an existing Email template, select an Email template from the drop-down list, or click the Details icon to create a new Email template. Every Email template specifies an Email connection. If you do not specify an Email template in this field, you must specify an Email connection in the Email Connection field. If you specify both an Email template (in this field) and an Email Connection, the Email server specified in the Email Connection field overrides the Email server specified in this field. (Any information specified in an Email task overrides what is specified in an Email template.)
Email Connection	Required if an Email Template is not specified in the Email Template field; Name of an outgoing Email Connection (Type = Outgoing). An Email Connection specifies information about an outgoing or incoming email server. Enter the name of an existing outgoing Email Connection, select an existing outgoing Email Connection from the drop-down list, or clear the Email Connection field and click the Details icon to create a new Email Connection (Outgoing will be pre-selected in the Type field). If you specify both an Email Template and an Email Connection (in this field), the Email Connection specified in this field overrides the Email Connection specified in the Email Template field.
Reply-To	Email address of the sender. Use commas to separate multiple recipients. Variables and functions supported.
To	Email address of the recipient. Use commas to separate multiple recipients. Variables and functions supported.
CC	Email address of the party being sent a copy of the email, if any. Use commas to separate multiple recipients. Variables and functions supported.
BCC	Email address of the party being sent a blind (hidden) copy of the email, if any. Use commas to separate multiple recipients. Variables and functions supported.
Subject	Subject line of the email. Variables and functions supported.
Body	Text of the email message. Variables and functions supported. **Note** If both the Email Template and the Email Task (or Email Notification) contain text in the Body, the text in the Email Template is appended to the text in the Email Task (or Email Notification).
Buttons	This section identifies the buttons displayed above and below the Notification Details that let you perform various actions.
Save	Submits the new record to the database.

Save & New	Saves a new record in the Controller database and redisplays empty Details so that you can create another new record.
Update	Saves updates to the record.
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 notification.

12.4.3 SNMP Notification Details



12.4.4 SNMP Notification Details Field Descriptions

The following table describes the fields and buttons on SNMP Notification Details.

Field Name	Description
Criteria	This section contains criteria for sending the notification.
Status Options	• Disconnected = Trigger the notification when the OMS Server is connected. • Connected = Trigger the notification when the OMS Server is connected. **Note** • If you select Disconnected, and the OMS Server status is Connected but the session status becomes Impaired, the notification will qualify and be sent. • If you select Connected, and the OMS Server recovers from an Impaired session status, the notification will qualify and be sent.
Details	This section contains assorted detailed information about the notification.
SNMP Manager	The SNMP Manager that will receive the SNMP notification. Enter the name of an existing SNMP Manager, select an existing SNMP Manager from the drop-down list, or clear the SNMP Manager field and click the Details icon to create a new SNMP Manager.

Notification Severity	Severity of this notification. Options: • Normal (1) • Warning (2) • Minor (3) • Major (4) • Critical (5)
Buttons	This section identifies the buttons displayed above and below the Notification Details that let you perform various actions.
Save	Submits the new record to the database.
Save & New	Saves a new record in the Controller database and redisplays empty Details so that you can create another new record.
Update	Saves updates to the record.
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 notification.

13 SNMP Managers

13.1 Overview

SNMP Managers are the network managers to which Universal Controller sends SNMP notifications.

Note

Universal Controller uses **SNMPv1** for its SNMP Managers.

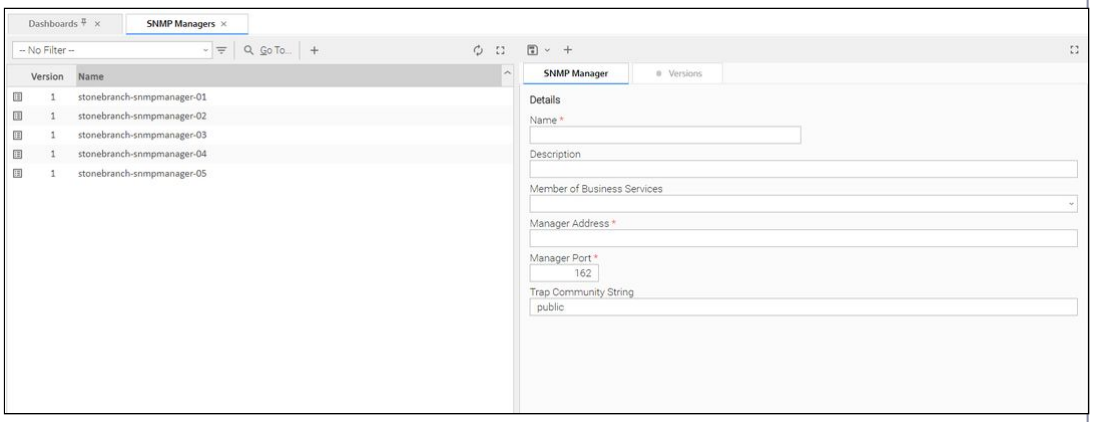
SNMP Managers can receive SNMP notifications when:

- An Agent or OMS Server goes down or comes back up.
- A Cluster Node goes Offline or becomes Active.
- An SNMP Notification is associated with a task.

Note

SNMP Notifications on Cluster Nodes cannot be exported; therefore, they cannot be imported. You must set up new SNMP Notifications for Cluster Nodes whenever an export / import has been run.

13.2 Creating an SNMP Manager

Step 1	From the Agents & Connections navigation pane, select **System > SNMP Managers**. The SNMP Managers list displays. Below the list, SNMP Manager Details for a new SNMP Manager displays. 
Step 2	Enter / select Details for a new SNMP Manager, using the field descriptions below as a guide. • Required fields display an asterisk (*) after the field name. • 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 + button above the list to display a pop-up version of the Details.
Step 3	Click a save button. The SNMP Manager is added to the database, and all buttons and tabs in the SNMP Manager Details are enabled.

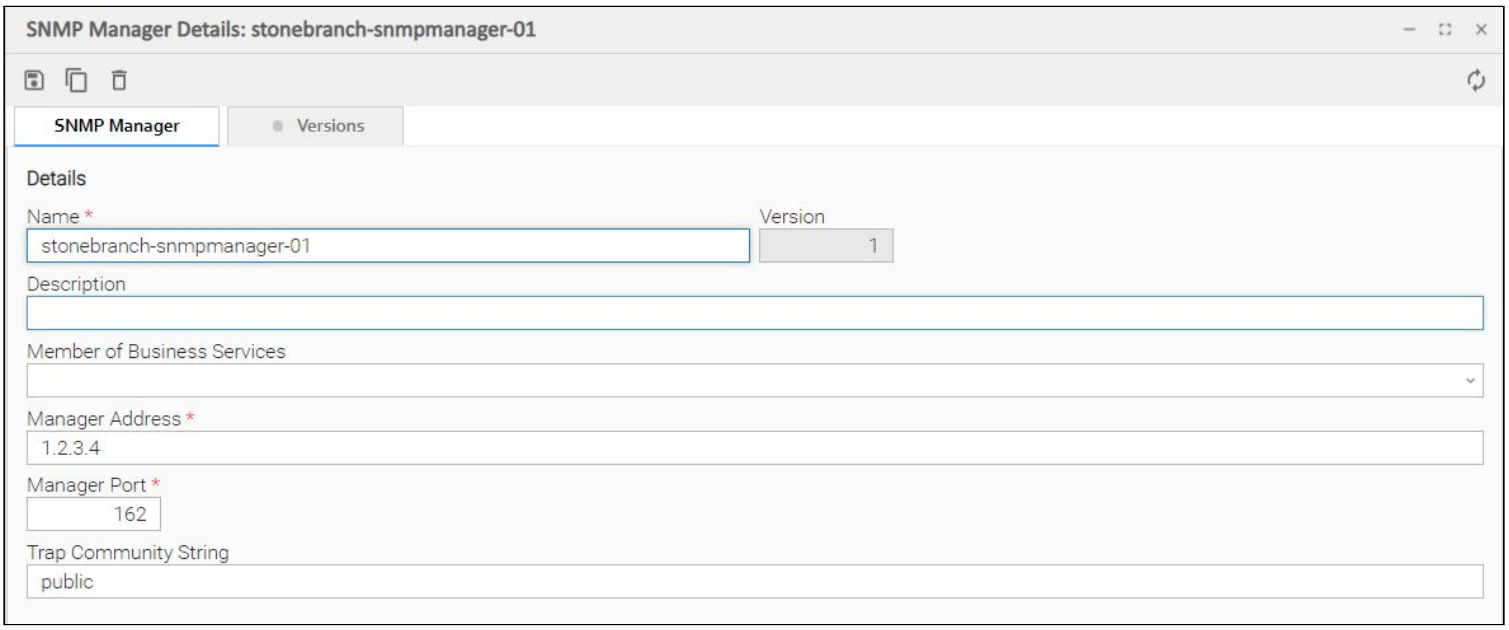
Note

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).

13.2.1 SNMP Manager Details

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



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

13.2.2 SNMP Manager Details Field Descriptions

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

Field Name	Description
Details	This section contains detailed information about the SNMP Manager.
Name	Name used within the Controller to identify this resource. Up to 40 alphanumerics. It is the responsibility of the user to develop a workable naming scheme for resources.
Version	System-supplied; version number of the current record, which is incremented by the Controller every time a user updates a record. Click the Versions tab to view previous versions. For details, see Record Versioning.
Description	Description of this record. Maximum length is 255 characters.
Member of Business Services	User-defined; Allows you to select one or more Business Services that this record belongs to. (You also can Check All or Uncheck All Business Services for this record.) You can select up to 62 Business Services for any record type, and enter a maximum of 2048 characters for each Business Service. 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.
Manager Address	Name or IP address of the SNMP Manager.
Manager Port	Port used by the SNMP Manager.
Trap Community String	Used by the trap receiver to determine which traps to process. Default is **public**.
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 SNMP Manager Details that let you perform various actions.
Save	Saves a new SNMP Manager 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.
Copy	Creates a copy of this SNMP Manager, which you are prompted to rename.
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 SNMP Manager.
Tabs	This section identifies the tabs across the top of the SNMP Manager Details that provide access to additional information about the SNMP Manager.
Versions tab	Stores copies of all previous versions of the current record. See Record Versioning.

13.3 MIB File

A MIB file contains the translation of the SNMP notifications sent to the SNMP Manager by the Controller.

A sample MIB file, `OPSWISE.MIB.txt`, is shipped with all Universal Agent for Windows and UNIX packages.

13.3.1 MIB and SNMP Protocol

SNMP protocol is a simple UDP package containing a set of dot-separated characters defined as ObjectID.

You can use the MIB file to set up the corresponding options Tree; the numbers will tell the server which line to go down. You then can look up inside the server for those results or, more importantly, define alerts on the decision option of the tree-structure that you defined with the MIN file.

If you have a more graphical server, you also may have a GUI showing the different parts of your trees in diagrams or other types of reporting.

SNMP protocol is, in effect, an external Alarm/(simple up to rather complex) Reporting System that searches for the Return Code (Success or Failure) of a task, rather than the actual output of the task. It could tell the Operator, for example: the Return Code is not as expected, add paper to the printer, the machine is low on disk space, or the server just booted up. These messages can be as descriptive as defined and, of course, will depend on the logging capability of the corresponding manager,

which in our case is the Controller. It can be thought of as a centralized Information system, where quite a lot of tools and hardware can use for status exchange.

13.3.2 MIB File Location

The MIB file for both UNIX and Windows are included in the `samp` directory (UNIX) and `samples` directory (Windows) for Universal Automation Center Agent (UAG):

UNIX	/opt/universal/uagsrv/samp
Windows	\Program Files\Universal\UAGSrv\samples

13.4 Copying SNMP Managers

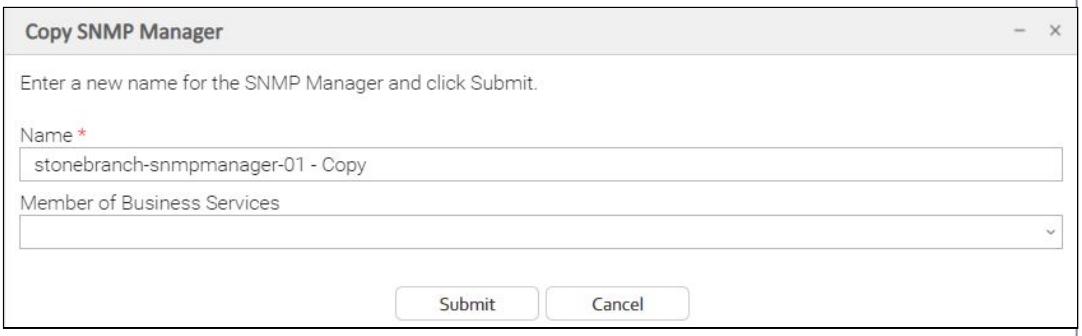
13.4.1 Overview

You can make copies of all Universal Controller records, including SNMP Managers, using the standard method for Copying a Record: selecting **Insert** on the Action menu.

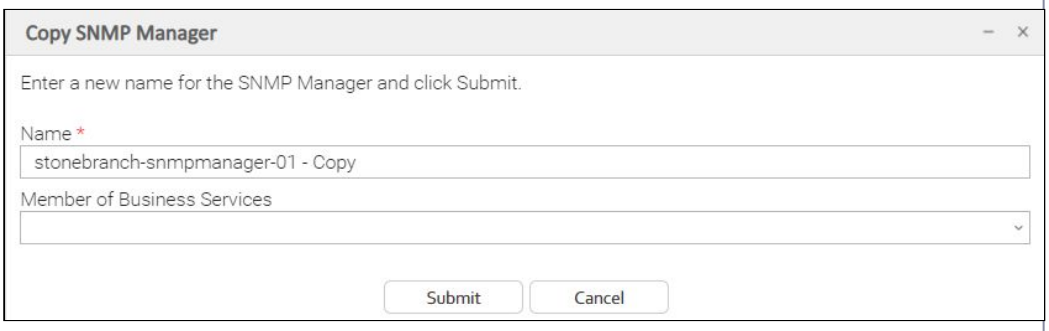
However, you also can use the Copy action on the SNMP Manager Action menu or the Copy button in the SNMP Manager Details.

13.4.2 Copying One or More SNMP Managers from an SNMP Managers List

Step 1	From the Agents & Connections navigation pane, select **System > SNMP Managers** to display the SNMP Managers list.
Step 2	Locate the SNMP Managers(s) you want to copy (see Filtering).

Step 3	Copy the SNMP Manager(s): **Copy One SNMP Manager** 1. Right-click the **SNMP Manager Name**. 2. On the Action menu, select **Copy**. A Copy SNMP Manager pop-up dialog displays.  3. Enter a new name for the SNMP Manager and, optionally, select any Business Services that you want the SNMP Manager assigned to. 4. Click **Submit** to create a copy of the SNMP Manager. **Copy Multiple SNMP Managers** 1. Ctrl-Click the SNMP Managers you want to copy. 2. Right-click any of the selected SNMP Managers. 3. On the Action menu, select **Copy**. 4. On the Confirmation pop-up that displays, click **OK**. The copied SNMP Managers are added to the list, with **- Copy** added as a suffix to the SNMP Manager Name for each SNMP Manager. If an SNMP Manager with that **- Copy** name already exists, another copy is not created.

13.4.3 Copying an SNMP Manager from the SNMP Manager Details

Step 1	Select an SNMP Manager from the SNMP Managers list. The SNMP Manager Details for that SNMP Manager displays.
Step 2	Either: • Click the **Copy** button. • Right-click the Details to display the Action menu, and then click **Copy**. A Copy SNMP Manager pop-up dialog displays. 
Step 3	Enter a new name for the SNMP Manager and, optionally, select any Business Services that you want the SNMP Manager assigned to.
Step 4	Click **Submit** to create a copy of the SNMP Manager.

13.4.4 Copy Permissions

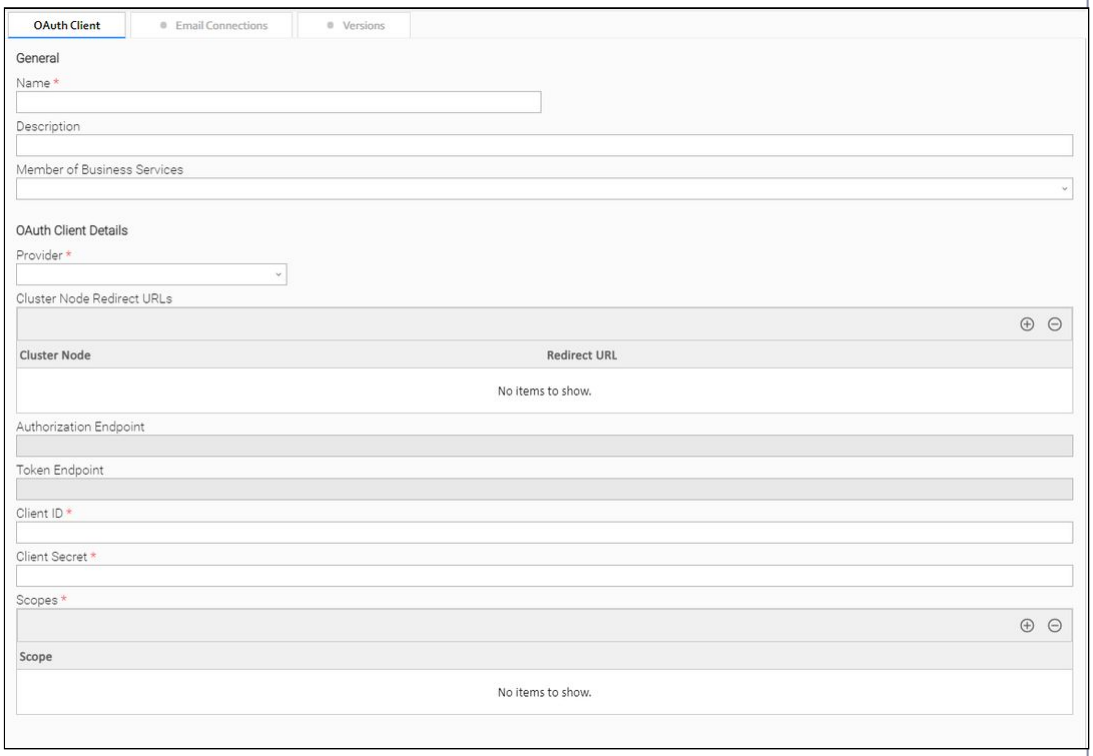
To copy an SNMP Manager, you must have both Read permission and Copy command permission for the SNMP Manager you are copying, in addition to having Create permission for the copied SNMP Manager.

14 OAuth Clients

14.1 Introduction

The OAuth Client is used to integrate with an external application registered with an authentication server such as Azure AD or Google. The OAuth Client will be referenced by one or more Email Connections and will be used to obtain an access token and refresh the access token when it expires.

14.2 Creating OAuth Client Records

Step 1	From the Agents & Connections navigation pane, select **System > OAuth Clients**. The OAuth Client list displays. Below the list, OAuth Client Details for a new OAuth Client record displays. 

Step 2	Enter / select Details for a new OAuth Client, using the field descriptions below as a guide. • Required fields display an asterisk (*) after the field name. • 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 OAuth Client record is added to the database, and all buttons and tabs in the OAuth Client Details are enabled.

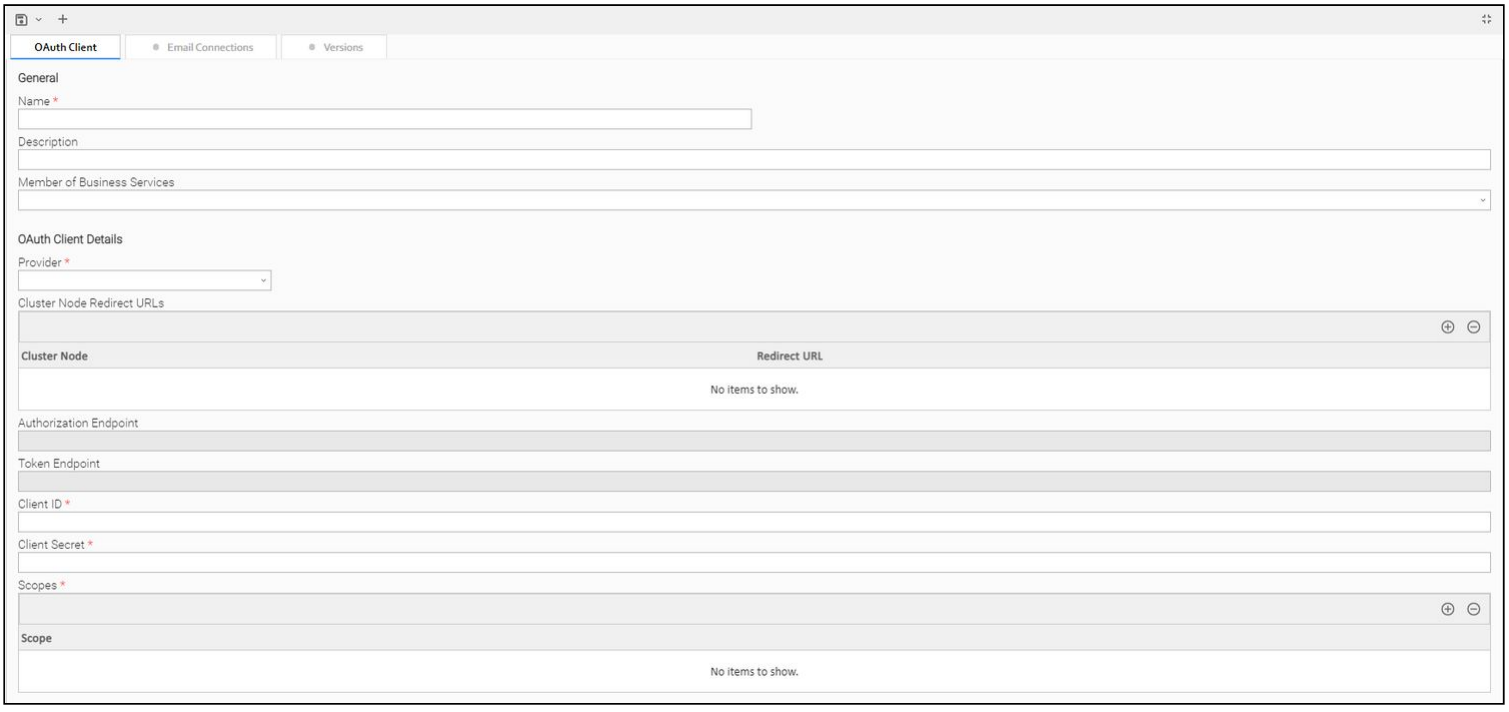
Note

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).

14.2.1 OAuth Client Details

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



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

14.2.2 OAuth Client Details Field Descriptions

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

Field Name	Description
General	This section contains detailed information about the OAuth Client.
Name	Name used within the Controller to identify this resource. Up to 40 alphanumerics. It is the responsibility of the user to develop a workable naming scheme for resources.
Description	Description of this record. Maximum length is 255 characters.
Member of Business Services	User-defined; Allows you to select one or more Business Services that this record belongs to. (You also can Check All or Uncheck All Business Services for this record.) You can select up to 62 Business Services for any record type, and enter a maximum of 2048 characters for each Business Service. 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.
OAuth Client Details	
Provider	Authorization server provider. Options: • **Azure AD** • **Google** **Azure AD** or **Google** will automatically populate the Authorization Endpoint and Token Endpoint fields. The **Provider** cannot be changed after the OAuth Client is created.
Cluster Node Redirect URLs	The URL that the user will be redirected to after authorizing the Universal Controller application. Redirect URLs are specified as '<Universal Controller Base URL>/oauth2/callback'. For example, 'https://example.stone.branch/uc/oauth2/callback'. The Universal Controller will extract the authorization code from the request and exchange it for an access token. The redirect URLs need to match the ones used when registering the Universal Controller application with the authorization server.
Authorization Endpoint	Authorization endpoint for the authorization server. This is used by Universal Controller to obtain a temporary authorization code. Read only.
Token Endpoint	Token endpoint for the authorization server. This is used by Universal Controller to exchange the temporary authorization code for an access token. It is also used by Universal Controller to refresh the access token once it expires. Read only.

Tenant ID	If provider is Azure AD; The tenant identifier. If not specified, defaults to common.
Client ID	Client identifier. This is issued by the authorization server when registering the Universal Controller application.
Client Secret	Client secret. This is issued by the authorization server when registering the Universal Controller application.
Scopes	The list of scopes to request access to. If Provider is Azure AD, use the following scopes: `offline_acce` ss and `https://outlook.office.com/IMAP.AccessAsUser.All` and/or `https://outlook.office.com/SMTP.Send` The `offline_access` scope will be used even if it's not specified explicitly as this is required to obtain a refresh token. If Provider is Google, use the following scope: `https://mail.google.com/`
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 OAuth Client Details that let you perform various actions.
Save	Saves a new record in the Controller database.
Save & New	Saves a new OAuth Client record in the Controller database and redisplays empty Details so that you can create another new record.
New	Displays empty (except for default values) Details for creating a new record.
Update	Saves updates to the record.
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 OAuth Client Details that provide access to additional information about the OAuth Client.
Email Connections	Lists all Email Connections that reference this OAuth Client. Click the **Details** icon to view full email connection record.
Versions	Lists all versions of this OAuth Client. Click the **Details** icon to view full version record.

14.3 Creating an Email Connection

From the **Email Connections** tab, You can create a new Email Connection that references this OAuth Client by clicking the  icon to display details for a new Email Connection record.