Universal Controller 6.7.x

Administration

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1. Administration . . . 3
1.1 Administration Overview . . . 5
1.2 High Availability . . . 6
1.3 Ports Configuration . . . 15
1.4 Universal Controller Properties . . . 16
1.5 Truststore . . . 49
1.6 LDAP Settings . . . 50
1.7 Single Sign-On Settings . . . 61
1.8 Data Backup - Purge . . . 76
1.9 Server Operations . . . 84
1.10 Universal Templates . . . 108
1.10.1 Universal Templates Overview . . . 109
1.10.2 Creating a Universal Template . . . 116
1.10.3 Copying Universal Templates . . . 140

Administration

Overview

Administration of Universal Controller

High Availability

Introduction

High Availability System

How High Availability Works

What To Do If a Failover Occurs

High Availability Configuration

High Availability Components

Universal Templates

Universal Templates Overview

Creating a Universal Template

Universal Controller Properties

Overview

Universal Controller Start-up Properties (opswise.properties)

Universal Controller System Properties

Command Line Interface (CLI) Properties

Configuration

Truststore

LDAP Settings

Single Sign-On Settings

Data Backup / Purge

Server Operations

Filters

Ports Configuration

Ports Configuration

The information on these pages also is located in the Universal Controller 6.7.x Administration.pdf.

Administration Overview

Universal Controller Administration

Administration of Universal Controller includes:

High Availability	Configuration of Universal Automation Center system as a redundant (multiple Universal Controller cluster node) system.
Ports Configuration	Configuration of ports for Universal Controller components and prerequisites.
Universal Controller Start-Up Properties	These properties are required for Controller start-up, initialization, and operation. They are contained in the **`opswise.properties`** file and have their values set during installation. To reset the values, you must stop the Controller, edit **`opswise.properties`**, and restart the Controller.
Universal Controller System Properties	These properties define Controller system information and performance. They have their values set during installation. They are available, and can be reset, only via the user interface.
LDAP Settings	These settings enable you to enable the LDAP bridge. They have their values set only via the user interface; they are not set at installation.
Universal Command Line Interface (CLI) Properties	CLI provides a sample configuration file, **`cmdtools.props`**, that you can use to pass CLI Global parameters to a CLI command. The file is created during installation of Universal Agent if the Universal Controller Command Line Interface has been selected to be installed.
Universal Templates	Creation of Universal Templates, on which Universal Tasks are based.
Data Backup/Purge	Configuration of automatic backups and/or purges of some or all of the Controller activity data.
Server Operations	Universal Controller server operations help you maintain and administer your Controller installation. Many of these operations should be run only by Technical Support or upon request by Technical Support.
Filters	Creation and application of filters to record lists throughout the Universal Controller user interface.
Security	Creation of Universal Controller users and user groups and the roles and permissions that can be assigned to them; Business Services that group Controller records into logical groups; and audits of all user interaction with the Controller.

High Availability

- Introduction
- High Availability System
- High Availability Components
  - Cluster Nodes
  - Passive Cluster Node Restrictions
  - Agent
  - Universal Message Service (OMS)
- How High Availability Works
  - Cluster Node Mode
  - High Availability Start-Up
  - Determining Mode of a Cluster Node at Start-up
  - Checking the Active Cluster Node During Operations
  - Checking OMS Connectivity During Operations
- What To Do If a Failover Occurs
  - Viewing Cluster Node Status
- High Availability Configuration
  - Configuring Cluster Nodes
  - Configuring OMS
  - Configuring Agents
  - Configuring Notifications Based on Component Status
- Load Balancer

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.

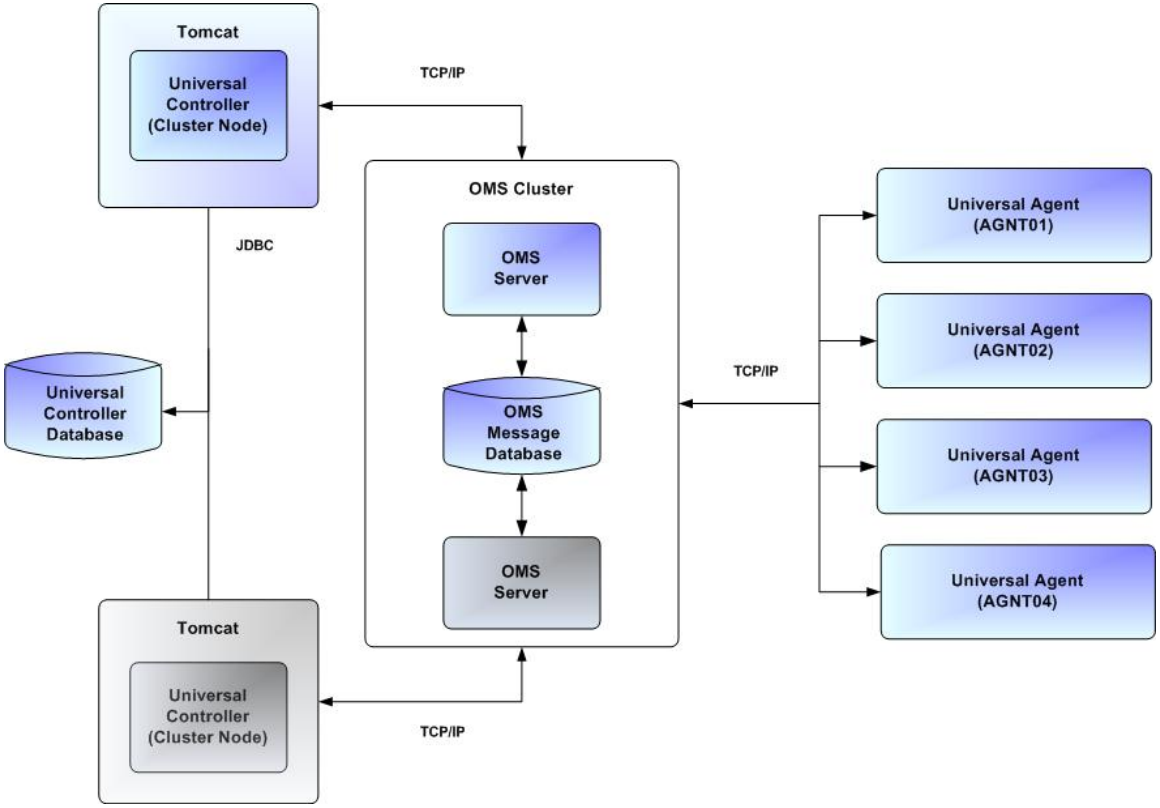
High Availability System

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.

High Availability Components

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

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.

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.

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.

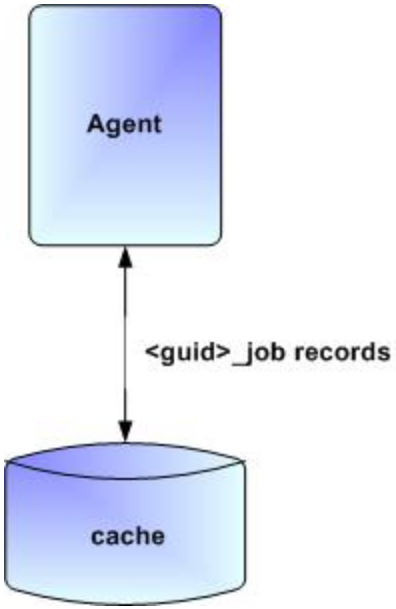
Once an Agent has registered with a node, you can view it by selecting that Agent type from the Agents & Connections navigation pane of the user interface. A list displays showing all the registered Agents of that type. See Agents for more information.

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.

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.



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.

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.

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.

High Availability Start-Up

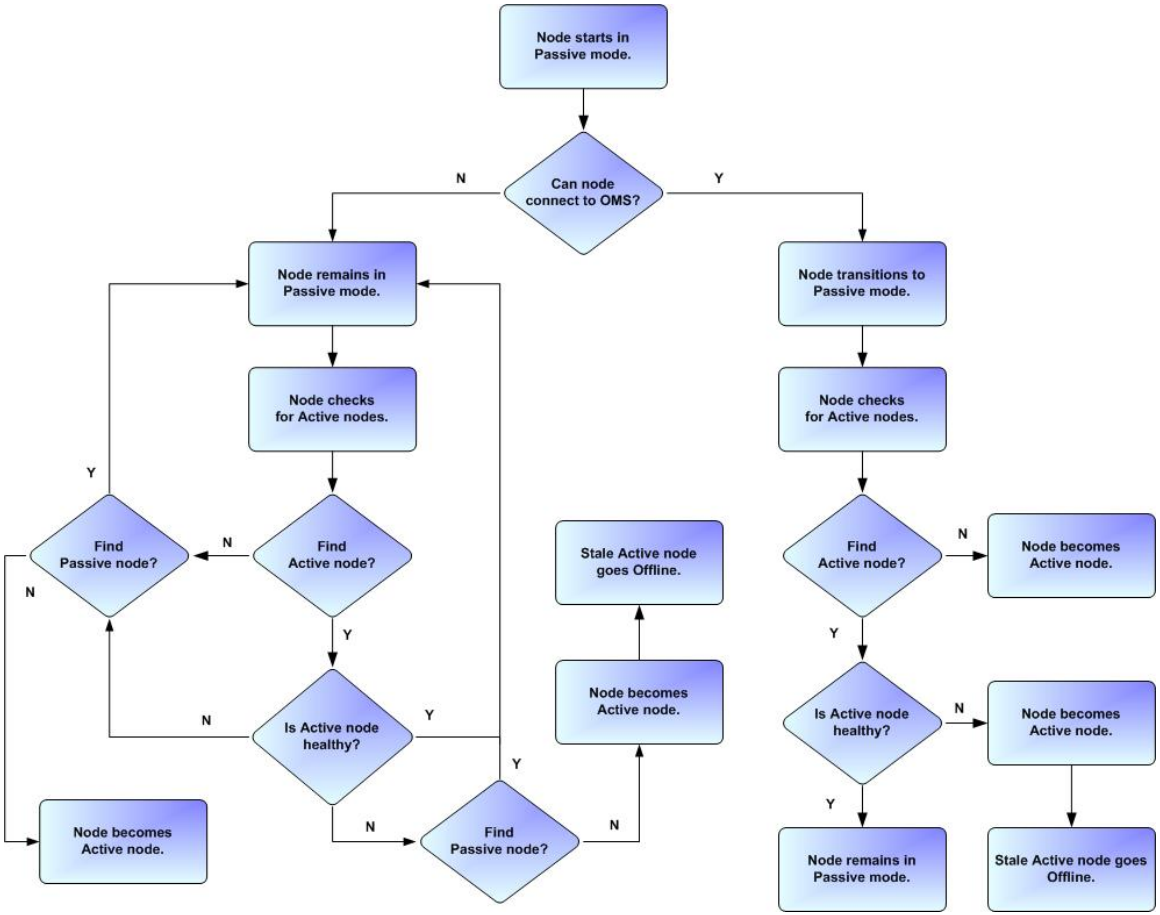
The following steps describe how a High Availability environment starts up:

Step 1	User starts the Cluster Nodes.
Step 2	Each cluster node reads its `opswise.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.

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.

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.

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 **opswise.log**.

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.

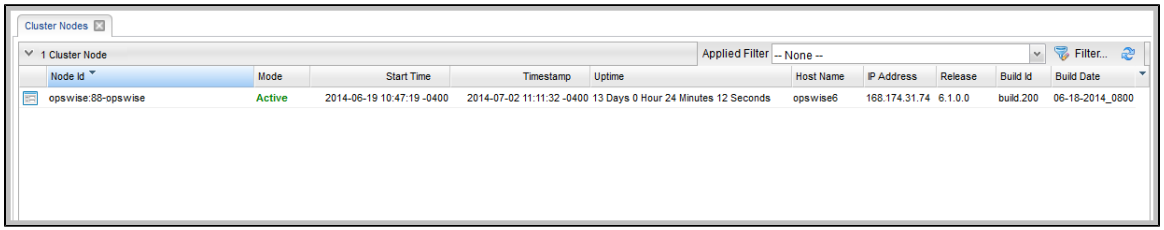
If you are using the Active cluster node in a browser and the cluster node fails, you will receive a browser error. In this case, take the following steps to continue working:

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.

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.)

High Availability Configuration

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

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 `opswise.properties` files are the same.

For example:

```
opswise.db.name=opswise
opswise.db.rdbms=mysql
opswise.db.url=jdbc:mysql://10.10.1.1/
```

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`.

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.

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.

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]/opswise/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**.
http(s)://serverhost:[Port]/opswise/ops_node_info.do	This URL returns information about a cluster node: • Node: serverhost.com:8080-opswise • 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

Ports Configuration

Ports Configuration

Ports configured for Universal Controller 6.7.x components and prerequisites cannot be blocked by a firewall.

The following table identifies the default ports, which you can change during installation or configuration:

Component or Prerequisite	Default Port
MySQL	3306
Microsoft SQL Server	1433
Oracle	1521
Universal Controller (Tomcat)	8080
Universal Message Service (OMS)	7878

Universal Controller Properties

- Overview
- Universal Controller Start-up Properties (opswise.properties)
  - Sample opswise.properties File
- Universal Controller System Properties
  - Overriding Universal Controller System Properties
- Command Line Interface (CLI) Properties

Overview

Universal Controller contains three types of configurable properties:

Universal Controller Start-up Properties (opswise.properties)	Universal Controller start-up properties are the default properties contained in the opswise.properties file when the Controller is installed. These properties are required for Controller start-up and operation. The values for these properties are set during the installation process. Some of the values are based on information that you provide during the installation. You can reset these properties by stopping the Controller, editing opswise.properties, and restarting the Controller. The changes will take effect after the restart (see Starting and Stopping Universal Controller).
Universal Controller System Properties	Universal Controller system properties define Controller system information and performance. They have their values set during installation. You can reset these properties at any time, without having to stop the Controller, via the user interface. **Note** In a High Availability environment, all Universal Controller cluster nodes share the same database; therefore, updating Universal Controller System Properties for one cluster node applies to all cluster nodes.
Command Line Interface (CLI) Properties	CLI provides a sample configuration file, `cmdtools.props`, that you can use to pass CLI Global parameters to a CLI command.

Note
Properties for Universal Message Service (OMS) are installed as configuration file options when OMS is installed as a component of Universal Agent. The values for these options are set during the installation. There are several configuration methods available for changing these values.

Universal Controller Start-up Properties (opswise.properties)

The **`opswise.properties`** file is read by the Controller, which is started by Tomcat.

The **opswise.properties** file resides here:

```
[tomcat directory]\conf
```

Note
The backslash character in a property value must be escaped as a double backslash.

For example: example.path=c:\\stonebranch\\uc

Property Name	Description
For MySQL:	

`opswise.db.mysql.character_encoding=`	Allows the retrieval of output with extended unicode characters. If the property is not set, character encoding will not be used in the JDBC URL.
	
	Examples:
	`#opswise.db.mysql.character_encoding=US-ASCII`
	`#opswise.db.mysql.character_encoding=Cp1252`
	`opswise.db.mysql.character_encoding=UTF-8`

`opswise.db.rdbms=mysql`	Database type. Specify this property if you are using a MySQL database.
`opswise.db.url=jdbc:mysql://localhost/`	JDBC connect URL. Specify this property if you are using a MySQL database.
For SQLServer	
`opswise.db.rdbms=sqlserver`	Database type. Specify this property if you are using a SQLServer database.

`opswise.db.url=jdbc:sqlserver://localhost:1433;DatabaseName=opswise`	JDBC connect URL. Specify this property if you are using a SQLServer database.
For Oracle	
`opswise.db.rdbms=oracle`	Database type. Specify this property if you are using an Oracle database.
`opswise.db.url=jdbc:oracle:thin:@//localhost:1521/@oracle.db.name@`	JDBC connect URL. Specify this property if you are using an Oracle database.
For All Databases	
`opswise.db.name=`	**IMPORTANT** If you specify a database name in this property and in **opswise.db.url**, the names must be the same. Name for the Controller database.
`opswise.db.password=`	Database password that will be replaced by **`opswise.db.password.encrypted`** in the **`opswise.properties`** file upon start-up.
`opswise.db.password.encrypted=`	Encrypted version of **`opswise.db.password`** that will replace **`opswise.db.password`** in the **`opswise.properties`** file upon start-up.
`opswise.db.pooler.connections=`	Sets the minimum number of idle connections to maintain in the Server connection pool, or zero to create none. The Server connection pool is used by all internal database transactions.
`opswise.db.pooler.connections.Client=`	Sets the minimum number of idle connections to maintain in the Client connection pool, or zero to create none. The Client connection pool is used by all user interface related database transactions.

`opswise.db.pooler.connections.max=`	Sets the maximum number of connections that can be allocated by the Server connection pool at a given time. The Server connection pool is used by all internal database transactions. **Note** The installer overrides the default by configuring a maximum number of 40 in the **`opswise.properties`** file.
`opswise.db.pooler.connections.max.Client=`	Sets the maximum number of connections that can be allocated by the Client connection pool at a given time. The Client connection pool is used by all user interface related database transactions.
`opswise.db.pooler.connections.max.Reserved=`	Sets the maximum number of connections that can be allocated by the Reserved connection pool at a given time. The Reserved connection pool is used by all critical internal database transactions.
`opswise.db.pooler.connections.Reserved=`	Sets the minimum number of idle connections to maintain in the Reserved connection pool, or zero to create none. The Reserved connection pool is used by all critical internal database transactions.
`opswise.db.url.append.properties=`	Allows additional options to be appended to the JDBC URL generated by Universal Controller. Example: `opswise.db.url.append.properties=&verifyServerCertificate=false&useSSL=true`
`opswise.db.user=`	Login ID that the Controller will use to log in to your database.
For LDAP:	
`opswise.ldap.groups.filter_indirect=`	When this property is set to true, any Groups synchronized indirectly (that is, through a User's **memberOf** attribute) will honor the Group search filter and Group OU filters under the LDAP Advanced Settings section. **Note** The code default for this property, which is used if this property is not set, is false.

`opswise.ldap.groups.single_parent_per_child=`	**IMPORTANT** This property should be set to true only if your Groups being synchronized from AD have at most one parent Group. When synchronizing Groups, the default behavior in the Controller is to copy the members of a Sub Group into the Parent Group. When this property is set to true, the Controller assumes that each Group has, at most, a single Parent Group and will use the Parent field on the Group definition to maintain the hierarchy instead of copying members.
`opswise.ldap.groups.update_members=`	**IMPORTANT** This property should be set to false only when synchronizing Groups from AD, and the number of values for the **member** attribute exceeds the `MaxValRange` LDAP policy (and the `MaxValRange` cannot be increased). When synchronizing Groups, the default behavior in the Controller is to use the multi-valued **member** attribute to update the members for a Group; however, AD limits the number of values returned for an attribute, which can result in Group members being removed unexpectedly. This limit is determined by the `MaxValRange` LDAP policy (typically 1,500). When this property is set to false, the Controller will not use the **member** attribute values to update members when synchronizing Groups from AD. Group membership will continue to be updated based on the **memberOf** attribute values when synchronizing Users from AD.
`opswise.ldap.users.synchronize_by_range=`	**IMPORTANT** This property should be set to false only if your LDAP server supports paged results. When synchronizing Users, the default behaviour in the Controller is to search based on ranges, using a filter like (&(uid>=a)(uid<=b)). To use the <= or >= operators in a filter, an ordering rule must be defined for the attribute in the LDAP schema. OpenLDAP's schema does not define an ordering rule for the User Id Attribute (for example, **uid**), so searches using filters like the above do not return any results. When this property is set to false, the Controller will not search based on ranges when synchronizing Users.

`opswise.ldap.users.synchronize_indirect=`	**IMPORTANT** This property should be set to true only if your LDAP server does not support the User Membership Attribute (for example, **memberOf**). Synchronizes LDAP users indirectly based on group membership. This only applies to groups that users are direct members of. When this property is set to true, the following will apply for the LDAP refresh (scheduled and server operations): • Users will not be synchronized directly based on the User Filter and User Target OU List. • Groups will continue to be synchronized directly based on the Group Filter and Group Target OU List. • For each matching group, the Group Member Attribute (for example, **member**) will be used to synchronize users matching the User Filter and User Target OU List **Note** The **`opswise.ldap.groups.update_members`** property will be ignored when indirect user synchronization is enabled. **Note** There is currently no support for nested groups if the User Membership Attribute is not supported by the LDAP server.
`opswise.ldap.users.update_memberships_on_login=`	**IMPORTANT** This property should ***not*** be set to true if group membership for users is static, since there is extra overhead to process the groups, which may impact login performance. When this property is set to true, LDAP group memberships for existing LDAP users are updated upon successful login. **Note** When dynamically creating a new LDAP user at login, the user will be added only to groups that it is a direct member of. Likewise, when updating an existing LDAP user at login, the user will be removed from any groups that it is not a direct member of. Therefore, it is not recommended that you enable this property if a group hierarchy exists, since the user will be removed from any parent groups when logging in. (Group membership for the parent groups will be restored the next time the LDAP refresh runs; however, this can take up to 24 hours.)
For Single Sign-On:	

`saml.log.level=`	Configures the log level for the SAML framework: ALL, TRACE, DEBUG, INFO, WARN, or ERROR.
`saml.maxAuthenticationAge=`	Specifies how long, in seconds, users can single sign-on after their initial authentication with the Identity Provider (based on value AuthInstance of the Authentication statement). Some Identity Providers allow users to stay authenticated for longer periods than this, so you might need to change the default value.
Other Properties:	
`jdk.xml.entityExpansionLimit=`	Limits the number of XML entity expansions. Valid values are any positive integer. A value equal to 0 indicates no limit. If `jdk.xml.entityExpansionLimit` is not specified in **`opswise.properties`** (or on start-up with `-Djdk.xml.entityExpansionLimit=<limit>`), Universal Controller will initialize it to a default value of 1. • If `jdk.xml.entityExpansionLimit` is specified on start-up with `-Djdk.xml.entityExpansionLimit=<limit>`, this takes precedence over the Universal Controller default value of 1. • If `jdk.xml.entityExpansionLimit` is specified in **`opswise.properties`**, this takes precedence over specifying it on start-up with `-Djdk.xml.entityExpansionLimit=<limit>`.
`opswise.date.formats=`	Accepted input date formats for Date Functions and Stored Procedure parameters. For example: `opswise.date.formats=yyyy/MM/dd;dd/MM/yyyy`. Formats can vary, but years must be defined with four digits (yyyy). Formats are used on a "first match" basis.
`opswise.email.attachments.local.path=`	Directory location from where files can be attached for a specific Cluster Node / Server. You must specify a location in this property in order for the Attach Local File field to display in the Email Task and Email Notifications Details. The **`opswise.properties`** file is refreshed every 10 minutes to accommodate changes to this property without requiring a restart. Every 10 minutes, **`opswise.properties`** is read, and if this property value has changed, that new value then will be used within the Controller. This property is local to the Cluster Node and must be specified on each Node based upon the path for that Node. Each Node can have a different path, but they should point to the same shared physical location in order to achieve the expected behavior. Best practices would be to use the same path in each Node.

`opswise.keymanager.algorithm=`	Java key manager algorithm. • For IBM AIX, the value must be IbmX509. • For all other platforms, use the default value. If no value is specified, the configured JVM default will be used.
`opswise.keymanager.client.alias=`	If multiple certificates reside in the keystore that could match the OMS server's certificate request, specifying an alias ensures that the intended client certificate is presented to the OMS server.
`opswise.keymanager.keystore=`	Location of the keystore which holds certificates and keys.
`opswise.keymanager.keystore.password=`	Password (if required) for the keystore that will be replaced by **`opswise.keymanager.keystore.password.encrypted`** in the **`opswise.properties`** file upon start-up.
`opswise.keymanager.provider=`	Java key manager provider. • For IBM AIX, the value must be IBMJSSE2. • For all other platforms, use the default value. If no value is specified, the configured JVM default will be used.

`opswise.mbean.catalina.manager.name=`	The Controller uses the Catalina:type=Manager MBean for the User Sessions feature.
	
	To determine the Manager MBean object name, the Controller dynamically determines the context. For example:
	
	`Catalina:type=Manager,context=/opswise,host=localhost`
	
	If the following error appears in the Universal Automation Center Console while you are using the User Sessions feature, you may need to configure this property manually:
	
	`Universal Controller not configured for user session operations.`
	
	In the opswise.log, you would see the following:
	
	`javax.management.InstanceNotFoundException: Catalina:type=Manager,context=/opswise,host=localhost`

`opswise.overdue.timer.startup.threshold=`	Maximum number of days after which an overdue trigger is considered "stale/expired."

`opswise.servlet.port=`	Port number used by Tomcat.
`opswise.trustmanager.algorithm=`	Java trust manager algorithm. • For IBM AIX, the value must be IbmX509. • For all other platforms, use the default value.
`opswise.trustmanager.provider=`	Java trust manager provider. • For IBM AIX, the value must be IBMJSSE2. • For all other platforms, use the default value.
`opswise.trustmanager.ssl.protocols=`	Comma-separated list of SSL protocols that can be used for Controller/OMS communications. • If the property does not contain a protocol list, a default SSL context will be referenced for building the SSL socket used for Controller/OMS communications. • If the property is used, only those protocols will be enabled for the Controller/OMS session. • If the property is not used, only the protocols specified in currently configured default SSLContext's default SSL protocol list will be enabled for the Controller/OMS session.
`opswise.trustmanager.truststore=`	Location of the keystore which holds certificates and keys.
`opswise.trustmanager.truststore.password=`	Password (if required) for the keystore that will be replaced by **`opswise.trustmanager.truststore.password.encrypted`** in the **`opswise.properties`** file upon start-up.
`opswise.trustmanager.truststore.password.encrypted=`	Encrypted version of **`opswise.trustmanager.truststore.password`** that will replace **`opswise.trustmanager.truststore.password`** in the **`opswise.properties`** file upon start-up.
`opswise.ui.session_timeout=`	Default browser session timeout, in minutes. To use the Tomcat session configuration (default 30 minutes), set this property to 0.
`opswise.web_service.httpclient.socket.keep_alive=`	Specifies (true or false) whether TCP socket keep-alive option is enabled for HTTP(S)/REST Web Service Tasks.

Sample opswise.properties File

```
# DB
opswise.db.rdbms=mysql
opswise.db.url=jdbc:mysql://localhost/
# MYSQL
# opswise.db.mysql.character_encoding=UTF-8
# opswise.db.rdbms=mysql
# opswise.db.url=jdbc:mysql://localhost/
# MS SQLSERVER
# opswise.db.rdbms=sqlserver
# opswise.db.url=jdbc:sqlserver://localhost:1433;DatabaseName=opswise
# ORACLE
# opswise.db.rdbms=oracle
# opswise.db.url=jdbc:oracle:thin:@//localhost:1521/@oracle.db.name@
#
# COMMON
#
# trust manager algorithm & provider
#opswise.trustmanager.algorithm=SunX509
#opswise.trustmanager.provider=SunJSSE
#opswise.trustmanager.ssl.protocols=TLSv1,TLSv1.1,TLSv1.2
#
opswise.db.user=root
opswise.db.password=pswd
opswise.db.name=opswise
opswise.servlet.port=8080
opswise.ui.session_timeout=30
```

Universal Controller System Properties

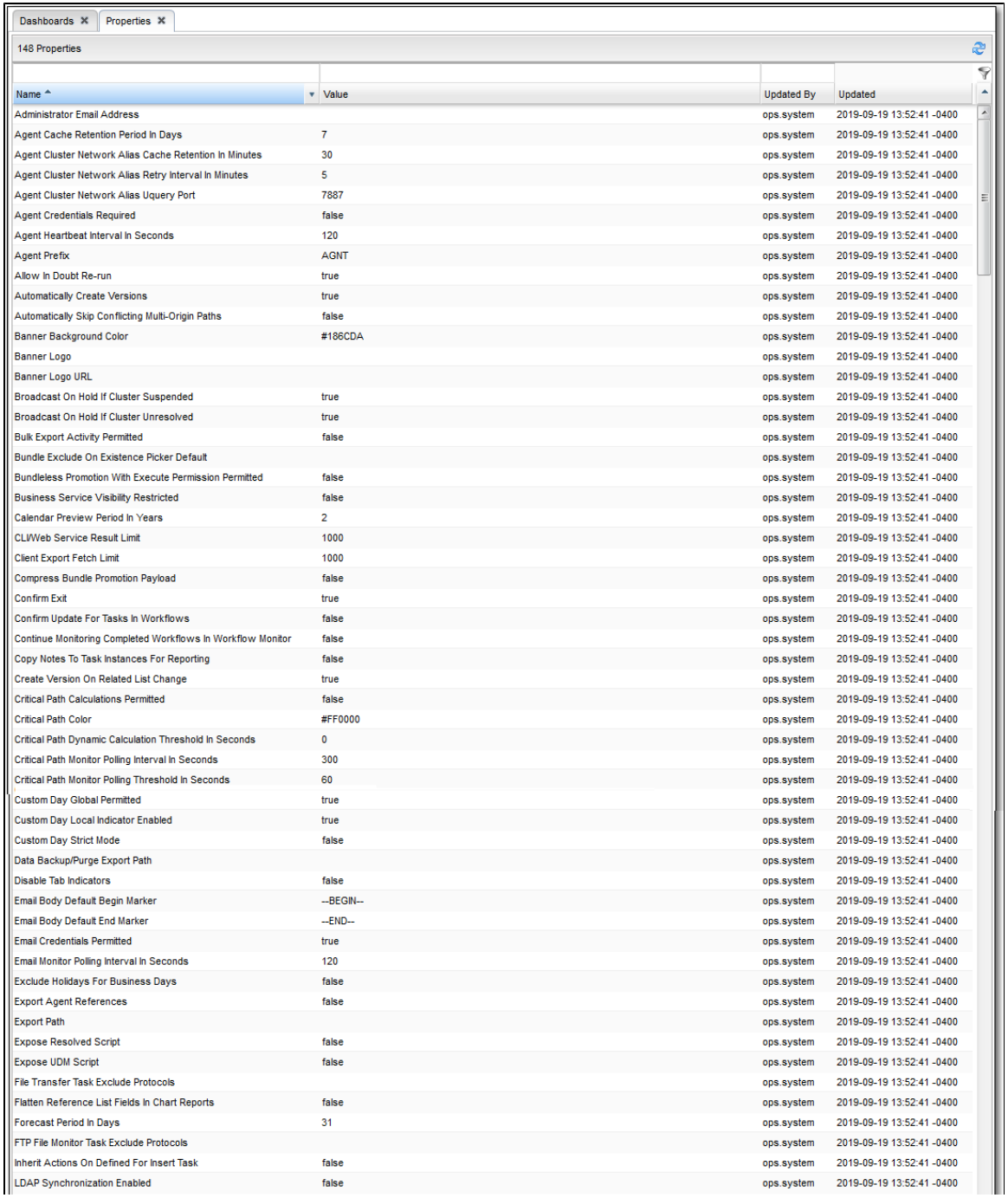
Properties for your Universal Controller system are set (in the Controller database) during Controller installation. These properties let you define Controller system information and performance.

Universal Controller system properties do not reside in a properties file; they are available only via the user interface.

Although you can reset these properties any time after the Controller is in operation without having to stop and restart the Controller, you should click the Reload current page icon in your browser taskbar after resetting a property.

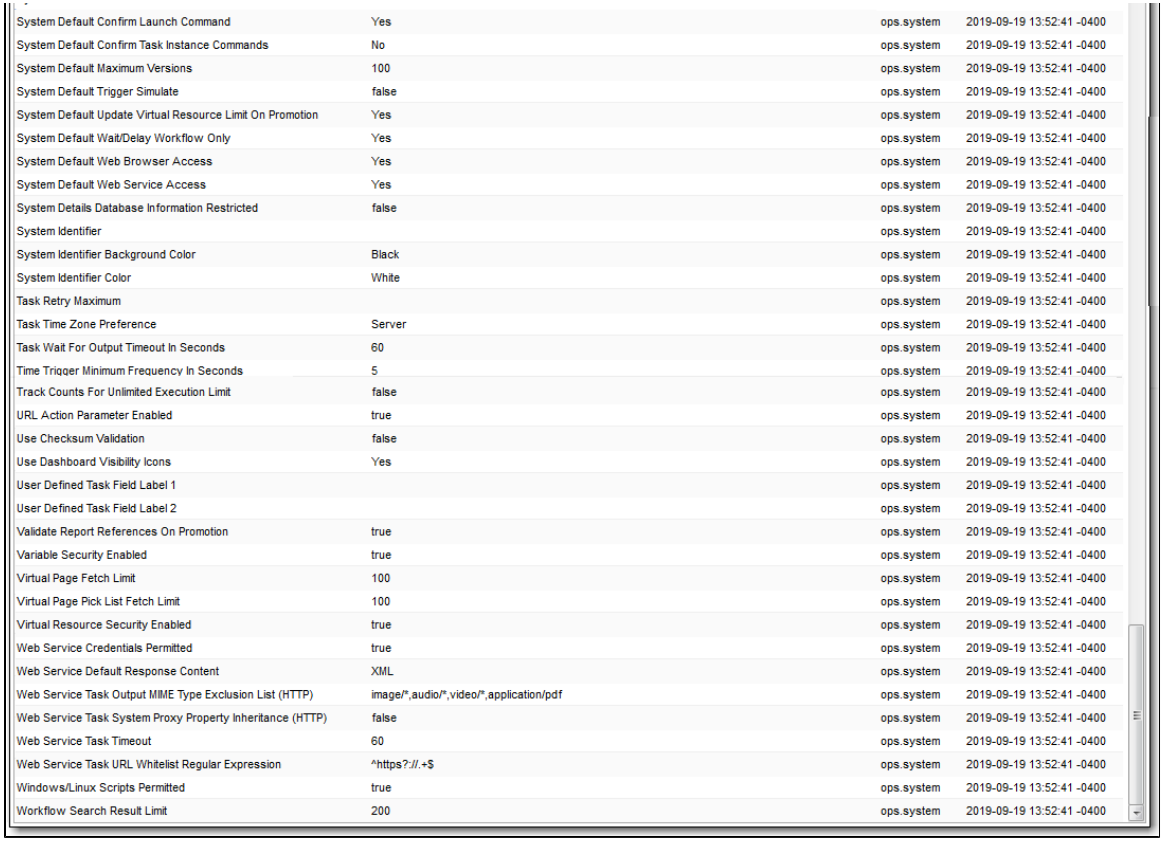
Note
You must be assigned the ops_admin role in order to reset these properties.

Step 1	From the Administration navigation pane, select **Configuration > Properties**. The Properties list displays.



Name	Value	Updated By	Updated
Administrator Email Address		ops.system	2019-09-19 13:52:41 -0400
Agent Cache Retention Period In Days	7	ops.system	2019-09-19 13:52:41 -0400
Agent Cluster Network Alias Cache Retention In Minutes	30	ops.system	2019-09-19 13:52:41 -0400
Agent Cluster Network Alias Retry Interval In Minutes	5	ops.system	2019-09-19 13:52:41 -0400
Agent Cluster Network Alias Uquery Port	7887	ops.system	2019-09-19 13:52:41 -0400
Agent Credentials Required	false	ops.system	2019-09-19 13:52:41 -0400
Agent Heartbeat Interval In Seconds	120	ops.system	2019-09-19 13:52:41 -0400
Agent Prefix	AGNT	ops.system	2019-09-19 13:52:41 -0400
Allow In Doubt Re-run	true	ops.system	2019-09-19 13:52:41 -0400
Automatically Create Versions	true	ops.system	2019-09-19 13:52:41 -0400
Automatically Skip Conflicting Multi-Origin Paths	false	ops.system	2019-09-19 13:52:41 -0400
Banner Background Color	#186CDA	ops.system	2019-09-19 13:52:41 -0400
Banner Logo		ops.system	2019-09-19 13:52:41 -0400
Banner Logo URL		ops.system	2019-09-19 13:52:41 -0400
Broadcast On Hold If Cluster Suspended	true	ops.system	2019-09-19 13:52:41 -0400
Broadcast On Hold If Cluster Unresolved	true	ops.system	2019-09-19 13:52:41 -0400
Bulk Export Activity Permitted	false	ops.system	2019-09-19 13:52:41 -0400
Bundle Exclude On Existence Picker Default		ops.system	2019-09-19 13:52:41 -0400
Bundleless Promotion With Execute Permission Permitted	false	ops.system	2019-09-19 13:52:41 -0400
Business Service Visibility Restricted	false	ops.system	2019-09-19 13:52:41 -0400
Calendar Preview Period In Years	2	ops.system	2019-09-19 13:52:41 -0400
CLI/Web Service Result Limit	1000	ops.system	2019-09-19 13:52:41 -0400
Client Export Fetch Limit	1000	ops.system	2019-09-19 13:52:41 -0400
Compress Bundle Promotion Payload	false	ops.system	2019-09-19 13:52:41 -0400
Confirm Exit	true	ops.system	2019-09-19 13:52:41 -0400
Confirm Update For Tasks In Workflows	false	ops.system	2019-09-19 13:52:41 -0400
Continue Monitoring Completed Workflows In Workflow Monitor	false	ops.system	2019-09-19 13:52:41 -0400
Copy Notes To Task Instances For Reporting	false	ops.system	2019-09-19 13:52:41 -0400
Create Version On Related List Change	true	ops.system	2019-09-19 13:52:41 -0400
Critical Path Calculations Permitted	false	ops.system	2019-09-19 13:52:41 -0400
Critical Path Color	#FF0000	ops.system	2019-09-19 13:52:41 -0400
Critical Path Dynamic Calculation Threshold In Seconds	0	ops.system	2019-09-19 13:52:41 -0400
Critical Path Monitor Polling Interval In Seconds	300	ops.system	2019-09-19 13:52:41 -0400
Critical Path Monitor Polling Threshold In Seconds	60	ops.system	2019-09-19 13:52:41 -0400
Custom Day Global Permitted	true	ops.system	2019-09-19 13:52:41 -0400
Custom Day Local Indicator Enabled	true	ops.system	2019-09-19 13:52:41 -0400
Custom Day Strict Mode	false	ops.system	2019-09-19 13:52:41 -0400
Data Backup/Purge Export Path		ops.system	2019-09-19 13:52:41 -0400
Disable Tab Indicators	false	ops.system	2019-09-19 13:52:41 -0400
Email Body Default Begin Marker	--BEGIN--	ops.system	2019-09-19 13:52:41 -0400
Email Body Default End Marker	--END--	ops.system	2019-09-19 13:52:41 -0400
Email Credentials Permitted	true	ops.system	2019-09-19 13:52:41 -0400
Email Monitor Polling Interval In Seconds	120	ops.system	2019-09-19 13:52:41 -0400
Exclude Holidays For Business Days	false	ops.system	2019-09-19 13:52:41 -0400
Export Agent References	false	ops.system	2019-09-19 13:52:41 -0400
Export Path		ops.system	2019-09-19 13:52:41 -0400
Expose Resolved Script	false	ops.system	2019-09-19 13:52:41 -0400
Expose UDM Script	false	ops.system	2019-09-19 13:52:41 -0400
File Transfer Task Exclude Protocols		ops.system	2019-09-19 13:52:41 -0400
Flatten Reference List Fields In Chart Reports	false	ops.system	2019-09-19 13:52:41 -0400
Forecast Period In Days	31	ops.system	2019-09-19 13:52:41 -0400
FTP File Monitor Task Exclude Protocols		ops.system	2019-09-19 13:52:41 -0400
Inherit Actions On Defined For Insert Task	false	ops.system	2019-09-19 13:52:41 -0400
LDAP Synchronization Enabled	false	ops.system	2019-09-19 13:52:41 -0400

License Key		ops.system	2019-09-19 13:52:41 -0400
List Qualifying Times Format	EEEEE, MMMMMMM dd, yyyy HH:mm:ss z Z	ops.system	2019-09-19 13:52:41 -0400
Lock Account After Maximum Login Attempts	false	ops.system	2019-09-19 13:52:41 -0400
Log File Retention Period In Days	5	ops.system	2019-09-19 13:52:41 -0400
Log Level	INFO	ops.system	2019-09-19 13:52:41 -0400
Login Disclaimer		ops.system	2019-09-19 13:52:41 -0400
Maximum Login Attempts	5	ops.system	2019-09-19 13:52:41 -0400
Maximum Login Attempts Use For LDAP Authentication	true	ops.system	2019-09-19 13:52:41 -0400
Maximum Nested Variable Depth	25	ops.system	2019-09-19 13:52:41 -0400
Maximum Nested Variable Expansion	250000	ops.system	2019-09-19 13:52:41 -0400
Maximum Processing Threads	1000	ops.system	2019-09-19 13:52:41 -0400
Maximum Timer Threads	300	ops.system	2019-09-19 13:52:41 -0400
Node Time Display	Yes	ops.system	2019-09-19 13:52:41 -0400
Node Time Display Background Color	White	ops.system	2019-09-19 13:52:41 -0400
Node Time Display Color	Black	ops.system	2019-09-19 13:52:41 -0400
Node Time Display Time Zone	Server	ops.system	2019-09-19 13:52:41 -0400
OMS Log Level	INFO	ops.system	2019-09-19 13:52:41 -0400
Password Expiration Enabled	false	ops.system	2019-09-19 13:52:41 -0400
Password Expiration In Days	30	ops.system	2019-09-19 13:52:41 -0400
Perform Actions On Defined For Tasks Within Skipped Workflow	false	ops.system	2019-09-19 13:52:41 -0400
Perform Actions On Defined Workflow First	false	ops.system	2019-09-19 13:52:41 -0400
Perform Actions On Halt	true	ops.system	2019-09-19 13:52:41 -0400
Platform Log Level	WARN	ops.system	2019-09-19 13:52:41 -0400
Promotion Accept Bundle Create/Update Permission Required	false	ops.system	2019-09-19 13:52:41 -0400
Promotion History Retention Period In Days	60	ops.system	2019-09-19 13:52:41 -0400
Promotion Read Permission Required	false	ops.system	2019-09-19 13:52:41 -0400
Promotion Schedule Retention Period In Days	7	ops.system	2019-09-19 13:52:41 -0400
Promotion Strict Mode	1	ops.system	2019-09-19 13:52:41 -0400
Purge Activity By Primary Key Limit	500	ops.system	2019-09-19 13:52:41 -0400
Purge All Non-Default Users And Groups Permitted	false	ops.system	2019-09-19 13:52:41 -0400
Purge Dates From Custom Day List Older Than		ops.system	2019-09-19 13:52:41 -0400
Report Group Threshold	10	ops.system	2019-09-19 13:52:41 -0400
Resolvable Credentials Permitted	false	ops.system	2019-09-19 13:52:41 -0400
Retain Overridden Step Codes On z/OS Task Re-run	false	ops.system	2019-09-19 13:52:41 -0400
Retrieve Output Default Number Of Lines	100	ops.system	2019-09-19 13:52:41 -0400
Retrieve Output Maximum Number Of Lines		ops.system	2019-09-19 13:52:41 -0400
Scheduled Report 3D Pie Chart	No	ops.system	2019-09-19 13:52:41 -0400
Scheduled Report Fetch Limit	1000	ops.system	2019-09-19 13:52:41 -0400
Scheduled Report Image Height	500	ops.system	2019-09-19 13:52:41 -0400
Scheduled Report Image Width	750	ops.system	2019-09-19 13:52:41 -0400
Scheduled Report Inline Image	Yes	ops.system	2019-09-19 13:52:41 -0400
Scheduled Report PDF Orientation	Landscape	ops.system	2019-09-19 13:52:41 -0400
Scheduled Report PDF Size	Letter	ops.system	2019-09-19 13:52:41 -0400
Scheduled Report Time Zone	Server	ops.system	2019-09-19 13:52:41 -0400
Show Metadata	No	ops.system	2019-09-19 13:52:41 -0400
Show Variables Fetch Global Automatically	No	ops.system	2019-09-19 13:52:41 -0400
SMTP Debug	false	ops.system	2019-09-19 13:52:41 -0400
SQL/Stored Procedure Close Additional Result Sets	true	ops.system	2019-09-19 13:52:41 -0400
SQL/Stored Procedure Ignore Update Count If No Results	false	ops.system	2019-09-19 13:52:41 -0400
SQL/Stored Procedure Maximum Rows		ops.system	2019-09-19 13:52:41 -0400
Start Server Paused	false	ops.system	2019-09-19 13:52:41 -0400
Stop Unknown Application Monitors	false	ops.system	2019-09-19 13:52:41 -0400
Strict Business Service Membership Read Constraints	false	ops.system	2019-09-19 13:52:41 -0400
Strict Connection Execute Constraints	false	ops.system	2019-09-19 13:52:41 -0400
Strict Dashboard Create Constraints	false	ops.system	2019-09-19 13:52:41 -0400
Strict Report Create Constraints	false	ops.system	2019-09-19 13:52:41 -0400
System Default Activity Quick Filters	Active=!180,!190,!200;Blocked=10,20,23,30,33,60;Completed=180,190,200; Problem=35,81,99,110,120,125,130,140;	ops.system	2019-09-19 13:52:41 -0400
System Default CLI Bulk Import Path	/opt/apache-tomcat-8.0.33/opswise_import	ops.system	2019-09-19 13:52:41 -0400
System Default Command Line Access	Yes	ops.system	2019-09-19 13:52:41 -0400



System Default Confirm Launch Command	Yes
System Default Confirm Task Instance Commands	No
System Default Maximum Versions	100
System Default Trigger Simulate	false
System Default Update Virtual Resource Limit On Promotion	Yes
System Default Wait/Delay Workflow Only	Yes
System Default Web Browser Access	Yes
System Default Web Service Access	Yes
System Details Database Information Restricted	false
System Identifier	
System Identifier Background Color	Black
System Identifier Color	White
Task Retry Maximum	
Task Time Zone Preference	Server
Task Wait For Output Timeout In Seconds	60
Time Trigger Minimum Frequency In Seconds	5
Track Counts For Unlimited Execution Limit	false
URL Action Parameter Enabled	true
Use Checksum Validation	false
Use Dashboard Visibility Icons	Yes
User Defined Task Field Label 1	
User Defined Task Field Label 2	
Validate Report References On Promotion	true
Variable Security Enabled	true
Virtual Page Fetch Limit	100
Virtual Page Pick List Fetch Limit	100
Virtual Resource Security Enabled	true
Web Service Credentials Permitted	true
Web Service Default Response Content	XML
Web Service Task Output MIME Type Exclusion List (HTTP)	image/*,audio/*,video/*,application/pdf
Web Service Task System Proxy Property Inheritance (HTTP)	false
Web Service Task Timeout	60
Web Service Task URL Whitelist Regular Expression	^https?://.+$
Windows/Linux Scripts Permitted	true
Workflow Search Result Limit	200

Step 2	If you want to change the value of a property, click a its **Value** field and select/enter a new value.
Step 3	To filter the list of displayed properties, enter appropriate characters (not case-sensitive) in the empty fields above the Name and/or Value columns. For example, to display only properties elated to promotion, enter **promotion** (or **PROMOTION**, **promo**, etc.) in the empty field above the Name column.

The following table describes the Universal Controller system properties:

Name (Property Name)	Description	Default
Administrator Email Address (opswise.admin.email_addr)	System administrator email address(es) specified as the recipient(s) for System Notifications. Addresses for multiple administrators should be specified in a comma-separated list.	(none)
Agent Cache Retention Period in Days (opswise.agent.cache.retention)	Number of days that cache files (stdout, stderr) are retained by the system.	7

Agent Cluster Network Alias Cache Retention In Minutes (opswise.agent_cluster.network_alias.cache_retention_in_minutes)	Amount of time (in minutes) that a resolved Network Alias will be used before attempting to resolve it again.	30
Agent Cluster Network Alias Retry Interval In Minutes (opswise.agent_cluster.network_alias.retry_interval_in_minutes)	Amount of time (in minutes) before automatically retrying the Network Alias resolution upon failure.	5
Agent Cluster Network Alias Uquery Port (opswise.agent_cluster.network_alias.uquery_port)	Default port for an Agent Cluster with a Distribution method of Network Alias if no Agent Port is specified.	7887
Agent Credentials Required (opswise.agent.credentials.required)	Specification (true or false) for whether or not Credentials are required for agent-based tasks and Application Resources.	false
Agent Heartbeat Interval in Seconds (opswise.agent.heartbeat.interval.in.seconds)	Number of seconds between each heartbeat message sent by the agent to the Controller.	120
Agent Prefix (opswise.agent.prefix)	Prefix appended to the Queue name for newly registered agents. A 4-digit number is appended to this prefix.	AGNT
Allow In Doubt Re-run (opswise.task_instance.rerun.allow_in_doubt)	Specification (true or false) for whether or not the Controller will allow the re-run of a task instance if it is in the In Doubt status.	true
Automatically Create Versions (opswise.version.automatically)	Specification (true or false) for whether or not the Controller will retain copies of previous versions. Affects system behavior when you make updates to records in your Controller database, such as changing a task definition.	true
Automatically Skip Conflicting Multi-Origin Paths (opswise.workflow.skip_conflicting_multi_origin_paths)	Specification (true or false) for whether or not the Controller will automatically skip a task (within a workflow) that is connected to multiple upstream tasks, where one or more of the upstream tasks would cause the task to be run and one or more would cause the task to be skipped.	false
Banner Background Color (opswise.banner.background_color)	Hexadecimal color code for the color of the Universal Controller user interface page banner. Valid values are #[0-9, a-f, A-F] (six characters).	#186CDA
Banner Logo (opswise.banner.logo)	Name of the Banner Logo file to use in the Universal Controller user interface page banner (next to the Stonebranch logo). Enter the name of the logo file, excluding the path, from directory `../tomcat/opswise_images/`. Valid logo files end in extension .png, .jpg, or .gif. **Note** The banner logo is allocated a maximum width of 298px and a maximum height of 32px. The image will be scaled, preserving its ratio, to fit within its designated area.	(none)
Banner Logo URL (opswise.banner.logo_url)	URL of a web resource that you want the Banner Logo to link to. The URL must begin with `http://`, `https://`, or `ftp://` and contain no spaces. (Banner Logo URL is not a valid URL.)	(none)
Broadcast On Hold If Cluster Suspended (opswise.cluster_broadcast.hold_on_suspended)	Specification (true or false) for whether or not cluster broadcast tasks will be run if the agent cluster selected for the broadcast has been suspended.	true

Broadcast On Hold If Cluster Unresolved (opswise.cluster_broadcast.hold_on_unresolved)	Specification (true or false), for a task instance defined within a worfklow, if a broadcast cluster is specified, and Universal Controller is unable to find the broadcast cluster by id, or unable to resolve the broadcast cluster variable, or the Execution User cannot read the cluster due to security constraints, that the task instance should be Held, with an appropriate Hold Reason, rather than the instance becoming Undeliverable only when eligible to run.	true
Bulk Export Activity Permitted (opswise.bulk_export.activity.permitted)	Specification (true or false) for whether or not to permit the Bulk Export Activity server operation to be run.	false
Bundle Exclude On Existence Picker Default (opswise.bundle.exclude_on_existence.picker.default)	Default selection for the Exclude on Existence field in both the Bundle Details for a new Bundle and the Promote dialog when promoting one or more individual records, which identifies record types in the promotion payload that will not be updated if they exist on the target server. Use the Shift and/or Ctrl keys to select multiple record types.	(none)
Bundleless Promotion With Execute Permission Permitted (opswise.promotion.bundleless.execute_permission.permitted)	Specifies whether or not a bundleless promotion should be limited to users with the ops_promotion_admin role, or if users with promotion target Execute permission should be permitted to perform a bundleless promotion.	false

Business Service Visibility Restricted (opswise.bsrvc.visibility_restricted)	Specification (true or false) for whether or not drop-down lists for selecting a Business Service, such as in the Member of Business Services field, should restrict the visibility of Business Services available for selection based on a user's assigned (or inherited) Permissions and Roles. If a user has any Permission, directly assigned or inherited, with its Member of Any Business Service or Unassigned checkbox selected, the user will have no Business Service visibility restrictions. For any Permission that the user has, directly assigned or inherited, with an explicit Business Service specified for Member of Business Services, visibility for that specific Business Service will not be restricted. The following Roles, directly assigned or inherited, provide a user with unrestricted Business Service visibility. • ops_admin • ops_agent_cluster_admin • ops_bundle_admin • ops_dba • ops_email_admin • ops_peoplesoft_admin • ops_promotion_admin • ops_sap_admin • ops_service • ops_snmp_admin • ops_user_admin **Note** In cases where the user can Read a record that is a member of one or more Business Services, and visibility for one or more of those Business Services is restricted for that user, the user will be able to see the display name of those Business Services in the Member of Business Services field; however, the drop-down will not contain those Business Services for selection. Any attempt to modify the selection of the Member of Business Services field will result in the removal of restricted Business Services from the selection.	false
Calendar Preview Period In Years (opswise.calendar.preview.years)	Number of years (starting from the end of the current year) to show all Custom Days defined for a calendar in a Calendar Preview.	2

CLI/Web Service Result Limit
(opswise.cli.result_limit)
	Maximum number of records that can be retrieved (or matched) for the following:
	• CLI List APIs.
	• CLI APIs for limiting matches:
	  • Launch a Task
	  • Export Trigger
	  • Disable a Trigger
	  • Enable a Trigger
	  • Launch Trigger Tasks Now
	• Web Service List APIs:
	  • List Agents
	  • List Task Instances
	  • List Tasks
	  • List Triggers
	  • List Virtual Resources
	  • List Variables
		1000

Client Export Fetch Limit (opswise.export.client.fetch_limit	Number of records to pre-fetch before performing an export to CSV, PDF, XLS (Excel), or XLSX. Before performing an export, the client will attempt to pre-fetch all list grid data. If after the pre-fetch, the list grid does not contain all matching rows, a warning displays, before continuing with the export, indicating that the export doesn't contain everything.	1000
Compress Bundle Promotion Payload (opswise.bundle.payload_compression)	Specification (true or false) for whether or not the Controller will compress record bundles during a promotion.	false
Confirm Exit (opswise.browser.confirm_exit)	Specification (true or false) for whether or not a confirmation pop-up displays if a user navigates away from the Universal Controller user interface (or closes the browser without logging out).	true
Confirm Update For Tasks In Workflows (opswise.task.confirm.workflow_update)	Specification (true or false) for whether or not a user, when updating a task, is prompted with a Confirmation dialog listing all Workflows containing that task, since those Workflows could be impacted by the task update.	false
Continue Monitoring Completed Workflows in Workflow Monitor (opswise.workflow_monitor.monitor_completed)	Specification (true or false) for whether or not the Controller will continue monitoring completed Workflows in the Workflow Monitor.	false
Copy Notes to Task Instances for Reporting (opswise.notes.copy_to_execs)	Specification (true or false) for whether or not the Controller will copy task notes to task instances so that task notes can be included in activity reports or gauges. For example, if true is specified, you can create a gauge that lists task notes for failed task instances. This property should be enabled only as needed.	false
Create Version On Related List Change (opswise.version.on.related.list.change)	Specification (true or false) for whether or not a record version will be created if the user changes a record associated with the current record. For example, if true, the Controller will create a version of the task when the user changes a task variable.	true

Critical Path Calculations Permitted
(opswise.cp.calculations.permitted)
	Specification (true or false) for whether or not a user can use the Critical Path feature of the Controller.
	
	• If this property is true:
	  ◦ The Toggle Critical Path View displays in the Workflow Monitor Toolbar.
	  ◦ The Calculate Critical Path field displays in the Workflow Details.
	• If this property is false:
	  ◦ The Toggle Critical Path View does not display in the Workflow Monitor Toolbar.
	  ◦ The Calculate Critical Path field does not display in the Workflow Details, either to view or modify.
	• If this property changes from false to true, logged-in users must log off/on to use the Critical Path feature.
	• If this property changes from true to false, the Critical Path feature will not be honored. However, Workflow Details will be preserved.
	
	Important
	• When restoring a Workflow Details Version, the Calculate Critical Path setting (enabled or disabled) will be preserved.
	• When promoting a Workflow record or importing (list or bulk) Workflow Details:
	  ◦ **Critical Path Calculations Permitted** setting will not change.
	  ◦ Calculate Critical Path, if enabled, will be disabled.
	• If the database is "dropped" for any reason:
	  ◦ **Critical Path Calculations Permitted** will be set to **false**.
	  ◦ Calculate Critical Path, if enabled, will be disabled.
		false

Critical Path Color (opswise.cp.color)	Hexadecimal color code for the color of the vertices and edges along the Critical Path displayed within the Workflow Monitor while in Critical Path view. Valid values are #[0-9, a-f, A-F] (six characters).	#FF0000 (red)
Critical Path Dynamic Calculation Threshold In Seconds (opswise.cp.calculations.dynamic.threshold_in_seconds)	When a task instance completes, if the difference between its end time and its projected end time is greater than or equal to the threshold specified in seconds, a critical path recalculation event will be dispatched. Valid values are 0-600.	0
Critical Path Monitor Polling Interval In Seconds (opswise.cp.monitor.polling.interval_in_seconds)	Interval (in seconds) in which that Universal Controller queries for task instances with a status greater than WAITING, and less than SKIPPED, and have elapsed their projected end time. Valid values are 60+.	300
Critical Path Monitor Polling Threshold In Seconds (opswise.cp.monitor.polling.threshold_in_seconds)	Threshold (in seconds) that Universal Controller uses to determine if a task instance has elapsed its projected end time when polling. Valid values are 60+.	60

Custom Day Global Permitted (opswise.custom_day.global.permitted)	Specification (true or false) for whether to enable (true) or disable (false) global Custom Days. **Note** You cannot set Custom Day Global Permitted to false if there are any existing global Custom Days.	true
Custom Day Local Indicator Enabled (opswise.custom_day.local_indicator.enabled)	Specification (true or false) for whether to enable (true) or disable (false) the Local Custom Day indicator ({L}) for Trigger and Composite Trigger components, Task Run Criteria, and Calendar Preview.	true
Custom Day Strict Mode (opswise.custom_day.strict.mode)	Specification (true or false) for whether or not a Custom Day referenced in the Complex section of Task Run Criteria for a task in a workflow must belong to the Calendar in use at run time.	false
Data Backup/Purge Export Path (opswise.backup.path)	Export path to use instead of the default export path (**opswise_backups** under the Tomcat directory) for Data Backup/Purge operations.	(none)
Disable Tab Indicators (opswise.disable.tab.indicators)	Specification (true or false) for whether or not to disable the tab icons that indicate if tabs contain (green icon) or do not contain (gray icon) records.	false
Email Body Default Begin Marker (opswise.email.body_begin_marker)	Default Begin Marker for Email Monitor Body Variables field.	- - BEGIN - -
Email Body Default End Marker (opswise.email.body_end_marker)	Default End Marker for Email Monitor Body Variables field.	- - END - -
Email Credentials Permitted (opswise.credentials.email.permitted)	Specification (true or false) for whether or not to enable the use of Email Credentials.	true
Email Monitor Polling Interval In Seconds (opswise.email.monitor.polling.interval_in_seconds)	Number of seconds between each poll of a Mailbox Folder by an Email Monitor task.	120
Exclude Holidays for Business Days (opswise.calendar.exclude_holidays)	Specification (true or false) for whether or not the Controller will consider a Business Day on which a holiday falls as a non-Business Day. • If true, holidays that fall on Business Days are considered non-Business Days. • If false (the default), holidays that fall on Business Days are considered Business Days. For example, if the default value (false) is used, and a job is defined to run on Business Days, the job will run on Christmas Day, even though it is a holiday. This behavior applies to Triggers, Task Run Criteria, and JavaScript functions that operate on Business Days, and provides a means to avoid having to specify a restriction or skip criteria for holidays.	false

Export Agent References (opswise.export.agent_references)	Specification (true or false) for whether or not the Controller will export referenced Agents when exporting definition XMLs with the Export References feature.	false
Export Path (opswise.export.path)	Pathname where exported XML files are written. All cluster nodes use their own local system default export path. You should set a value for Export Path only if the path is writable by all cluster nodes. **Note** Any bulk import or list import of an Export Path property (from version 6.1.1.0 or earlier) will result in the server resetting the database back to the default "unset" Export Path value. Both bulk export and list export will first look for a configured Export Path property. If a value has not been set, they will use the local system default path of <tomcat>/opswise_export.	(none)
Expose UDM Script (opswise.infitran.expose_script)	***For debugging use only.*** Specification (true or false) for whether or not the Controller prepares a script when it launches a file transfer on a UDM installation. If troubleshooting is necessary, enabling this property allows you to view the script in the Output tab on the task instance.	false
Expose Resolved Script (opswise.script_library.expose_resolved_script)	Specification (true or false) for whether or not to generate a SCRIPT output type capturing the resolved contents of the Scripts script for each task instance run attempt that utilizes a script from the Scripts. This property only applies to Scripts defined with the **Resolve UAC Variables** option checked. Any user with the task instance Read permission for a specific task instance will be able to view the SCRIPT output type content for that specific instance. To avoid generating unnecessary output, we recommend enabling this property only for debugging purposes. The unresolved script content can always be viewed from Scripts.	false
File Transfer Task Exclude Protocols (opswise.task.file_transfer.exclude_protocols)	Specification for which protocols will be excluded from the Transfer Protocol field in the File Transfer Task Details: • FTP • SFTP • UDM • FTPS You can select multiple, but not all, protocols. Also, you cannot exclude a protocol if it is specified in the Transfer Protocol field for any exisitng File Transfer Task or Task Instance.	
Flatten Reference List Fields In Chart Reports (opswise.report.flatten_references)	Specification (true or false) for whether or not to flatten Business Services in Chart reports when grouping by **Member of Business Services**.	false

Forecast Period in Days (opswise.forecast.days)	Number of days to be included in a trigger forecast. See Displaying Trigger Forecast Information.	31
FTP File Monitor Task Exclude Protocols (opswise.task.ftp_file_monitor.exclude_protocols)	Specification for which protocols will be excluded from the Server Type field in the FTP File Monitor Task Details: • FTP • SFTP • FTPS You can select multiple, but not all, protocols. Also, you cannot exclude a protocol if it is specified in the Server Type field for any exisitng FTP File Monitor Task or Task Instance.	
Inherit Actions On Defined For Insert Task (opswise.inherit_actions.on_defined.insert_task)	Specification (true or false) for whether or not a task inserted into a Workflow, whose initial inserted status will be Defined, will perform inherited Workflow Actions for the Defined status.	false
LDAP Synchronization Enabled (opswise.security.ldap.enabled)	Specification (true or false) for whether or not LDAP synchronization is enabled. This allows you to retain your LDAP Settings while using or not using LDAP authentication, as desired.	false
License Key (opswise.license)	License key for your installation; provided to you by your Universal Controller representative.	(none)
List Qualifying Times Format (opswise.trigger.date.format.display)	Format that you want the Controller to use when listing qualifying times for Time and Cron Triggers. See List Qualifying Times.	EEEEE, MMMMMMM dd, yyyy HH:mm:ss z Z
Lock Account After Maximum Login Attempts (opswise.login.maximum_attempts.enabled)	Specification (true or false) for whether or not to lock a user account if the user has reached the maximum number of successive login attempts that is allowed, as specified by the Maximum Login Attempts property. Whenever this property is enabled (value is changed from **false** to **true**), the current number of failed login attempts for all users is reset to 0.	false
Log File Retention Period in Days (opswise.log.retention)	Number of days that the Controller retains its log files.	5
Log Level (opswise.log.level)	Level of logging for the Controller: • ALL • TRACE • DEBUG • INFO • WARN • ERROR • SEVERE • OFF	INFO
Login Disclaimer (opswise.login.disclaimer}	Allows for the the specification of free-form text to be displayed at the bottom of the Universal Automation Center Login page.	(none)

Maximum Login Attempts (opswise.login.maximum_attempts)	For users that are not available for LDAP authentication; Maximum number of successive login attempts that a user can make before the user's account is locked if the Lock Account After Maximum Login Attempts property is set to **true**.	5
Maximum Login Attempts Use For LDAP Authentication (opswise.login.maximum_attempts.use_for_ldap_authentication)	Use the Maximum Login Attempts value for LDAP authentication when logging in via a web browser, web service or the CLI. • If true, the attempt count is incremented for failed login attempts when logging in with an LDAP user and LDAP authentication is enabled. • If false, the attempt count is not incremented for failed login attempts when logging in with an LDAP user and LDAP authentication is enabled. Maximum Login Attempts Use For LDAP Authentication is ignored if Maximum Login Attempts is not enabled.	true
Maximum Nested Variable Depth (opswise.variable.maximum_depth)	Maximum number of nested variables allowed.	25
Maximum Nested Variable Expansion (opswise.variable.maximum_expansion)	Maximum number of nested variable characters allowed.	250000
Maximum Processing Threads (opswise.threads.max)	Maximum number of processing threads used.	1000
Maximum Timer Threads (opswise.timer.threads.max)	Maximum number of timer threads used.	300
Node Time Display (opswise.node_time.display.default)	Specification (Yes or No) for whether or not the User Task Bar will display the Cluster Node time by default.	Yes
Node Time Display Background Color (opswise.node_time.display.background_color.default)	Default color to use for the Cluster Node time field background in the User Task Bar.	White
Node Time Display Color (opswise.node_time.display.color.default)	Default color to use for the Cluster Node time field in the User Task Bar.	Black
Node Time Display Time Zone (opswise.node_time.display.tz.default)	Specification for whether to display the time zone of the **Server** or the **User** in the Cluster Node time field in the User Task Bar.	Server
OMS Log Level (opswise.oms.log.level)	Level of logging for OMS: • ALL • TRACE • DEBUG • INFO • WARN • ERROR	INFO

Password Expiration Enabled (opswise.login.password_expiration.enabled)	For local user account authentication; Specification (true or false) for whether or not user passwords will expire after the maximum number of days that a user password can remain unchanged before expiring, as specified by the Password Expiration in Days property. **Note** Password expiration is not applicable to LDAP-authenticated users or users who authenticate using the Single Sign-On login method.	false
Password Expiration in Days (opswise.login.password_expiration)	For local user account authentication; Maximum number of days that a user password can remain unchanged before expiring, if the Password Expiration Enabled property value is **true**.	30
Perform Actions On Defined For Tasks Within Skipped Workflow (opswise.perform_actions.on_defined.tasks_within_skipped_wf)	Specification (true or false) for whether or not tasks within a workflow that is being skipped due to trigger-time run criteria should perform Actions on Defined status and evaluate their own run criteria.	false
Perform Actions On Defined Workflow First (opswise.perform_actions.on_defined.wf_first)	Specification (true or false) for whether or not to allow a workflow, on Defined status, to process its own Actions prior to processing any Actions for its children task instances on Defined status. This might be leveraged if, on Defined status, a workflow initializes a variable using the Set Variable Action, and a child task instance, also on Defined status, leverages that same variable in its own Set Variable Action.	false
Perform Actions On Halt (opswise.perform_actions.on_halt)	Specification (true or false) for whether or not to allow the triggering of notifications for a task instance status change when issuing a Force Finish (Halt) or Force Finish/Cancel (Halt) command.	true
Platform Log Level (opswise.platform.log.level)	Level of logging for the user interface framework: • ALL • TRACE • DEBUG • INFO • WARN • ERROR • OFF	WARN
Promotion Accept Bundle Create/Update Permission Required (opswise.promotion.accept_bundle.create_update_permission.required)	Specification (true or false) for whether or not the ops_promotion_admin role additionally requires Create (or Update) permission, on the target Universal Controller, for any record type being promoted. Any user without the ops_promotion_admin role always will require Create (or Update) permission, regardless of this property.	false
Promotion History Retention Period in Days (opswise.promotion_history.retention)	Number of days that the Controller retains Promotion History.	60

Promotion Read Permission Required (opswise.promotion.read_permission.required)	Specification (true or false) for whether or not the ops_promotion_admin role additionally requires Read permission, on the source Universal Controller, for any record type being promoted. Any user without the ops_promotion_admin role always will require Read permission, regardless of this property. **Note** If false, any user with the ops_promotion_admin role automatically is granted Read permission for any record that can be promoted.	false
Promotion Schedule Retention Period In Days (opswise.promotion_schedule.retention)	Number of days that a Promotion Schedule will remain available after the promotion has completed successfully.	7
Promotion Strict Mode (opswise.promotion.strict_mode)	Specification for whether or not to fail a promotion if a record being promoted matches both of the following target records: • Record with same name / different sysid • Record with different name / same sysid If the record being promoted matches a target record by only one of the above conditions, the Controller will allow the promotion to continue. • If the record being promoted matches a target record with same name / different sysid, the id mismatch will be logged in this format: `Promoted {type} with name "name" and id 3c7a1b3c422049cab796e98fb5420ff3 has a different id than the original "name" with id 7b91616ff0dc431b9ae011f6e795806e.` • If the record being promoted matches a target record with different name / same sysid, it is considered a name update and the name mismatch will not be logged. Valid values are **0** (allow) and **1** (fail).	1
Purge Activity By Primary Key Limit (opswise.backup.purge_by_primary_key.limit)	Number of task instances to purge per transaction while performing the Activity purge (by primary key).	500
Purge All Non-Default Users And Groups Permitted (opswise.purge.non_default_users_and_groups.permitted)	Specification (true or false) for whether or not to allow the Purge All Non-Default Users And Groups Server Operation to be run.	false
Purge Dates From Custom Day List Older Than (opswise.custom_day.purge_dates_older_than)	Number of days old (1-999) that a date in a Custom Day List of Dates will cause it to be purged automatically.	(none)

Report Group Threshold (opswise.report.group_threshold.default)	If the Group Threshold field on the Report is - - System Default - -; Maximum number of groups to display on a Chart report. All groups above the threshold will be displayed in one group named Other. **Note** This option was formerly named System Default Report Group Threshold.	10
Resolvable Credentials Permitted (opswise.credentials.resolvable.permitted)	Specification (true or false) for whether or not the use Resolvable Credential is enabled.	false
Retain Overridden Step Codes On z/OS Task Re-run (opswise.task_instance.rerun.zos.retain_step_codes)	Specification (true or false) for whether or not a changed return code of a previously executed step in a z/OS task is retained when the task is re-run.	false
Retrieve Output Default Number Of Lines (opswise.retrieve_output.maximum_lines)	Specifies the default value for the Number of Lines field on the Retrieve Output dialog. Additionally, if the Number of Lines field is blank, it specifies the limit for the number of lines retrieved when Automatic Output Retrieval is enabled on a task.	100
Retrieve Output Maximum Lines (opswise.retrieve_output.maximum_lines.limit)	Specifies the maximum number of lines that can be requested when retrieving output.	(none)
Scheduled Report 3D Pie Chart (opswise.report.scheduled.3d_pie_chart.default)	Specification (Yes or No) for whether Pie Chart reports are rendered in 2D (No) or 3D (Yes).	No
Scheduled Report Fetch Limit (opswise.report.scheduled.fetch_limit)	Maximum number of records to fetch for inclusion in a List report (minimum is 1; no maximum). The report will indicate if the specified maximum has been reached.	1,000
Scheduled Report Image Height (opswise.report.scheduled.image_height.default)	Specification for the height (in pixels) of PNG chart report images.	500
Scheduled Report Image Width (opswise.report.scheduled.image_width.default)	Specification for the height (in pixels) of PNG chart report images.	750
Scheduled Report Inline Image (opswise.report.scheduled.inline_image.default)	Specification (Yes or No) for whether to inline chart report images within the email (Yes) or include them as attachments (No). If any other attachments, such as standard error and standard output, are included, this property does not apply; the chart report image will be delivered as an attachment.	Yes
Scheduled Report PDF Orientation (opswise.report.scheduled.pdf.orientation.default)	Specification (Landscape or Portrait) for the page layout of the PDF.	Landscape
Scheduled Report PDF Size (opswise.report.scheduled.pdf.size.default)	Specification (Letter, Legal, or A4) for the page size of the PDF.	Letter
Scheduled Report Time Zone (oopswise.report.scheduled.tz.default)	Specification for whether to obtain the time zone from the Server (Server) or from the User record of the Execution User (User). This property applies to all report types (List, Bar Chart/Horizontal, Bar Chart/Vertical, and Pie Chart).	Server

Show Metadata (opswise.form.show_metadata.default)	Specification (Yes or No) for whether or not the Metadata section displays automatically in the the Details of all Controller records. You can override this system default configuration by customizing the Show Metadata user preference.	No
Show Variables Fetch Global Automatically (opswise.show_variables.fetch_global.default)	Specification (Yes or No) for whether or not to fetch and display Global Variables automatically for the Show Variables action. If No, the visibility of Global Variables in Show Variables can still be toggled, on demand, by the Show Global and Hide Global buttons. You can override this system default configuration by customizing the Show Variables Fetch Global Automatically user preference.	No
SMTP Debug (opswise.smtp.debug)	Specification (true or false) for whether or not additional debug information about any Email Connection issues (for example, Email Connection Test fails or errors while sending emails) will be included in the log.	false
SQL/Stored Procedure Close Additional Results Sets (opswise.sql_handler.close_additional_result_sets)	Specification (true or false) for whether or not to close any additional Result Sets if multiple Result Sets have been returned by SQL or Stored Procedure tasks. **Note** You should not change this property to false unless there is a backwards compatibility issue.	true
SQL/Stored Procedure Ignore Update Count If No Results (opswise.sql_handler.update_count.ignore_if_no_results)	Specification (true or false) for whether or not to create a SQL Results record for rows affected when no results (result sets or update counts) are returned by SQL or Stored Procedure tasks.	false
SQL/Stored Procedure Maximum Rows (opswise.sql_handler.maximum_rows)	Specifies the maximum number of rows that can be returned from an SQL task or Stored Procedure task.	(none)
Start Server Paused (opswise.startup.paused)	Specification (true or false) for whether or not a Universal Controller cluster node should become paused when starting up. **Note** This property is applicable only for a Universal Controller cluster node that is starting up. Any cluster node that has already started will not be impacted. Once a cluster node is in paused mode, it will remain in paused mode until running the Resume Cluster Node server operation for that specific cluster node.	false

Stop Unknown Application Monitors (opswise.application.stop_unknown_monitors)	Specification (true or false) for whether or not to stop any application monitors currently running on an Agent if the Controller is no longer managing those monitors (Windows and Linux/Unix only).	false
Strict Business Service Membership Read Constraints (opswise.read_constraints.bsrvc_membership.strict)	Specification (true or false) for whether the Controller will enforce explicit Read permission for the following record types: • Agent • Agent Cluster • Calendar • Credential • Database Connection • Email Connection • Email Template • PeopleSoft Connection • SAP Connection • SNMP Manager • Trigger Forecasts • Virtual Resource If the property is false, users have implicit Read permission for these record types. If the property is true, users can view these record types only if they are granted Read permission explicitly via an appropriate role or permission. **Note** For those record types, above, that have a corresponding permission type, when you create a permission, the Read operation checkbox automatically will be checked if the property is false.	false
Strict Connection Execute Constraints (opswise.connection.execute_constraints.strict)	Specification (true or false) for whether Universal Controller will enforce Execute constraints for connections (Database Connections, Email Connections, SAP Connections, and SNMP Managers) during task instance execution. If Strict Connection Execute Constraints is false, only Read constraints for connections are enforced based on the configuration of the Strict Business Service Membership Read Constraints Universal Controller system property. If Strict Connection Execute Constraints is true, the Execution User for any task instance executing with a connection must have Execute permission for that connection; otherwise, the task instance will transition into a Start Failure status.	false
Strict Dashboard Create Constraints (opswise.dashboard.create_constraints.strict)	Specification (true or false) for whether or not to restrict dashboard creation only to users with the ops_admin, ops_report_admin, ops_dashboard_group, or ops_dashboard_global role.	false

Strict Report Create Constraints (opwise.report.create_constraints.strict)	Specification (true or false) for whether or not to restrict report creation only to users with the ops_admin, ops_report_admin, ops_report_group, or ops_report_global role.	false
System Default Activity Quick Filters (opswise.activity.quick_filters.default)	Task instance status types to include in the Active, Blocked, Completed, and Problem Quick Filters. You can add statuses to or delete statuses from any of these Quick Filter. You also can delete any of these Quick Filters and create you own Quick Filters.	Active=!180,!190,!200; Blocked=10,20,23,30,33,60; Completed=180,190,200; Problem=35,81,99,110,120,125,130,140
System Default CLI Bulk Import Path (opswise.bulk_import.path.default)	Pathname from where imported XML files are written.	`<tomcat-home>/opswise_import` **or** `<tomcat-home>\opswise_import` (`<tomcat-home>` is the base tomcat installation directory.)
System Default Command Line Access (opswise.user.command_line.default)	Specification (Yes or No) for all users whose **Command Line access** field in their User Details is set to **-- System Default --**, for whether or not to control a user's ability to access the Controller through the Command Line Interface (CLI).	Yes
System Default Confirm Launch Command (opswise.user.confirm.launch.default)	Specification (Yes or No) for whether or not a user is prompted with a Confirmation dialog when issuing the Launch command.	Yes
System Default Confirm Task Instance Commands (opswise.user.confirm.task_instance.commands.default)	Specification (Yes or No) for whether or not to enable command confirmations when issuing commands against task instances.	No
System Default Maximum Versions (opswise.version.maximum.default)	Maximum number of version records (1 to 255) to maintain per definition.	100
System Default Trigger Simulate (opswise.trigger.simulation)	Specification (true or false) for whether or not to simulate the launching of tasks when triggers are eligible to fire. If simulation is enabled, only the scheduled launch of the task by the trigger is inhibited. All other aspects of the trigger execution, including generation of forecast data, are enabled. You can still force a trigger by using the Trigger Now command or launch a task by using the Launch command.	false
System Default Update Virtual Resource Limit On Promotion (opswise.promotion.virtual_resource.update_limit.default)	Specification (Yes or No) for whether or not virtual resource limits are updated as part of a promotion.	Yes
System Default Wait/Delay Workflow Only (opswise.timewait.workflow.only.default)	Specification (Yes or No) for whether or not to apply Wait/Delay Options to a task only if it runs within a workflow.	Yes
System Default Web Browser Access (opswise.user.browser.default)	Specification (Yes or No), for all users whose **Web Browser access** field in their User Details is set to **-- System Default --**, for whether or not to control a user's ability to access the Controller through the user interface.	Yes
System Default Web Service Access (opswise.user.web_service.default)	Specification (Yes or No), for all users whose **Web Service access** field in their User Details is set to **-- System Default --**, for whether or not to control a user's ability to access the Controller through the RESTful Web Services API.	Yes

System Details Database Information Restricted (opswise.widget.system_details.db_info_restricted)	Specification (true or false) for whether or not the followinng database information on the System Details widget is visible only to users assigned the ops_admin role or ops_server_operation_admin role: • Database Type • Database Name • Database URL • Database Connections These restrictions apply no matter where the System Details widget is accessed from: • Home Dashboard • Custom Dashboard • Widget List Preview • System Identifier on User Task Bar • System Clock on User Task Bar	
System Identifier (opswise.system_identifier)	User-selected name displayed in the System Identifier field on the User Task Bar.	(none)
System Identifier Background Color (opswise.system_identifier.background_color)	Background color for the System Identifier field on the User Task Bar.	black
System Identifier Color (opswise.system_identifier.color)	Text color for the System Identifier field on the User Task Bar.	white
Task Retry Maximum (opswise.task.retry_maximum)	Specification for whether or not to enforce a maximum number of task instance retries. Valid values: 1. blank: No limit on Maximum Retries; Retry Indefinitely is permitted. 2. >=1: Limit on Maximum Retries; Retry Indefinitely is not permitted. **Note** If any current tasks are in violation of the selected >=1 Task Retry Maximum, an error message will occur. To see which tasks have a Maximum Retries value specified, or have Retry Indefinitely selected, run a Report on all tasks or display the Maximum Retries and Retry Indefinitely columns on the All Tasks list.	blank
Task Time Zone Preference (opswise.task.time_zone_preference.default)	Specification (Server or Inherited) for whether the time zone for a task is evaluated on the time zone of the server or the time zone of the Parent Workflow or Trigger / Launch specification.	Server
Task Wait For Output Timeout In Seconds (opswise.task.wait_for_output.timeout_in_seconds)	If Wait For Output is enabled for a task where automatic output retrieval is selected (potentially, to be used by a successor task); Length of time (in seconds) that the task will wait (that is, remain Running) until the output is returned by the Agent so that the successor task does not run before the output is available.	60

Time Trigger Minimum Frequency In Seconds (opswise.trigger.time.minimum_frequency_in_seconds)	Minimum frequency - in seconds - of the Time Interval for a Time Trigger.	5
Track Counts For Unlimited Execution Limit (opswise.execution_limit.unlimited.counts)	Specification (true or false) for enabling the tracking of task instances running concurrently if the Task Execution Limit field for an Agent or Agent Cluster is set to **Unlimited**. The following restrictions apply to this property: • If you change this property, all UI behavior based on this property will require logging out/logging in to take effect. • You cannot change this property from **false** to **true** while there are one or more task instances running against an Agent and/or Agent Cluster. • If you change this property from **false** to **true**, all Agents and Agent Clusters will begin tracking task counts. • If you change this property **true** to **false**, all Agents and Agent Clusters that are not **Limited** will have their **Current Count** column set to 0. • If this property is **false**, and an Agent or Agent Cluster is **Unlimited**, the **Current Count** column will display as blank in the list and will be hidden in the Agent / Agent Cluster Details. • If this property is **true**, and an Agent or Agent Cluster is **Unlimited**, the **Current Count** column will display the current count and the current count will be visible in the Agent / Agent Cluster Details. • If this property is **false**, and you change an Agent / Agent Cluster from **Limited** to **Unlimited**, the current count will be reset back to 0. • If this property is **true** or **false**, and you change an Agent / Agent Cluster from **Unlimited** to **Limited**, the current count will be reset back to 0. **Note** For optimal performance, we recommend that you leave this property set to **false**.	false
URL Action Parameter Enabled (opswise.url.action_parameter.enabled)	Specification (true or false) for whether or not to enable the URL Action parameter, which lets you automatically perform an action in the user interface.	true
Use Checksum Validation (opswise.use.checksums)	Specification (true or false) for whether or not to implement checksum validation in order to prevent tampering of Controller data outside of the Controller system.	false
Use Dashboard Visibility Icons (opswise.dashboard.use_visibility_icons.default)	Specification (Yes or No) of the system default for the Use Dashboard Visibility Icons user preference.	Yes
User Defined Task Field Label 1 (opswise.task.custom_field1.label)	Label for this user-defined field that will display in the General Information section of the Details for all existing and new tasks and task instances.	(none)
User Defined Task Field Label 2 (opswise.task.custom_field2.label)	Label for this user-defined field that will display in the General Information section of the Details for all existing and new tasks and task instances.	(none)

Validate Report References On Promotion (opswise.promotion.report.validate_references)	Specification (true or false) for whether or not to implement report-related promotion validation. **Note** This property applies to the target system to which a promotion payload is being promoted.	true
Variable Security Enabled (opswise.security.variable.enabled)	Specification (true or false) for enabling enhanced Global Variable security.	true
Virtual Page Fetch Limit (opswise.virtual_page.fetch_limit)	Virtual page size to be used when scrolling in a list.	100
Virtual Page Pick List Fetch Limit (opswise.virtual_page.pick_list.fetch_limit)	Virtual page size to be used when scrolling the options in a drop-down list that are bound by another data source (for example, the Task To Monitor drop-down list options in the Task Monitor Task Details).	100
Virtual Resource Security Enabled (opswise.security.virtual_resource.enabled)	Specification (true or false) for enabling enhanced Virtual Resource security.	true

Web Service Credentials Permitted (opswise.credentials.web_service.permitted)	Allows enabling/disabling the use of Web Service credentials.
	• If false:
	  ◦ Creation of new Web Service credentials will be prohibited.
	  ◦ All Web Service Task Instances using authentication will transition into the Start Failure status.
	• If false on a target Controller to which you are promoting, the promotion will fail.
		true

Web Service Default Response Content (opswise.web_service.response.content.default)	Default type of content, XML or JSON, for web service responses.	XML
Web Service Task Output MIME Type Exclusion List (HTTP) (opswise.task.web_service.output.mime_type.exclusion_list)	List of content-types, such as binary, that are discarded to avoid being stored as Web Service Task output, which are not supported and can lead to task instance run failure.	image/*,audio/*,video/*,application/pdf
Web Service Task System Proxy Property Inheritance (HTTP) (opswise.task.web_service.http.proxy_property_inheritance)	Specification (true or false) for whether or not to use the Java proxy system properties for HTTP Web Service tasks.	false
Web Service Task Timeout (opswise.task.web_service.timeout)	Number of seconds to wait for the request to complete, if a Timeout value is not specified for a Web Service task.	60
Web Service Task URL Whitelist Regular Expression (opswise.task.web_service.url.whitelist)	Regular Expression that specifies the URLs supported by the Web Service task. (The default value specifies that all URLs are supported.) If you have a specific regex that you want to be case-insensitive, pre-pend the following option to the regex: (?i)"."(?i)	^https?://.+$

Windows/Linux Scripts Permitted (opswise.script.distributed.permitted)	Specification (true or false) for whether to enable (true) or disable (false) the use of the Script Script type. **Note** You can set Windows/Linux Scripts Permitted to false only if currently there are no Script Script types defined in the database.	true
Workflow Search Result Limit (opswise.workflow.search_result_limit)	Results limit when querying for task records from the Task Find or Open Workflow pop-up.	200

Overriding Universal Controller System Properties

You can override any Universal Controller system property by adding it to the Universal Controller Start-up Properties (opswise.properties) file and restarting the Controller.

Any Universal Controller system property added to **`opswise.properties`** must be in the same format as the **`opswise.properties`** properties: **`<Property Name>=<value>`**. For example: **`opswise.startup.paused=true`**

When the restarted Controller reads the **`opswise.properties`** file, it updates the database with the value of any Universal Controller system property included in the file. It then removes that property from the file.

Command Line Interface (CLI) Properties

A sample Command Line Interface (CLI) configuration file, **`cmdtools.props`**, is provided for your use to pass CLI Global parameters to a CLI function.

The file is created during installation of Universal Agent if the Command Line Interface (CLI) has been selected to be installed.

```
network.provider=
network.omsservers=
network.omsnft=
network.transports=
network.core=HUB01
security.userid=
security.password=
config.timeout=
```

However, you can create a configuration file with any name; it must exist in the directory from where you are issuing the functions (see Command Line Interface (CLI)).

Truststore

- Overview
- Configuring Universal Controller
- Importing Server Certificates

Overview

Universal Controller requires a truststore (keystore) in order to support SSL validation and encryption for LDAPS and HTTPS communications. The truststore will contain the server certificates or the root certificate (Certificate Authority) that issued the server certificate.

Universal Controller truststore uses the Oracle Java keystore format (JKS). By default, and without further configuration, the Java keystore will be used. The Java keystore (cacerts) is located in the `/lib/security` sub-directory of the JRE home directory.

Server certificates can be imported using the Oracle Java keytool utility, which can be found in the `bin` sub-directory of the JRE home directory.

JRE version-specific documentation for the keytool utility can be found at docs.oracle.com. For JRE 8, the documentation is available at http://docs.oracle.com/javase/8/docs/technotes/tools/windows/keytool.html.

Configuring Universal Controller

If you choose not to use the JRE keystore, you must configure the following properties in the Universal Controller Start-up Properties (opswise.properties) file:

- opswise.trustmanager.truststore
- opswise.trustmanager.truststore.password

These properties will take effect only after you restart Tomcat.

Importing Server Certificates

After you have obtained the certificate, you will need to import the certificate into the truststore. This can be done with the following example keytool command, which will create the keystore if it does not already exist:

```
keytool -keystore $JAVA_HOME/lib/security/cacerts -importcert -trustcacerts -file server_ca_certificate.pem -alias serverca
```

LDAP Settings

- Overview
- Credentials for Running Tasks Authentication
- User Login Authentication
- LDAP Settings Field Descriptions
- Mappings Tab
  - Mappings Tab Column Descriptions
  - Mapping Details
- Best Practices
  - Determining your User OUs and Group OUs
  - Customizing Users and Groups Lists to see DN of LDAP Synchronized Users and Groups
  - LDAP Server Operations
  - LDAP Settings Fields
- SSL Secured LDAP (LDAPS)

Overview

Note
The information provided on this page assumes you have a working knowledge of LDAP authentication.

LDAP Settings, which allow you to enable the LDAP bridge for both UNIX and Windows operating systems, are available through the user interface.

You can set up Universal Controller to use LDAP authentication for:

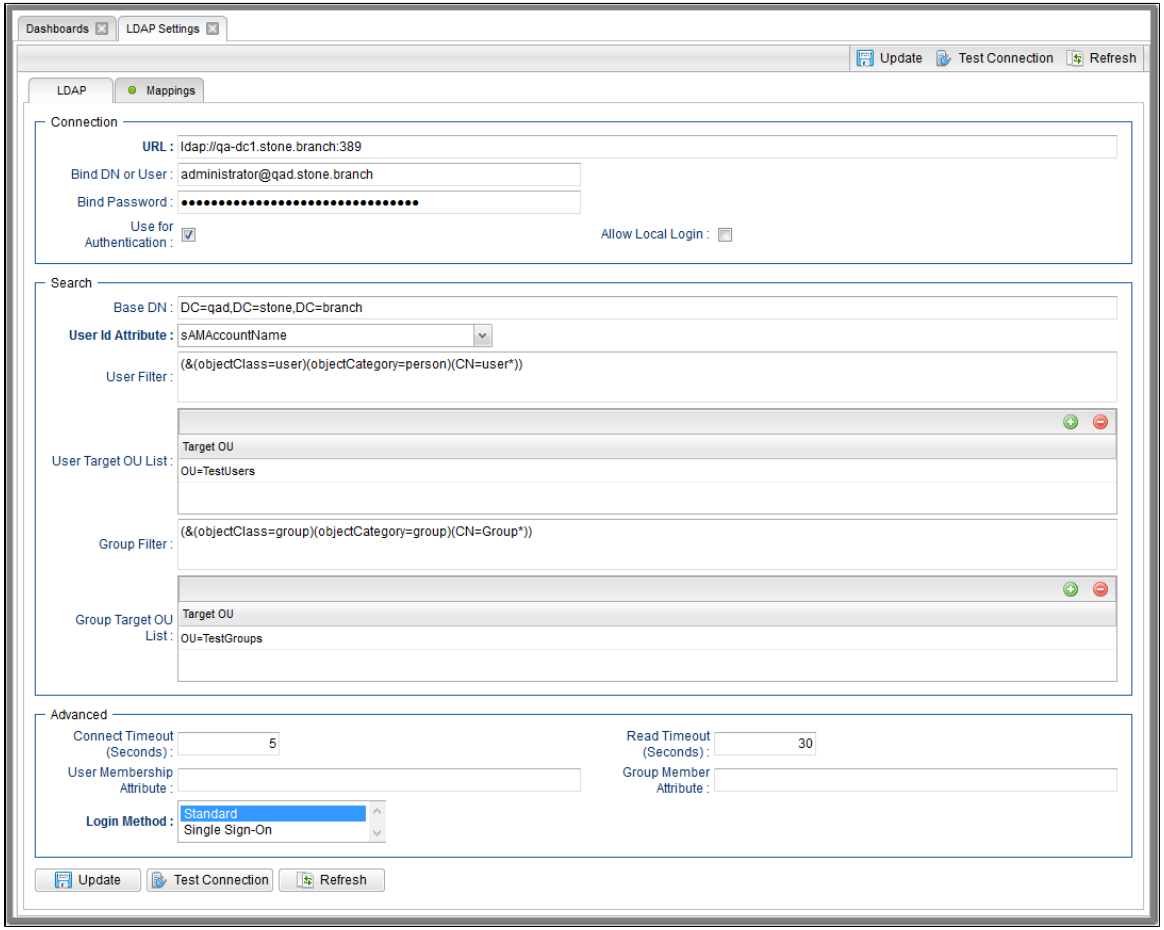
- Credentials for running tasks
- User logins

Credentials for Running Tasks Authentication

To use LDAP authentication for Universal Controller user credentials:

UNIX	If you want the credentials for Universal Agent to go through LDAP authentication, the UNIX machine on which the Agents reside require PAM. The Agents must be configured to use PAM, and PAM must be configured to use LDAP. The UNIX systems that support PAM authentication are AIX, HP-UX, Linux, and Solaris. Refer to Security of Universal Agent Components to see which Agent Server components can use PAM authentication on these systems. Set up your PAM configuration to use the PAM LDAP module. Depending on your LDAP version, some other configuration steps may be required. Once PAM is configured, tasks specifying credentials will authenticate over LDAP transparently.
Windows	While no set-up steps are required to specifically enable Domain/Active Directory credential authentication, the target system does need to belong to a Domain or Active Directory Forest. When you specify credentials for a task, use DOMAIN\user as the user name.

User Login Authentication

Step 1	From the Administration navigation pane, select **Configuration > LDAP Settings**. The LDAP Settings page displays. 
Step 2	Enter / select your LDAP Settings, using the field descriptions below as a guide. • Required fields display in **boldface**. • Default values for fields, if available, display automatically.
Step 3	Click the **Update** button.

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

> **Note**
> In order to log in to the Controller using LDAP, you must set the LDAP Synchronization Enabled Universal Controller System property (**Administration > Configuration > Properties** in the Controller user interface) to **true**.

LDAP Settings Field Descriptions

The following table describes the fields and buttons that display in the LDAP Settings.

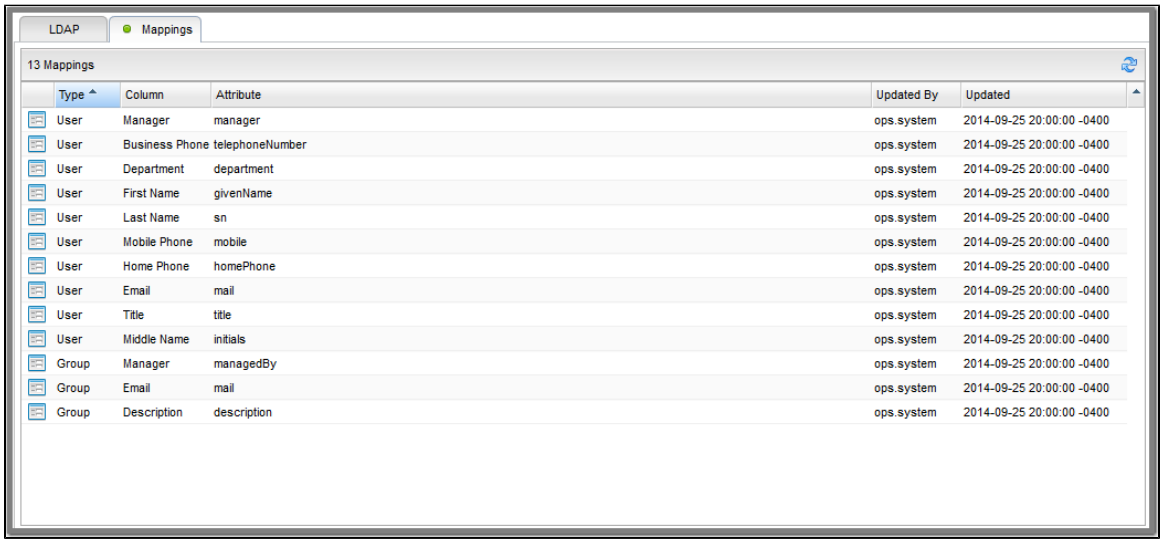
Field Name	Description
Connection	This section contains information on the LDAP connection.
URL	URL of the LDAP connection. For example: • **`ldap://ldap.stonebranch.com:389/`** • **`ldaps://192.202.185.90:636/`** To use SSL encryption (**`ldaps://`**), you will have to configure the Universal Controller truststore with an X.509 CA certificate in either of these formats: • DER-encoded binary • Base64-encoded
Bind DN or User	Distinguished Name (DN) or User ID used for initial access to the LDAP server.
Bind Password	Password associated with the Bind ND or User.
Use for Authentication	If enabled, indicates that LDAP will be used for password authentication.
Allow Local Login	If the LDAP Synchronization Enabled Universal Controller system property is false, or if it is true but the Use for Authentication field is not enabled, an administrator must explicitly specify Allow Local Login to allow local account login for users that were provisioned through LDAP synchronization. This option is intended only to provide temporary access while an LDAP directory is unavailable. An administrator will need to update the local account password for any LDAP-synchronized user who requires temporary local account login, as the provisioned password would be unknown.
Search	This section contains search information.
Base DN	Starting point for searching the directory. For example: **`dc=stonebranch,dc=com`**. If you do not specify a Base DN, the search starts as the root of the directory tree.

User Id Attribute	LDAP attribute for the specified User ID. Options: • sAMAccountName • cn • uid • Other...
User Filter	Search filter for users. If you do not specify a User Filter, the server uses **`(&(objectClass=user)(objectCategory=person))`**.
User Target OU List	Single- or multi-level target OU's (Organizational Units) within the Base DN directory to filter for user records. For example, **`OU=Employees`** or **`OU=Employees,OU=Users`**. If you do not specify one or more OU's, the entire sub-tree from the Base DN will be searched.
Group Filter	Search filter for groups. If you do not specify a Group Filter, the server uses **`(&(objectClass=group)(objectCategory=group))`**.
Group Target OU List	Single- or multi-level target OU's within the Base DN directory to filter for group records. For example, **`OU=Universal Controller`** or **`OU=Universal Controller,OU=Groups`**. If you do not specify one or more OU's, the entire sub-tree from the Base DN will be searched.
Advanced	This section contains advanced information.
Connection Timeout (Seconds)	Timeout for connecting to the LDAP server.
Read Timeout (Seconds)	Timeout for reading from the LDAP server.
User Membership Attribute	LDAP attribute for the groups in which a user is a member. If you do not specify a User Membership Attribute, the LDAP server uses **memberOf** (see the `opswise.ldap.users.synchronize_indirect` Universal Controller start-up property.
Group Member Attribute	LDAP attribute for the members of a group. If you do not specify a Group Member Attribute, the LDAP server uses **member** (see the `opswise.ldap.groups.update_members` Universal Controller start-up property.
Login Method	Login method(s) that an LDAP-provisioned user can authenticate with by default. The default is applied only at user creation time. (You can use the Ctrl key to select both methods.) Options: • Standard • Single Sign-On

Buttons	This section identifies the buttons displayed above and below the LDAP Settings that let you perform various actions.
Update	Saves updates to the record.
Test Connection	After saving the LDAP Settings to the database, click **Test Connection** to run a connection test.
Refresh	Refreshes any dynamic data displayed in the LDAP Settings.
Tabs	This section identifies the tabs across the top of the LDAP Settings page that provide access to additional information about the LDAP Settings.
Mappings	List of User and Group columns mapped to LDAP attributes that enables you to customize how the User/Group records get populated from LDAP.

Mappings Tab

The Mappings tab of the LDAP Settings page displays a list of Controller columns mapped to LDAP attributes.



Mappings Tab Column Descriptions

The following table describes the default columns displayed on the Mappings tab:

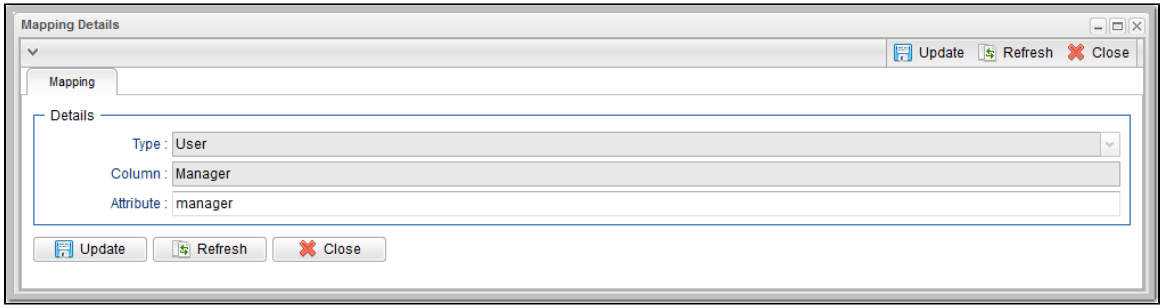
Type	Type of records.
Column	Controller column being mapped to LDAP attribute.

Attribute	LDAP attribute to which the Controller column is being mapped.
Updated By	User who last updated this record.
Updated	Date and time this record was last updated.

Mapping Details

To view the Mapping Details for a mapping on the list, click the Details icon next to that mapping.

For example:



Best Practices

The following best practices are provided to assist you in configuring LDAP.

Determining your User OUs and Group OUs

1. Determine which users/groups need to have access to Universal Controller.
2. Determine which Organizational Units (OUs) those users/groups belong to.
3. Build your list of user and group OUs.

Consider the following organizational units for required Users and Groups.

Users

OU=NorthAmerica,OU=CorporateUsers,**OU=Corporate,DC=stonebranch,DC=com**
OU=Students,**OU=Corporate,DC=stonebranch,DC=com**

Groups

OU=AtlantaGroup,OU=CorporateGroups,**OU=Corporate,DC=stonebranch,DC=com**

OU=OntarioGroup,OU=CorporateGroups,**OU=Corporate,DC=stonebranch,DC=com**
OU=OtherGroups,**OU=Corporate,DC=stonebranch,DC=com**

You specify the User and Group Target OUs relative from the Base DN. In this case, the Base DN would be **OU=Corporate,DC=stonebranch,DC=com**.

For the User Target OU List LDAP Settings field, you would have the following entries:

OU=NorthAmerica,OU=CorporateUsers
OU=Students

For the Group Target OU List LDAP Settings field, you would have the following entries:

OU=AtlantaGroup,OU=CorporateGroups
OU=OntarioGroup,OU=CorporateGroups
OU=OtherGroups

Customizing Users and Groups Lists to see DN of LDAP Synchronized Users and Groups

For each User and Group object in the LDAP directory that matches the configured search and OU configuration in Universal Controller, a User and Group record are created in the Controller to represent those objects.

For each User and Group record in the Controller that represents a synchronized LDAP User or Group, the **Source** column on the Users list or Groups List, respectively, contains the Distinguished Name of that User or Group in LDAP. (For Users and Groups created locally in the Controller, the **Source** column is blank.)

For example:

Source Column for a User	ldap:CN=Stonebranch User,OU=TestUsers,DC=qad,DC=stone,DC=branch
Source Column for a Group	ldap:CN=UnvControllerParent,OU=TestGroups,DC=qad,DC=stone,DC=branch

> **Note**
> By default, the **Source** column is not shown on either lists. For instructions on how to add the **Source** column, see Selecting Columns / Column Locations for a List.

LDAP Server Operations

If LDAP is configured for Universal Controller, it refreshes every 24 hours.

Additionally, the Controller provides two Server Operations that let you force an LDAP refresh:

- **LDAP Refresh (Asynchronous)**
  This server operation performs an LDAP refresh in the background and sends entries to the Universal Controller log.
- **LDAP Refresh**
  This server operation perform an LDAP refresh that writes all log entries to the user interface as well as to the log, and prevents all other user activity while the process is running. If you estimate the refresh could take a considerable amount of time, we recommend you use the **LDAP Refresh (Asynchronous)** server operation.

LDAP Settings Fields

The following Best Practices should be followed for specific fields in the LDAP Settings.

URL

To avoid an inadvertent synchronization of LDAP using an incomplete LDAP configuration, refrain from providing a value for this setting until LDAP configuration has been completed.

Once LDAP configuration has been completed, you can utilize the LDAP Refresh server operation to verify your configuration.

Base DN

All directory searches are relative from the base object defined by the specified DN. The Base DN (or search entry point) should be the lowest base object in the directory for which both the User and Group OUs can be searched from.

If your Users are in:	**OU=CorporateUsers,OU=Corporate,DC=stonebranch,DC=com**
And your Groups are in:	**OU=CorporateGroups,OU=Corporate,DC=stonebranch,DC=com**
Your Base DN can be:	**OU=Corporate,DC=stonebranch,DC=com**

User Filter

This setting defines which objects the Controller considers as Users when it queries objects in the configured User OUs (see pointers on configuring User OUs).

By default, the server will use filter **(&(objectClass=user)(objectCategory=person))**.

For Active Directory (AD)	At a minimum, specify the following: `(&(objectClass=user)(objectCategory=person))` This filter would match both user and **inetOrgPerson objectClasses**. **objectCategory=person** is added for two reasons: • It is an indexed attribute, so the query performance is optimized. • Without it, Computer objects could be synchronized. For example, in AD, a computer **objectClass** extends from a user **objectClass**, but a computer's **objectCategory=computer**, not **person**.

Note
Once an object (User or Group) is synchronized into the Controller, it will not be deleted if search filter/OU criteria are narrowed. However, broadening your search filter/OU scope will pull in new objects. After modifying your LDAP configuration to narrow the search scope, a Controller administrator will need to delete any Users and Groups that are no longer desired/match the LDAP configuration.

You can synchronize Users that belong only to a specific Group, such as one created for Unversal Controller.

For example:

```
CN=UnvControllerGroup,OU=CorporateGroups,OU=Corporate,DC=stonebranch,DC=com
```

To ensure that only Users belonging to **UnvControllerGroup** are synchronized, modify the recommended minimum user search filter:

```
(&(objectClass=user)(objectCategory=person)(memberOf=CN=UnvControllerGroup,OU=CorporateGroups,OU=Corporate,DC=stonebranch,DC=com))
```

You can synchronize Users that belong any Group that is a descendant of **UnvControllerGroup**.

For example:

- **UnvControllerGroupA** is a member of **UnvControllerGroup**.
- **UnvControllerGroupB** is a member of **UnvControllerGroupA**.
- **UnvControllerGroupC** is a member of **UnvControllerGroupB**.

To achieve this in AD, modify the search filter used to synchronize users that belong only to a specific Group:

```
(&(objectClass=user)(objectCategory=person)(memberOf:1.2.840.113556.1.4.1941:=CN=UnvControllerGroup,OU=CorporateGroups,OU=Corporate,DC=stonebranc
```

Essentially, replacing **memberOf** with **memberOf:1.2.840.113556.1.4.1941:** will ensure that nested groups are considered.

1.2.840.113556.1.4.1941 (Matching rule OID) is a special "extended match operator" that walks the chain of ancestry in objects all the way to the root until it finds a match (see http://msdn.microsoft.com/en-us/library/windows/desktop/aa746475(v=vs.85).aspx).

Group Filter

This setting defines which objects the Controller considers as Groups when it queries objects in the configured Group OUs (see pointers on configuring Group OUs).

By default, the server will use filter **(&(objectClass=group)(objectCategory=group))**.

For Active Directory (AD)	It is recommended that you optimize the query performance by incorporating the indexed **objectCategory** attribute: **`(&(objectClass=group)(objectCategory=group))`**

To limit the Groups synchronized from LDAP to a few specific Groups or Groups by name, adjust the Group search filter to include a query on the CN (common name) attribute.

For example, to synchronize a single group named **CN=UnvControllerGroup,OU=CorporateGroups,OU=Corporate,DC=stonebranch,DC=com**, modify the recommended minimum group

search filter:

```
(&(objectClass=group)(objectCategory=group)(cn=UnvControllerGroup))
```

To synchronize only **UnvControllerGroupA**, **UnvControllerGroupB**, and **UnvControllerGroupC**, use the following filter:

```
(&(objectClass=group)(objectCategory=group)(|(cn=UnvControllerGroupA)(cn=UnvControllerGroupB)(cn=UnvControllerGroupC)))
```

To synchronize any Group that is a (direct) member of **UnvControllerGroup**, use the following search filter:

```
(&(objectClass=group)(objectCategory=group)(|(cn=UnvControllerGroup)(memberOf=CN=UnvControllerGroup,OU=CorporateGroups,OU=Corporate,DC=stonebranc
```

To synchronize any Group that is a descendant of **UnvControllerGroup** (multi-nested groups), use the following search filter:

```
(&(objectClass=group)(objectCategory=group)(|(cn=UnvControllerGroup)(memberOf:1.2.840.113556.1.4.1941:=CN=UnvControllerGroup,OU=CorporateGroups,OU=Corporate,DC=stonebranch,DC=
```

Essentially, replacing **memberOf** with **memberOf:1.2.840.113556.1.4.1941:** will ensure that nested groups are considered.

1.2.840.113556.1.4.1941 (matching rule OID) is a special "extended match operator" that walks the chain of ancestry in objects all the way to the root until it finds a match (see http://msdn.microsoft.com/en-us/library/windows/desktop/aa746475(v=vs.85).aspx).

If you do not want to synchronize Groups:

1	Do not explicitly specify a value for the Group search filter.
2	Do not specify any target Group OUs (organizational units).
3	Ensure that the Universal Controller Start-up Properties file (**`opswise.properties`**) contains the following property configuration: **opswise.ldap.groups.filter_indirect=true** (If **opswise.ldap.groups.filter_indirect=true**, any Groups synchronized indirectly - that is, through a User's **memberOf** attribute - will honor the Group Filter and Group Target OU List.)

Note
The **`opswise.ldap.groups.single_parent_per_child`** start-up property should be set to **true** only if your Groups being synchronized from AD have at most one parent Group. When synchronizing Groups, the default Controller behavior is to copy the members of a Sub Group into the Parent Group. If this property is set to **true**, the Controller assumes that each Group has, at most, a single Parent Group and will use the Parent field on the Group definition to maintain the hierarchy instead of copying members.

SSL Secured LDAP (LDAPS)

Universal Controller supports the use of LDAPS instead of the non-encrypted LDAP connection offered in the Controller.

It requires setting up a truststore (keystore) and setting the following properties in the Universal Controller Start-up Properties (opswise.properties) file:

- opswise.trustmanager.truststore
- opswise.trustmanager.truststore.password

You must make sure that the LDAP server's certificate exists in the truststore that is referenced by these two properties.

When these configurations have been made, use **`ldaps://`** for the URL prefix in the LDAP Settings.

Single Sign-On Settings

- Overview
- Terminology
- Single Sign-On Login
  - Service Provider-Initiated Login
  - Identity Provider-Initiated Login
  - Action URLs
  - Session Expired
  - Administrator Account
- Single Logout
  - User Sessions
- User Provisioning
  - User Attribute Mapping
  - User Field Defaults
  - Group Membership Attribute Mapping
- SAML Configuration
  - Service Provider Metadata
  - SAML Endpoints
  - Identity Provider Metadata
  - SAML KeyStore
  - Java Cryptography Extension (JCE)
  - Debugging
- Single Sign-On Settings
  - Single Sign-On Settings Field Descriptions
  - Default Configuration
  - Security
  - Bulk Import/Export
- Troubleshooting
  - NameID
  - Login Errors

Overview

Note
The information provided on this page assumes you have a working knowledge of SAML Single Sign-On.

Universal Controller enables Web Browser Single Sign-On (SSO) through Security Assertion Markup Language 2.0 (SAML 2.0).

SAML 2.0 is an XML-based protocol for exchanging security information between a SAML Identity Provider and a SAML Service Provider.

As a SAML Service Provider, Universal Controller accepts authentication assertions from a configured SAML Identity Provider compliant with the SAML 2.0 Web Browser Single Sign-On profile.

SAML Single Sign-On eliminates the need for application-specific passwords. Universal Controller issues an authentication request to the configured Identity Provider, through the web browser, for

any unauthenticated user accessing the Universal Controller web application through the SAML Login URL.

Universal Controller uses SAML Single Sign-On for authentication and User Provisioning. All user and group authorization must be configured within Universal Controller through Permission and Role assignment.

Terminology

IdP	Identity Provider (for example, Okta)	Third-party system that pre-authenticates SAML users.
SAML	Security Assertion Markup Language	SAML is an XML-based protocol for exchanging security information between a SAML Identity Provider and a SAML Service Provider.
SP	Service Provider (for example, Universal Controller)	Receives and accepts authentications via SAML Single Sign-On.
SSO	Single Sign-On	Method of authentication.

Single Sign-On Login

SAML Single Sign-On can be initiated by either Universal Controller, as the Service Provider, or the Identity Provider.

Only users designated with **Single Sign-On** as a Login Method can authenticate using SAML Single Sign-On. However, users designated with both **Standard** and **Single Sign-On** as a Login Method can continue to log into the Universal Controller using the standard application URL (see Logging In).

Service Provider-Initiated Login

Universal Controller, as a Service Provider, will initiate the SAML Single Sign-On login flow when an unauthenticated user accesses the web application through the following URL.

http(s)://<server:port>/opswise/saml

Identity Provider-Initiated Login

Identity Provider-initiated SAML Single Sign-On begins at the Identity Provider, typically by accessing an application-specific Identity Provider URL. Once authenticated, the user will be taken to the Universal Controller web application.

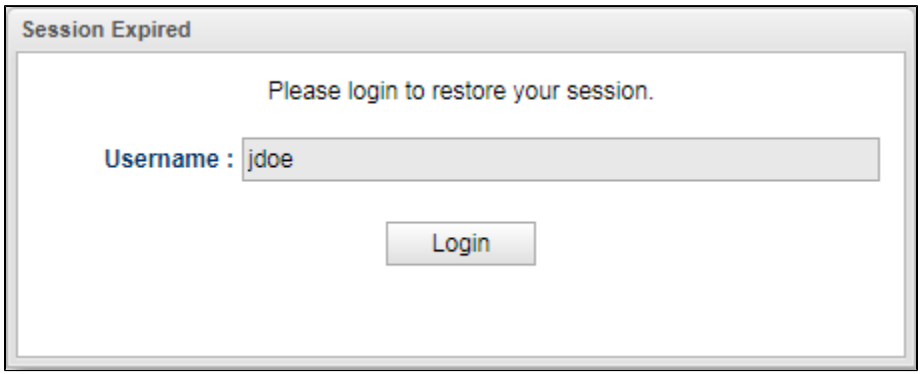
Action URLs

Any Action URL parameters on the URL used by the SAML-authenticated user to access the Universal Controller web application are restored when the Service Provider-initiated SAML SSO authentication flow has completed successfully and the user has been redirected back to the Universal Controller web application.

Note:
This is not applicable for an Identity Provider-initiated login.

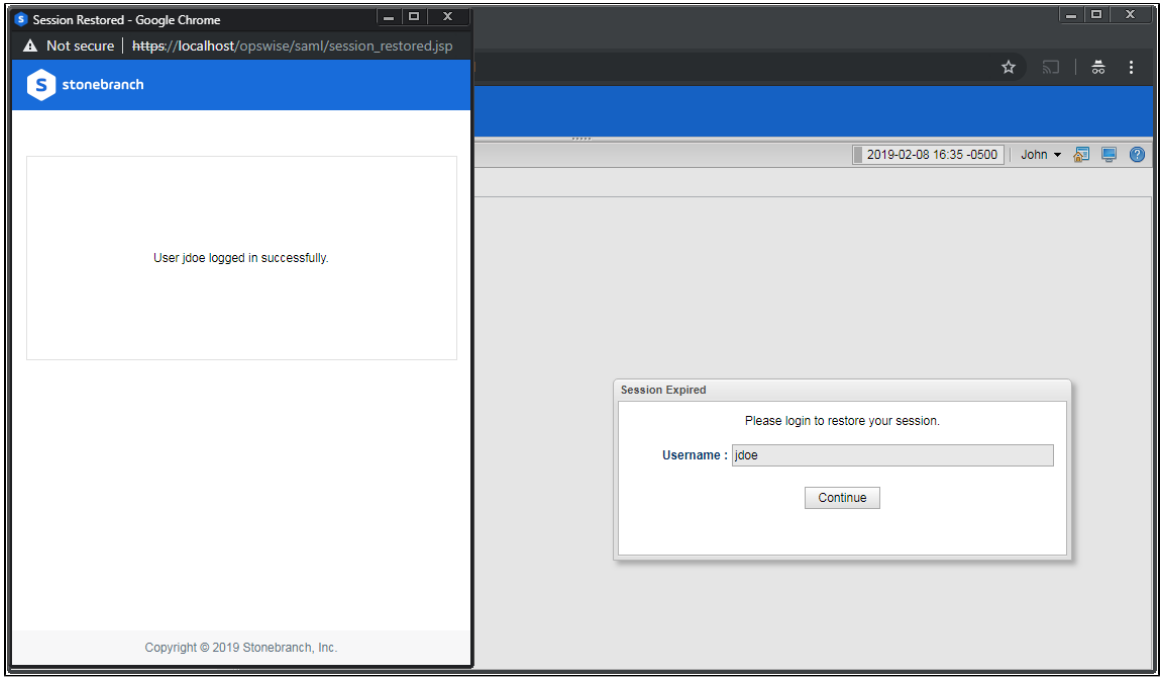
Session Expired

Universal Controller allows you to restore an HTTP session without leaving the application (or losing data) by prompting you to re-enter your login credentials in a Session Expired pop-up:

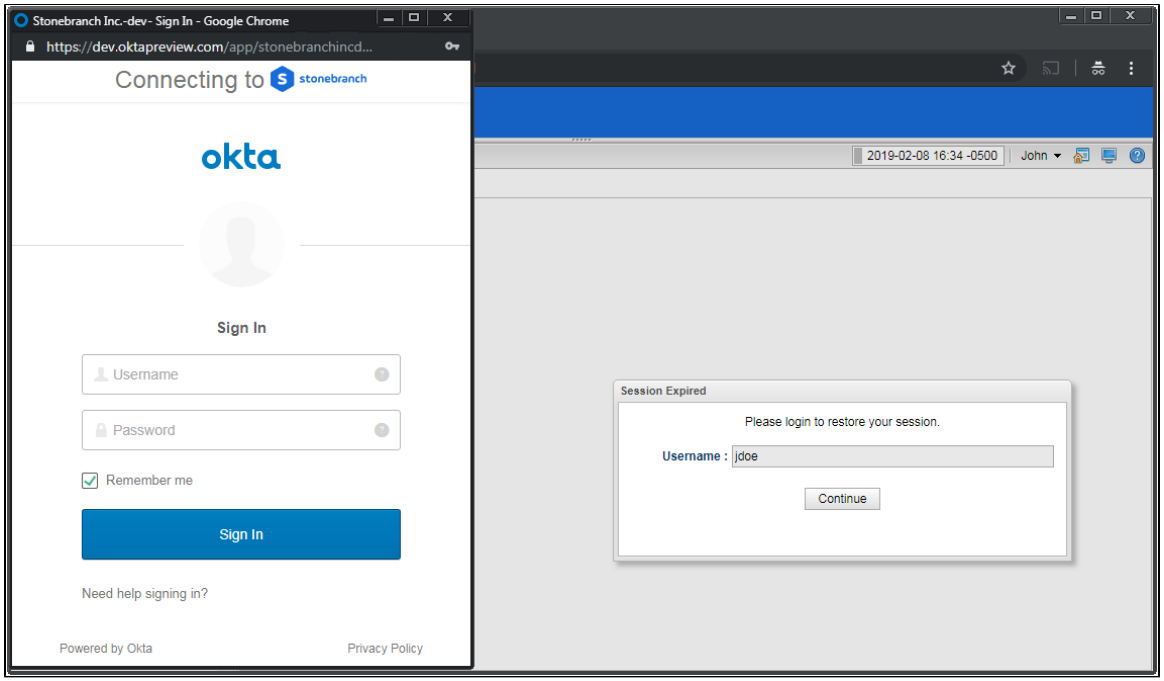


If you are a SAML-enabled user, the Controller allows you to initiate the SAML Single Sign-On authentication flow without leaving the application. On the Session Expired pop-up, instead of entering your login credentials, simply click the Login button to initiate the SAML SSO authentication flow..

If only your Universal Controller session has expired, and not your session with the Identity Provider, you are logged in without being prompted for your credentials. Click Continue on the original dialog to proceed, which closes the SAML SSO authentication flow window.



If your session with the Identity Provider has expired, you are prompted for its login credentials.



When the Identity Provider has authenticated you and the SAML SSO authentication flow has completed, click Continue on the original dialog to proceed, which closes the SAML SSO authentication flow window.

Administrator Account

Modification of the ops.admin account Login Method is not permitted; therefore, the account will always be accessible for cases where, for example, Single Sign-On Settings are incorrectly configured or the Identity Provider is inaccessible.

Single Logout

Universal Controller supports SAML Single Logout for SAML-authenticated users, in accordance with the SAML 2.0 Single Logout profile.

By initiating the Logout menu option, a SAML-authenticated user is initiating Single Logout.

The Single Logout profile terminates the session at the originating Service Provider (Universal Controller), the Identity Provider session, and, potentially, sessions at other Service Providers connected to the same Identity Provider session, depending on the Identity Provider implementation.

> **Note**
> It is required that the configured Identity Provider metadata declares a Single Logout endpoint.

User Sessions

The administrative functionality in the user interface that allows for management of User Sessions is applicable only for local Universal Controller sessions; therefore, expiring a user's session through this interface is only expiring the local Universal Controller session.

User Provisioning

The following diagram illustrates the expectations in Universal Controller for provisioning users from attributes available in the SAML assertion:

As illustrated, when LDAP synchronization is enabled, provisioning of users through LDAP synchronization takes precedence over provisioning of users through the SAML assertion during the Single Sign-On process.

During the next scheduled LDAP refresh, consistent with locally created users and groups, any Identity Provider-sourced user or group matching a user or group synchronized from the LDAP automatically is converted to an LDAP-sourced user or group.

Once a user has been provisioned (created) in the Universal Controller database, its Source (ldap:dn or idp:remote-entity-id) determines how the user record is refreshed during the next login

through single sign-on.

User Attribute Mapping

For Universal Controller to correlate SAML assertion attributes with Universal Controller user fields, Universal Controller must provide a way to configure a mapping between Universal Controller User fields and SAML assertion attributes.

The following Universal Controller user fields are mappable.

- User Id (Required)
  (This field automatically is mapped to the SAML Subject NameID from the SAML assertion and cannot be changed.)
- First Name (Required)
- Middle Name
- Last Name
- Email
- Title
- Department
- Manager
  (This field is a reference to another user and is mapped only if the attribute value contains the Name of a valid Universal Controller user.)
- Business Phone
- Mobile Phone
- Home Phone
- Active

Any user created by SAML assertion attributes, during the single sign-on process, is considered an Identity Provider-sourced user. See Attribute Mappings in Single Sign-On Settings.

User Field Defaults

Single Sign-On provisioned users are created with the following default field values:

Field	Value
User Password	random, 32-characters
Password Requires Reset	true
Login Method	Single Sign-On
Web Browser Access	- - System Default - -
Command Line Access	- - System Default - - Applies only to users designated to use the Standard login method.
Web Service Access	- - System Default - - Applies only to users designated to use the Standard login method.

Group Membership Attribute Mapping

An additional configuration is provided to allow for assigning group membership using the SAML assertion. Universal Controller allows configuring which SAML assertion attribute contains the user's group membership.

To support multiple groups, the attribute is multi-valued, where each attribute value specifies the Group Name of a Universal Controller group for which the user belongs. If the Universal Controller group is not already provisioned, it is provisioned automatically as an Identity Provider-sourced group.

If a group membership attribute mapping is specified, any time that an Identity Provider-sourced user authenticates using SAML Single Sign-On, its group membership will be updated based on the group attribute value in the accepted SAML assertion. The user will be added to, or removed from, groups accordingly.

SAML Configuration

Service Provider Metadata

Universal Controller is configured for automatic generation of Service Provider metadata. By default, the Service Provider Entity ID for a Universal Controller deployment is: https://uc.stonebranch.com/sp.

However, Universal Controller allows an administrator to customize the Service Provider Entity ID by specifying a Service Provider Entity ID Subdomain in the Single Sign-On Settings in the user interface.

For example, an Service Provider Entity ID Subdomain value of `dev` would allow for a Service Provider Entity ID of https://dev.uc.stonebranch.com/sp.

SAML Endpoints

To generate the SAML endpoints for the Service Provider metadata, an SP Entity Base URL for Universal Controller must be determined. By default, Universal Controller uses information from first request after the Controller has been initiated to automatically generate a Service Provider Entity Base URL in the format `scheme://server:port/contextPath`.

For example: https://example.stone.branch:443/opswise

To configure the SP Entity Base URL to a specific value, an administrator can specify the Service Provider Entity Base URL from the Single Sign-On Settings in the user interface.

The following table documents the SAML endpoints, and their supported bindings, contained within the Universal Controller Service Provider metadata.

SAML Profile	Binding	Endpoint
Web Single Sign-on	HTTP-POST, HTTP-Artifact	scheme://server:port/contextPath/saml/SSO
Single Logout	HTTP-POST, HTTP-Redirect	scheme://server:port/contextPath/saml/SingleLogout

Universal Controller provides a Service Provider Metadata link, from the Single Sign-On Settings, for downloading the Universal Controller Service Provider metadata file.

Alternatively, you can download the metadata file directly using the following URL:

http(s)://<server:port>/opswise/saml/metadata

Identity Provider Metadata

Universal Controller requires the Identity Provider configuration provided in the form of an IdP metadata XML file.

You can download the Identity Provider metadata file from the Identity Provider and save it under the Tomcat `conf/` directory, in a `saml/` subdirectory.

You can specify the location of the Identity Provider metadata file in the Single Sign-On Settings Details of the user interface. By default, on initial start-up, the Controller automatically populates the Identity Provider metadata file setting with a value of `${catalina.base}/conf/saml/idp.xml`.

For example, if `${catalina.base}` resolves to `/opt/tomcat`, the Identity Provider metadata file setting would be populated with `/opt/tomcat/conf/saml/idp.xml`.

SAML KeyStore

SAML message exchanges required for the Web Browser SSO profile and the Single Logout profile involve usage of cryptography for the signing and encryption of data.

The Universal Controller requires a single JKS keystore that contains all private and public keys. The keystore must have one default private key.

To create the JKS keystore file, with the default private key, assuming your Identity Provider does not require keys be signed by a specific certification authority, you can use the Java utility keytool command to generate a self-signed key, entering the distinguished name information when prompted.

```
keytool -genkeypair -keyalg RSA -sigalg SHA256withRSA -alias ucsaml -keypass ucsaml -keystore samlKeystore.jks -storepass ucsaml -storetype
JKS
```

To import a key signed by a certification authority, which are typically provided in .p12/.pfx format (or can be converted to .p12/.pfx format using OpenSSL), you can use the following keytool command.

```
keytool -importkeystore -srckeystore key.p12 -srcstoretype PKCS12 -srcstorepass password -alias alias -destkeystore samlKeystore.jks
-destalias ucsaml -destkeypass ucsaml
```

To determine the alias available in the p12 file, you can use the following command.

```
keytool -list -keystore key.p12 -storetype pkcs12
```

If your Identity Provider metadata is signed, to verify trust of the signature, Universal Controller will use all keys found in the configured keystore. To import the public certificate of the metadata signature, you can use the following keytool command.

```
keytool -importcert -alias alias -keystore samlKeystore.jks -file signature.cer
```

The location of the KeyStore File can be specified from the Single Sign-On Settings in the user interface. However, by default, Universal Controller automatically populates the KeyStore File setting with a value of `${catalina.base}/conf/saml/samlKeystore.jks` on initial start-up.

For example, if `${catalina.base}` resolves to `/opt/tomcat`, the KeyStore File setting would be populated with `/opt/tomcat/conf/saml/samlKeystore.jks`.

The JKS keystore password, the default private key alias, and the default private key password can also be specified from the Single Sign-On Settings in the user interface. Each of these settings are populated with a default value of `ucsaml` on initial start-up.

If your Identity Provider requires that you upload the public key certificate for the SAML Single Logout profile, you can export the certificate from the JKS keystore as follows.

```
keytool -exportcert -alias ucsaml -file ucsaml.cer -keystore samlKeystore.jks -storepass ucsaml -storetype JKS
```

Java Cryptography Extension (JCE)

Universal Controller is configured to use signature algorithm SHA256withRSA and digest method algorithm SHA-256.

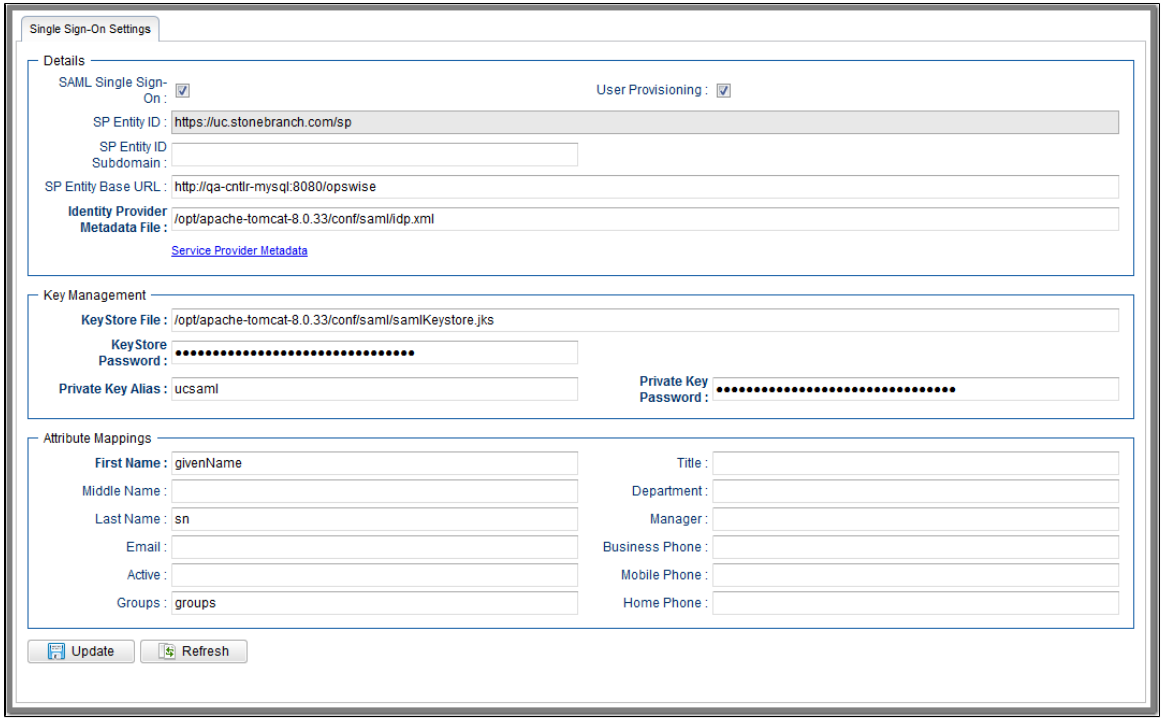
Use of SAML Single Sign-On requires installation of the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files for JDK/JRE 8 to remove limitations on cryptography capabilities.

Debugging

The saml.log.level property can be configured in the opswise.properties to enable debug logging for the SAML framework. However, as a best practice, saml.log.level should remain at INFO under normal operation.

Single Sign-On Settings

An administrator can turn on/off and configure SAML Single Sign-On through the user interface.

Step 1	From the Administration navigation pane, select **Configuration > Single Sign-On Settings**. The Single Sign-On Settings page displays. 
Step 2	Enter / select your Single Sign-On Settings, using the field descriptions below as a guide. • Required fields display in **boldface**. • Default values for fields, if available, display automatically.
Step 3	Click the **Update** button.

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

Single Sign-On Settings Field Descriptions

The following table describes the fields and buttons that display in the Single Sign-On Settings.

Field Name	Description
Details	This section contains detailed information on the Single Sign-On settings.

SAML Single Sign-On	If enabled, turns on SAML Single Sign-On. If disabled, all fields are read-only.
User Provisioning	If enabled, turns on the provisioning of users through SAML assertion attributes.
SP Entity ID	Read-only; Unique identifier of the Universal Controller Service Provider.
SP Entity ID Subdomain	Customize the SP Entity ID with a unique subdomain.
SP Entity Base URL	Base URL to construct SAML endpoints from; must be a URL with protocol, server, port. and context path. If one is not specified, it defaults to values from the initial request in this format: `scheme://server:port/contextPath`
Identity Provider Metadata File	Identity Provider metadata file location.
Service Provider Metadata	Link to download the Service Provider metadata for the Universal Controller node.
Key Management	
KeyStore File	Keystore file location.
KeyStore Password	Password used to protect the integrity of the keystore. Default is ucsaml.
Private Key Alias	Alias of the private key (with either self-signed or CA-signed certificate) used to digitally sign SAML messages. Default is ucsaml.
Private Key Password	Password used to protect the integrity of the private key. Default is ucsaml. See SAML KeyStore.
Attribute Mappings	If User Provisioning is enabled; This section allows you to configure a mapping between user fields and attributes from the attribute statement of a SAML assertion. It is displayed only when User Provisioning is enabled. See User Attribute Mapping for more details. In addition to user fields, you can specify an attribute mapping for Groups allowing for automatic provisioning of a user's group membership. See Group Membership Attribute Mapping for more details.
First Name	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the First Name of the user.
Middle Name	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Middle Name of the user.
Last Name	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Last Name of the user.
Email	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Email of the user.
Active	Name of an attribute, of type `xs:boolean`, `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Active condition of the user. Non-boolean type values that evaluate to **true** are "true", "1", "yes", and "on." All other non-boolean type values evaluate to **false**.
Groups	Name of a multi-valued attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Group Name of each group that the user is a member of.
Title	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Title of the user.
Department	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Department of the user.

Manager	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Name of the Manager of the user.
Business Phone	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Business Phone of the user.
Mobile Phone	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Mobile Phone of the user.
Home Phone	Name of an attribute, of type `xs:string` or `xs:any`, from the attribute statement of the SAML assertion containing the Home Phone of the user.
Buttons	This section identifies the buttons displayed above and below the Single Sign-On Settings that let you perform various actions.
Update	Saves updates to the record.
Refresh	Refreshes any dynamic data displayed in the Single Sign-On Settings.

Default Configuration

Upon initial start-up of Universal Controller, a default Single Sign-On Settings record is created and associated with the Universal Controller node by node id. The settings are specific to the Universal Controller node, as the SP Entity ID, Base URL, and File paths may differ between each Universal Controller node. See Single Sign-On Settings Field Descriptions, above, for the default configuration.

Security

Single Sign-On Settings can be viewed only by users with the ops_admin role, regardless of Navigation Visibility; therefore, only users with the ops_admin role can update Single Sign-On Settings.

Bulk Import/Export

Any Single Sign-On Settings record in the database that has a corresponding Universal Controller node is exported to `ops_single_sign_on.xml` during the Bulk Export server operation.

Single Sign-On Settings being updated through the Bulk Import server operation are applied immediately; however, you can update the Single Sign-On Settings only for the node you are performing the Bulk Import on.

Troubleshooting

NameID

The SAML Subject NameID from the SAML assertion received from the Identity Provider correlates directly to the User ID field of a user record in the Universal Controller database.

- If User Provisioning is off, the NameID must match with the User ID field of an existing user record in the Universal Controller database.
- If User Provisioning is on, any provisioned user record will be assigned a User ID equivalent to the NameID.

Login Errors

Universal Controller Uninitialized	While the Universal Controller web application is initializing, the user login flow cannot proceed. Any users attempting to authenticate with SAML at this time receive the following error: Universal Controller is being initialized. Please try again later.
User Account Not Found	Any SAML-authenticated user who cannot be linked to a user account in the Universal Controller database is prohibited from accessing the application and receives the following error: User 'username' not synchronized with Universal Controller. Please check with your administrator. Additionally, the opswise.log will contain the following warning: User 'username' authenticated by identity provider 'remote-entity-id' not synchronized with a Universal Controller account.
User Account Not Active	Any SAML-authenticated user linked to a Universal Controller user account that is not Active is prohibited from accessing the application and receives the following error: User 'username' not synchronized with Universal Controller. Please check with your administrator. Additionally, the opswise.log will contain the following warning: User 'username' authenticated by identity provider 'remote-entity-id' is synchronized with an inactive Universal Controller account.
Login Method	Any SAML authenticated user linked to a Universal Controller user account that is not designated to use Single Sign-On login method is prohibited from accessing the application and receives the following error: User 'username' not synchronized with Universal Controller. Please check with your administrator. Additionally, the opswise.log will contain the following warning: User 'username' authenticated by identity provider 'remote-entity-id' is not permitted to use Single Sign-On login method.
User Account Locked	Any SAML-authenticated user linked to a Universal Controller user account that is locked is prohibited from accessing the application and receives the following error: User account 'username' is locked. Please check with your administrator.
No Web Browser Access	Any SAML-authenticated user linked to a Universal Controller user account designated with the Single Sign-On login method, but without Web Browser Access, is prohibited from accessing the application and receives the following error: User 'username' not permitted to login through the web browser. Please check with your administrator.
Authentication Statement Too Old	If users already are authenticated with their Identity Provider, depending on how long their Identify Provider allows them to stay authenticated, they could experience an "Error validating SAML message" authentication error when signing into the Universal Controller through single sign-on. If users are experiencing this error, search the opswise.log for the following message: `Authentication statement is too old to be used with value 2019-08-15T19:22:56.312Z` Upon confirming the presence of the above message, review property saml.maxAuthenticationAge and adjust accordingly. This property allows you to set the maximum time between a user's authentication and processing of an authentication statement, which by default is 7200 seconds.

Data Backup - Purge

- Overview
- Purge Rules for Task Instances
  - Task Instance Status
  - Purging by Retention Duration
- Creating a Data Backup / Purge Record
  - Data Backup / Purge Details
  - Data Backup / Purge Details Field Descriptions
- Running a Data Backup / Purge Manually
- Importing Backed Up / Purged Data into the Controller
- Returning Virtual Resources for Purged Task Instances in Failure Status

Overview

Universal Controller maintains a record of all system activity, including:

- Audits
- Activity
- History

The Data Backup / Purge feature allows you to configure automatic backups and/or purges of some or all of the Controller activity data. Depending on your organization's needs, you should schedule regular data backups. Depending on the volume of your installation, the amount of data in your Controller database could become unwieldy if you do not schedule regular purges of old data.

The data is written to XML files in the directory you specify.

Note
For instructions on how to purge user-created Controller records, see Purging Old Versions of Records.

Purge Rules for Task Instances

The following rules apply for the purging of task instances.

Task Instance Status

A task instance (including a workflow task instance) can be purged only if it is in a status greater than 99:

- 110 (In Doubt)
- 120 (Start Failure)
- 125 (Confirmation Required)
- 130 (Cancelled)

- 140 (Failed)
- 180 (Skipped)
- 190 (Finished)
- 200 (Success)

A task instance within a workflow cannot be purged until its workflow task instance has been purged.

A workflow task instance cannot be purged if one or more of its task instances is in a status other than Skipped, Finished, or Success, because that will cause the workflow to be in a status which will not qualify it to be purged (for example: Running, Running/Problems), and therefore none of the task instances within the workflow will qualify for purge.

Purging by Retention Duration

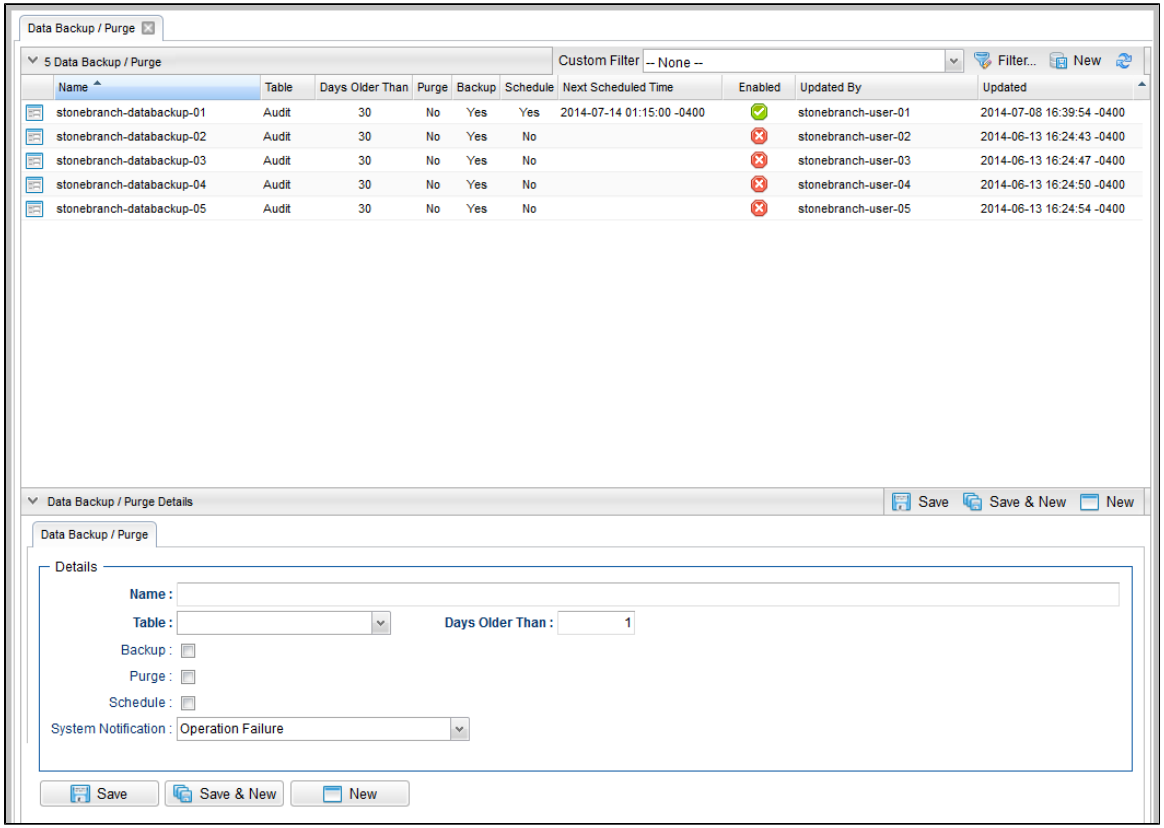
If Purge By Retention Duration has been specified for a trigger, and the Purge By Retention Duration checkbox has been selected in the Data Backup / Purge Details, all task instances launched by the trigger are eligible to be purged from the database as soon as the retention duration time specified in the trigger has been met.

When a purge is run, any task instances eligible to be purged by retention duration will be purged at that time, regardless of the Days Older Than value specified in the Purge Details.

Creating a Data Backup / Purge Record

Step 1 From the Administration navigation pane, select **Configuration > Data Backup / Purge**. The Data Backup / Purge list displays.

Below the list, Details for a new Data Backup / Purge record displays.



Step 2 Enter / select Details for a new Data Backup / Purge record, using the field descriptions below as a guide.

- Required fields display in **boldface**.
- Default values for fields, if available, display automatically.

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

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

Step 3 If you want the backup / purge to run automatically, enable the **Schedule** field and specify how often and what time it should run. Otherwise, you can run it manually.

Step 4 Click a **Save** button to save the record. The record is added to the database, and all buttons and tabs in the Data Backup / Purge Details are enabled.

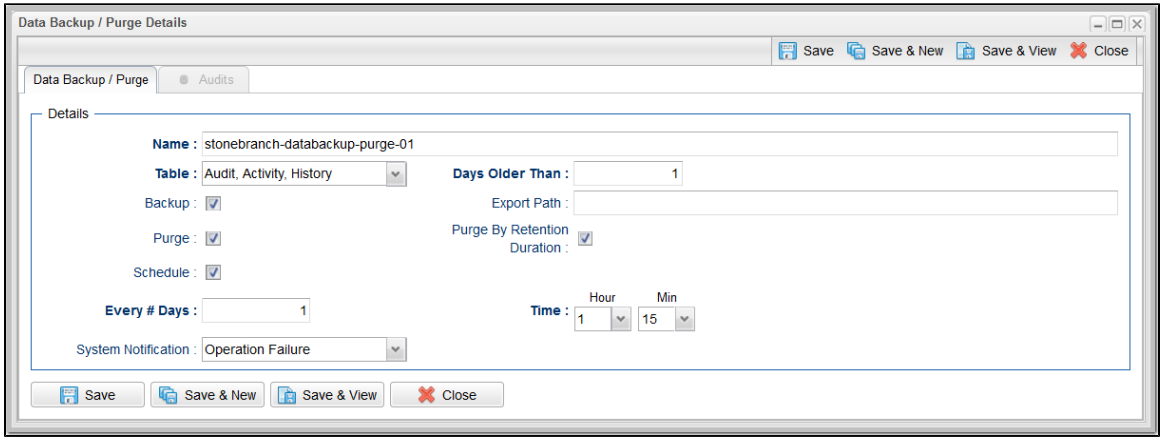
Note
To open an existing record on the list, either:

- 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).

Data Backup / Purge Details

The following Data Backup / Purge Details is for an existing Data Backup / Purge record.

Depending on the values that you enter / select for these fields, more (or less) fields may display. See the field descriptions, below, for a description of all fields that may display in the Data Backup / Purge Details.



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

Data Backup / Purge Details Field Descriptions

The following table describes the fields, buttons, and tabs that display in the Data Backup / Purge Details.

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

Name	Name of this backup specification.
Table	Specifies which records you want to back up and/or purge: • Audit • Activity • History
Days Older Than	Allows you to specify the minimum number of days you wish to retain data. The process will run according to the schedule you specify, only processing data that is older than the number of days you specify in this field.
Backup	If enabled, the process will write all the selected data to XML files.

Export Path	If Backup is enabled, specifies the path to the directory to which you want the backed up data written. The data must be backed up to a location on the server's file system. It is written to a separate XML file for each record type, as shown in the following examples:
	`Audit:`
	`ops_audit_Sat_Apr_30_08_30_00_PDT_2011.xml`
	`Activity:`
	`ops_exec_sleep_Sat_Apr_30_08_30_00_PDT_2011.xml`
	`ops_exec_unix_Sat_Apr_30_08_30_00_PDT_2011.xml`
	`ops_exec_workflow_Sat_Apr_30_08_30_00_PDT_2011.xml`
	`History:`
	`ops_history_Sat_Apr_30_08_30_00_PDT_2011.xml`
	Note
	If no path is specified, the system default path (**opswise_backups** under the Tomcat directory) is used, unless an alternate path is specified in the Universal Controller system property Data Backup/Purge Export Path. If a path is specified but does not exist as an "absolute" path, it will be assumed to be a "relative" path from Tomcat home.

Purge	If enabled, the process will purge the selected data from your Universal Controller database.
Purge By Retention Duration	Specification for whether task instances qualifying to be purged by retention duration should be purged.

Schedule	If enabled, displays additional fields that allow you to specify an automated backup and/or purge schedule. If you do not select schedule, you must manually run the backup / purge process.
Next Scheduled Time	System-supplied; If Data Backup/Purge is enabled; the next scheduled time the that backup / purge process will run, based on the specifications in your schedule.
Every # Days	If Schedule is enabled, specifies the frequency (in number of days) of the backup / purge process. Default is 1.
Time	If Schedule is enabled, specifies the time of the backup / purge. Use 24:00 hour time. **Note** When enabling a Data Backup / Purge, or updating the Time for an enabled Data Backup / Purge, the backup / purge process will be scheduled for the specified Time on the current day if the current time is on or before the specified Time. Otherwise, the backup / purge process will be scheduled for the specified Time on the next day.
System Notification	Specification for whether or not to receive system notifications for Data Backup / Purge operations. Options are: • --None -- • Operation Failure • Operation Success/Failure • Operation Success **Note** In order to receive system notifications, you must provide an email address in the Administrator Email Address system property and select the Use for System Notifications field on an Email Connection.
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 Data Backup / Purge Details that let you perform various actions.
Save	Saves a new record in the Controller database.

Save & New	Saves a new Data Backup/Purge record in the Controller database and redisplays empty Details so that you can create another Data Backup/Purge record.
Save & View	Saves a new Data Backup/Purge 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	Enables these Backup / Purge instructions so that they will be processed by the Controller.
Disable	Disables these backup / purge instructions so they will not be processed by the Controller.
Run	Manually runs the backup / purge instructions.
Terminate	Terminates a running Data Backup/Purge operation.
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 Data Backup / Purge Details that provide access to additional information about the record.
Audits	Lists audits created for all scheduled runs of this data backup / purge operation.

Running a Data Backup / Purge Manually

If you want to manually run a data backup or purge, either:

- On the Backups list, right-click the **Name** of the Data Backup / Purge that you want to run and click **Run**.
- Display the Details of the Data Backup / Purge that you want to run and click the **Run** button.

Importing Backed Up / Purged Data into the Controller

If you want to import any of the XML files created by a Data Backup / Purge, you can copy the XML file(s) into the bulk export output path and run bulk import. See Running an Import.

Returning Virtual Resources for Purged Task Instances in Failure Status

Task instances that have their **Hold Resources on Failure** field enabled will hold their renewable virtual resources if the task instance is in Failed status.

However, when these task instances are purged, the virtual resources are returned.

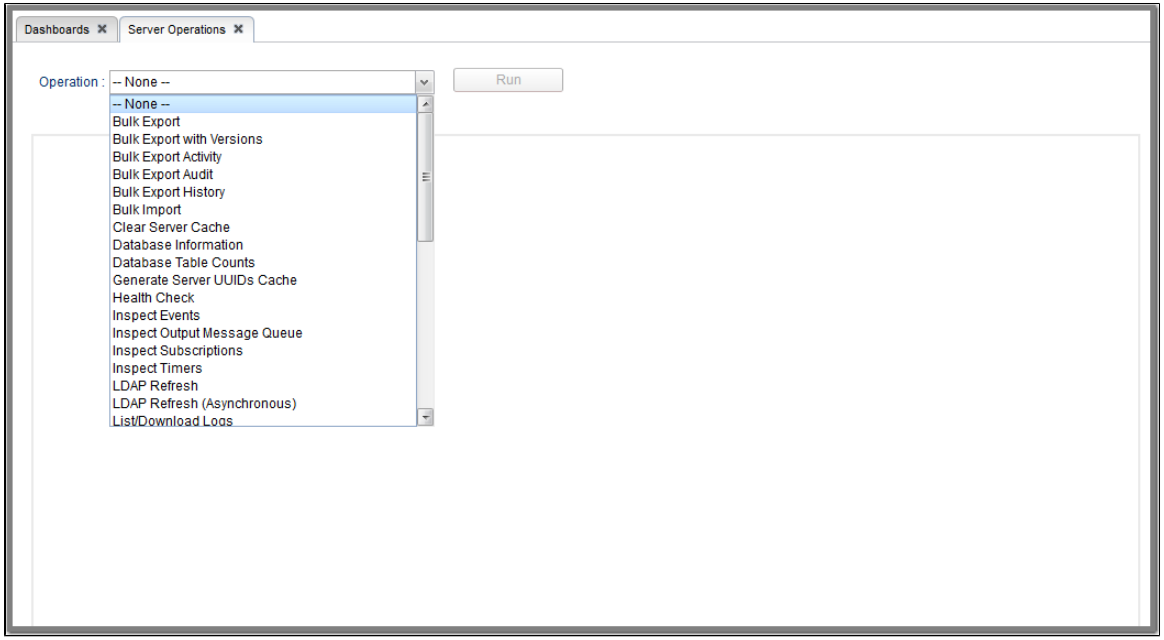
Server Operations

- Overview
- Running a Server Operation
- Server Operation Completion
- Server Operation Status
- Server Operation Timeout
- Server Operations Descriptions
- Universal Controller Database Tables

Overview

Universal Controller provides a set of server operations that help you maintain and administer your Controller installation. Many of the operations, as noted, should be run only by Technical Support or upon request by Technical Support.

Running a Server Operation

Step 1	From the Administration navigation pane, select **Configuration > Server Operations**. The Server Operations list displays. 
Step 2	Select an operation from the drop-down list and click **Run**.

Server Operation Completion

When a server operation has been run and completed, the Controller issues an INFO-level log message.

For example:

```
2018-03-31-09:24:58:957 -0400   INFO [http-8080-exec-4] Running Server Operation: Bulk Export
```

```
2018-03-31-09:25:12:357 -0400  INFO [http-8080-exec-4] Server Operation completed: Bulk Export in 1 Minute 37 Seconds
```

Server Operation Status

The status for a completed Server Operation is either Success or Failed. The Audit Status field for Server Operations can have one of the following values: Invoked, Failed, or Success.

All Server Operations can fail if the user invoking the Server Operation does not have sufficient permission or if the Server Operation is limited to one execution per node and it is already running.

Most Server Operations will complete successfully; however, if errors occur executing the Server Operation, the Audit Status field is set to Failed, and error messages may be added to the Additional Information field.

The Server Operation duration message will be added to the Audit Additional Information field regardless of the Server Operation status. For example:

```
Server Operation 'LDAP Refresh' completed in 0 Seconds at 2018-06-11 12:46:01 -0400
```

Server Operation Timeout

For potentially long running server operations, such as Bulk Import and Bulk Export, we set a request timeout of 30 minutes.

However, some browsers may timeout earlier, regardless. In the case where a server operation has timed out, you will see an error similar to the following in the Universal Automation Center Console:

```
"No response from 'Bulk Import' server operation; check server log for details."
```

In the case of a request timeout, the server operation will continue to run on the server. You will have to confirm completion of the server operation from either the server log, **opswise.log**, or from the Audits list.

View the log for the start and completion of the server operation, as well as any warnings/errors logged in between.

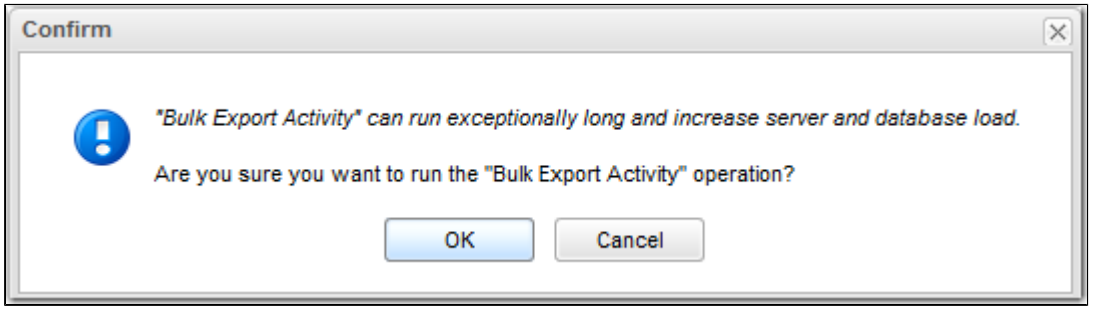
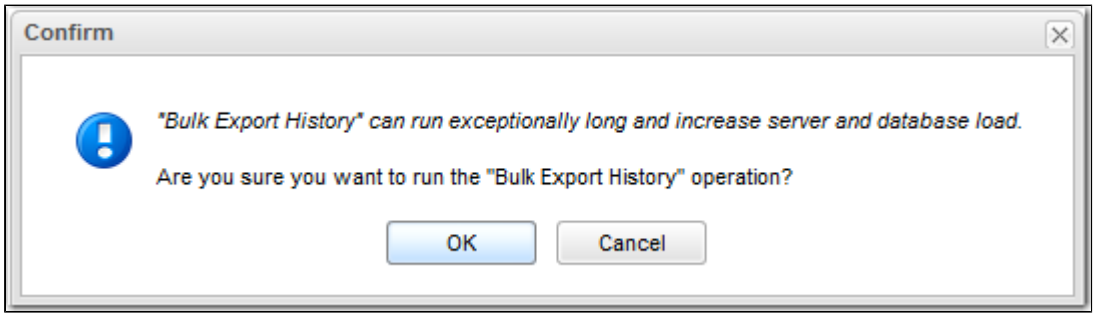
```
2018-03-31-09:24:58:957 -0400   INFO [http-bio-8080-exec-4] Running Server Operation: Bulk Import
...
2018-03-31-09:25:12:357 -0400   INFO [http-bio-8080-exec-4] Server Operation completed: Bulk Import in 11 Minutes 57 Seconds
```

Alternatively, you can view the server operation audit record; however, the log usually provides the most detailed information.

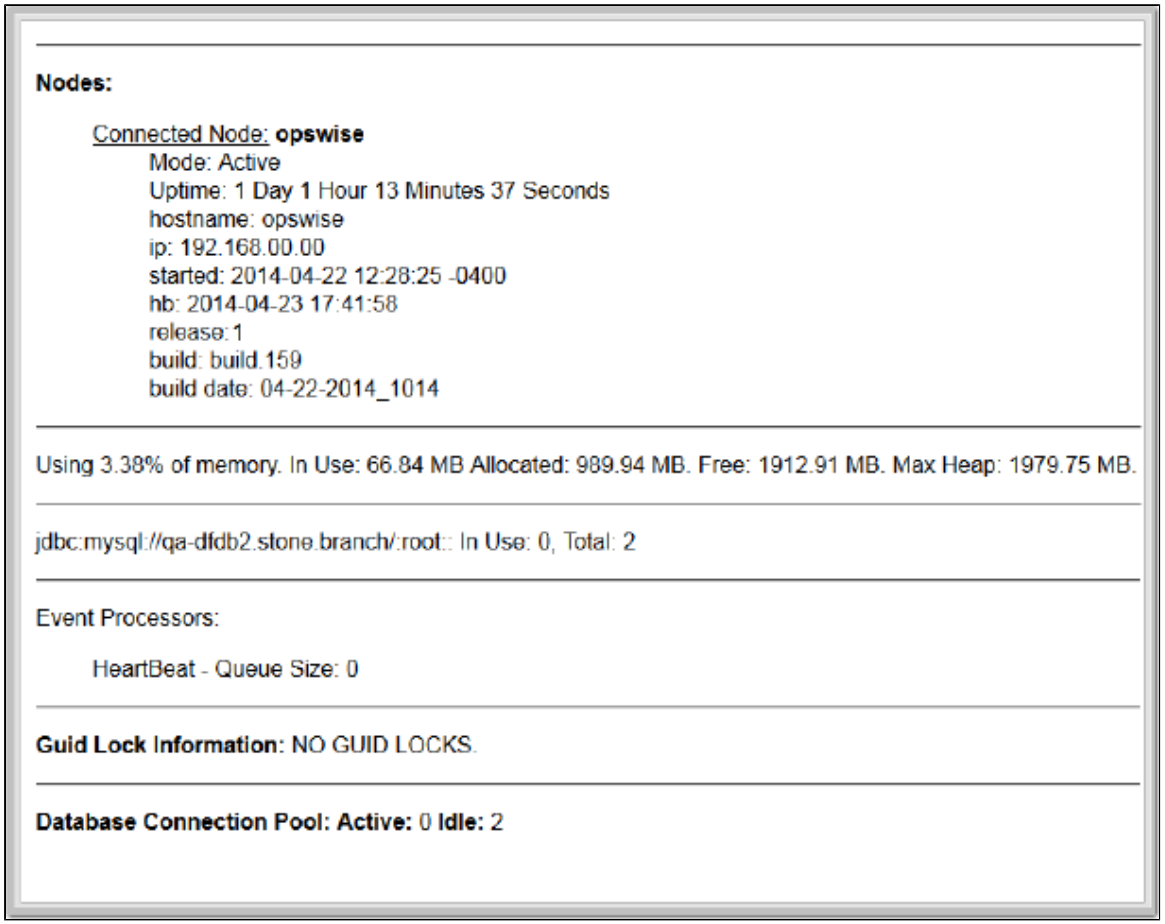
Server Operations Descriptions

The following table describes and, where appropriate, provides links for each server operation.

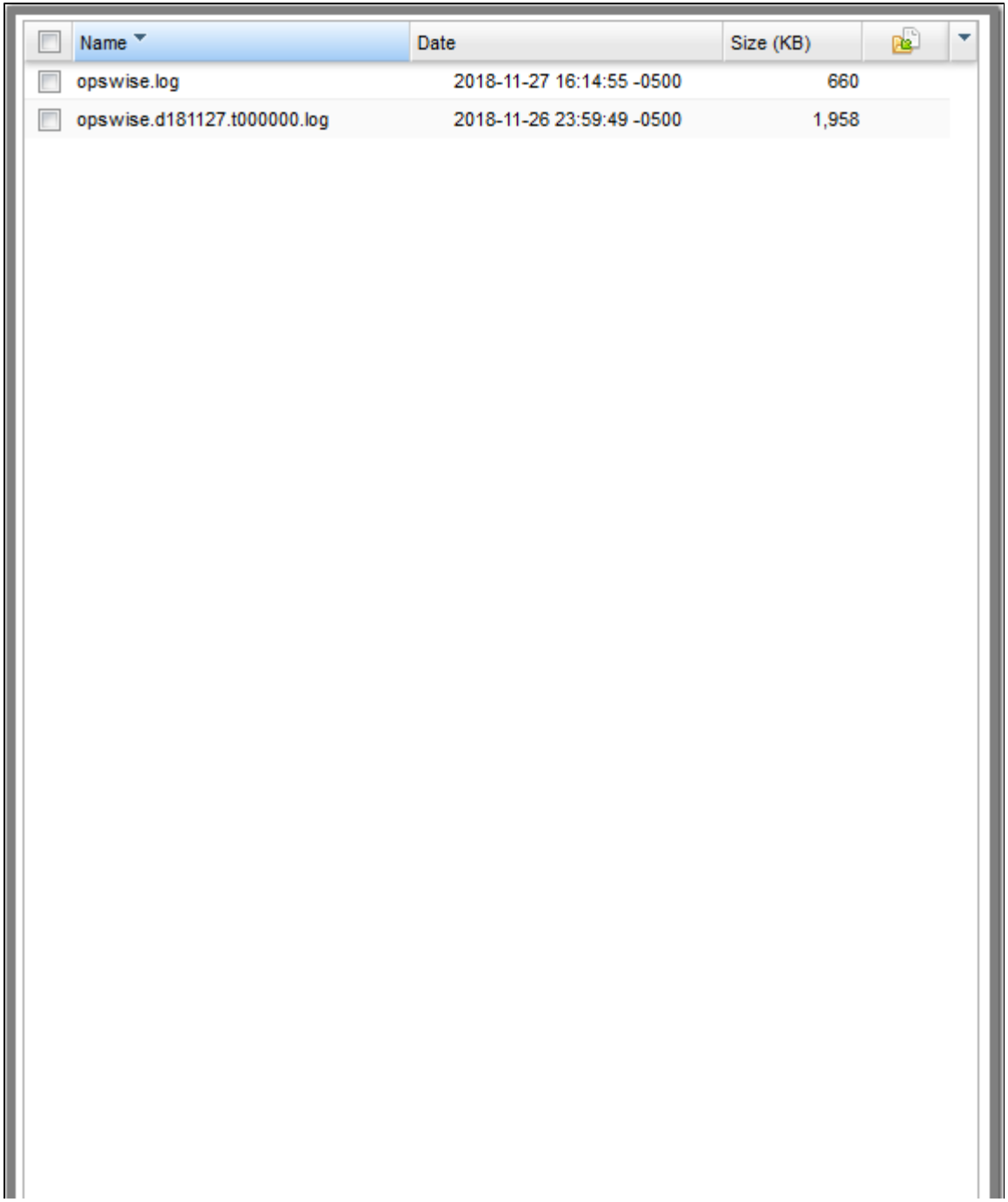
Script	Description and Links
Bulk Export	Exports all current record definitions, without versions, when migrating data to a new Universal Controller deployment.

Bulk Export Activity	Exports all current Activity data from multiple Universal Controller database tables. **Note** In order to run this server operation, the Bulk Export Activity Permitted Universal Controller system property must be set to true. If you choose to run this server operation, the following confirmation pop-up displays: 
Bulk Export Audit	Exports all current Audit records when migrating data to a new Universal Controller deployment.
Bulk Export History	Exports all current History records when migrating data to a new Universal Controller deployment. If you choose to run this server operation, the following confirmation pop-up displays: 
Bulk Export with Versions	Exports all current records along with older (non-current) versions of record definitions when migrating data to updated software (see Upgrading Universal Controller from 5.2.0).
Bulk Import	Imports all data from an exported file when migrating data to updated software (see Upgrading Universal Controller from 5.2.0).
Clear Server Cache	Clears the internal server cache. You can use this operation if you are experiencing unexpected behavior with the Controller system. For example, Technical Support may ask you to first run this operation to clear the server cache, then clear your browser cache.

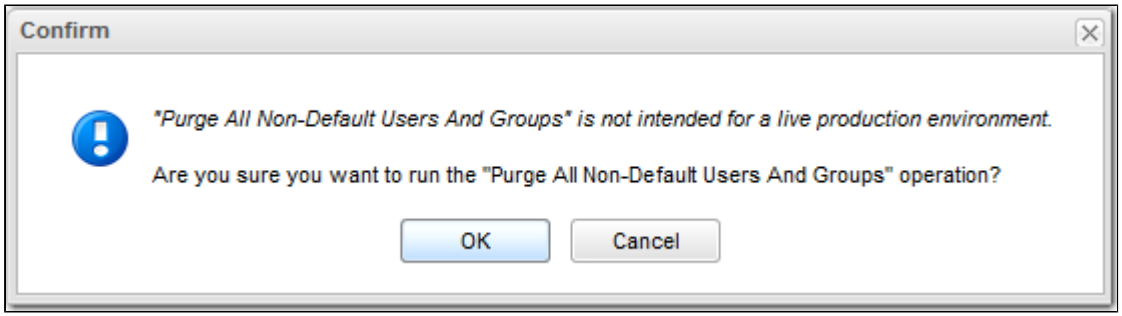
Database Information	Displays the following information for the Controller database: • Type: MYSQL • Database Name: db_name • Database Product Name: MySQL • Database Product Version: 8.0.11 • Driver Name: MySQL Connector/J • Driver Version: mysql-connector-java-8.0.12 (Revision: 24766725dc6e017025532146d94c6e6c488fb8f1) • Configured JDBC URL: jdbc:mysql://hostname:port/ • Adjusted JDBC URL: jdbc:mysql://hostname:port/db_name?useUnicode=true&serverTimezone=US/Eastern&socketTimeout=1800000 • Connection Pool: Server (0/3) • Connection Pool: Reserved (0/3) • Connection Pool: Client (0/5)
Database Table Counts	Displays the following information for Universal Controller database tables: • Largest table • Number of tables • Number of rows • Number of rows in each table See Universal Controller Database Tables, below, for a description of all tables.
Generate Server UUIDs Cache	For use only by Technical Support personnel or when you are requested to run it by Technical Support.

Health Check	Displays information about the current instance of the Controller. 
Inspect Events	For use only by Technical Support personnel or when you are requested to run it by Technical Support.
Inspect Output Message Queue	For use only by Technical Support personnel or when you are requested to run it by Technical Support.
Inspect Subscriptions	For use only by Technical Support personnel or when you are requested to run it by Technical Support.
Inspect Timers	For use only by Technical Support personnel or when you are requested to run it by Technical Support.
LDAP Refresh	If LDAP is configured for this installation, it refreshes every 24 hours. This server operation forces a refresh. The refresh writes all Controller log entries to the user interface as well as to the Controller log, and the response will not be returned until the process completes. If you estimate the refresh could take a considerable amount of time, we recommend you use LDAP Refresh (Asynchronous).
LDAP Refresh (Asynchronous)	If LDAP is configured for this installation, it refreshes every 24 hours. This server operation forces a refresh. The refresh is performed in the background and sends Controller log entries to the Controller log.

List/Download Logs	Lists (and optionally lets you download) any existing Opswise log files for the Controller node that this operation is executed on. The list identifies the name, last modification date, size of each log file, and - when you hover over the log file entry on the list - an icon that lets you download that file.


Name
Date
Size (KB)
opswise.log
2018-11-27 16:14:55 -0500
660
opswise.d181127.t000000.log
2018-11-26 23:59:49 -0500
1,958

	  The icons at the bottom of the list let you perform the following: • Download selected log files. • Select all log files. • Deselect all log files. (You also can select / deselect all log files by clicking the Name checkbox at the top of the list.)
Load Demonstration Definitions	Loads base demonstration data into your database (for example: workflows, tasks, triggers).
Memory Usage	Displays a summary of Controller memory usage.
Overdue Timers Delete	Deletes any overdue timers, as listed by the Overdue Timers List operation.
Overdue Timers List	Lists any timers that are overdue (normally, no timers should be overdue).
Pause Cluster Node	Pauses the Controller, which prevents it from processing tasks and events. If an event or task is already running when you run this operation, the event or task will complete. The Controller remains in a paused state until you run the Resume Cluster Node operation.

Purge All Non-Default Users And Groups	Purges all non-default Users and Groups and their associated data. There is one default User: Administrator (ops.admin). There are two default Groups: Administrator Group and Everything Group. This server operation will also clear the following fields: • Manager field for the Administrator user if it references a non-default user. • Manager field for the Administrator Group and/or Everything Group if it references a non-default user. • Parent field for the Administrator Group and/or Everything Group if it references a non-default group. The following is recommended before running this server operation: • Disable any triggers that are currently enabled by a non-default user. • Unassign the Execution User for any triggers that are currently assigned a non-default user as the Execution User. • Complete any active task instances that are currently assigned a non-default user as the Execution User. **Note** To run this server operation, the Purge All Non-Default Users And Groups Permitted Universal Controller System Property must be set to true. If you choose to run this server operation, the following confirmation pop-up displays: 
Purge History	Purges all records from the History table (ops_history). Any time a task instance goes into an end status (Cancelled, Failed, Skipped, Finished, Success), a copy of it is written to the History table. You can view your History table by selecting **Automation Center > Task Instances > History** from the navigation pane. **Note** If you do not need to keep or back up your task instance history, we recommend that you run this operation periodically; otherwise, make sure you schedule a routine Data Backup/Purge for history by selecting **Administration > Data Backup/Purge** from the navigation pane. Executing a Data Backup/Purge of an extremely large History table can seriously degrade Controller system performance.

Purge Instances	Purges everything in the All Task Instances table (ops_exec), which contains all system activity, including task instances in any status (including end statuses). Records in the All Task Instances table (ops_exec) remain there until they are purged. **Warning** Running this operation will purge any live data; that is, task instances that have not completed.
Purge Logs and Cache	Sends a request to all active Agents to purge their logs and cache.
Purge Versions	Purges versions of records in excess of the maximum specified by the System Default Maximum Versions Universal Controller system property.
Refresh System Default List Layouts	For Controller upgrades only; resets system defaults list layouts. You may be asked to run this server operation by Technical Support.
Reset All Agent Cluster Task Counts	Resets the current number of tasks currently being run by all Agent clusters to 0 (see Resetting the Current Task Count).
Reset All Agent Task Counts	Resets the current number of tasks currently being run by all Agents to 0 (see Resetting the Current Task Count).
Restart Cluster Node	Stops and restarts the Controller within the running Tomcat server. The Controller is effectively shut down and started up without stopping and starting Tomcat. **Note:** Restart Cluster Node will cause a failover to occur if it is executed on the Active node while another node is running as Passive.
Restore System Default List Layouts	Restores all lists to their default layouts.
Resume Cluster Node	Resumes the Controller after it has been paused using the Pause Cluster Node operation, or paused by the Start Server Paused Universal Controller property on startup.
Roll Log	Renames the existing log to a timestamped log and opens a new log file.
Run Garbage Collection	Runs the "garbage collector." The gc method suggests that the Java Virtual Machine expend effort toward recycling unused objects in order to make the memory they currently occupy available for quick re-use. When control returns from the method call, the Java Virtual Machine has made a best effort to reclaim space from all discarded objects.
Server Information	Displays the following categories of information about the Universal Controller server: • Node • License • Server Deployment • Database Information • Memory Information
System Properties	Displays all properties of the operating system on which the Controller is running. You may be asked to run this server operation by Technical Support.

Temporary Property Change	Allows for the temporary setting of specific Universal Controller properties to be used for diagnosing problems. This operation and setting of properties should be performed only under the guidance of Stonebranch support.
Thread List	Captures information about internal Controller system processes. You may be asked to run this server operation by Technical Support.
Thread List by CPU	Captures information about internal Controller system processes. You may be asked to run this server operation by Technical Support.
Thread Stack Trace	Captures information about internal Controller system processes. You may be asked to run this server operation by Technical Support.

Universal Controller Database Tables

The following table identifies and describes all Universal Controller database tables, which are listed if you run the Database Table Counts server operation, above.

*The tables are in alphabetical order according to **Table Name**.*

See Reportable Tables for a list of these database tables that are available for creating Reports.

Table	Table Name	Description
Abort Actions	ops_abort_action	Contains details about Abort actions.
Abort Actions Versions	ops_abort_action_v	Contains details about previous versions of Abort actions. New versions of Abort Action records are created when a task record is updated.
All Agents	ops_agent	Displays a list of Agents.
All Agent Clusters	ops_agent_cluster	Contains details about Agent Clusters.
All Agent Clusters Versions	ops_agent_cluster_v	Contains details about previous versions of Agent Clusters.
All Agents Mapping	ops_agent_mapping	Shows all the agents connected to one or more Promotion Targets (as retrieved using the **Refresh Target Agents** button).
Linux/Unix Agents Mapping	ops_agent_mapping_unix	Shows the mapping specifications between local Linux/Unix agents and Linux/Unix agents on a Promotion Target (as retrieved using the **Refresh Target Agents** button).
Windows Agents Mapping	ops_agent_mapping_windows	Shows the mapping specifications between local Windows agents and Windows agents on a Promotion Target (as retrieved using the **Refresh Target Agents** button).
z/OS Agents Mapping	ops_agent_mapping_zos	Shows the mapping specifications between local z/OS agents and z/OS agents on a Promotion Target (as retrieved using the **Refresh Target Agents** button).
Applications	ops_application	Shows a list of Application Resources.
Applications Versions	ops_application_v	Contains details about previous versions of Application resources.

Audits	ops_audit	Contains details of events being written to the Audit history.
Backups	ops_backup	Contains Backup and Purge records.
Bundles	ops_bundle	Contains all Bundles records.
Bundles and Agent Clusters	ops_bundle_agent_cluster_join	Shows relationship information between Bundles and Agent Clusters; that is, which agent clusters belong to which bundles.
Bundles and Applications	ops_bundle_application_join	Shows relationship information between Bundles and Application resources; that is, which Application resources belong to which bundles.
Bundles and Calendars	ops_bundle_calendar_join	Contains relationship information between Bundles and Calendars; that is, which Calendars belong to which Bundles.
Bundles and Credentials	ops_bundle_credentials_join	Contains relationship information between Bundles and Credentials; that is, which Credential records belong to which bundles.
Bundles and Custom Days	ops_bundle_custom_day_join	Contains relationship information between Custom Days and Bundles; that is, which Custom Days belong to which Bundles.
Bundles and Database Connections	ops_bundle_db_cntn_join	Contains information about the relationship between Bundles and Database Connections; that is, which Database Connections belong to which Bundles.
Bundles and Email Connections	ops_bundle_email_cntn_join	Contains information about the relationship between Bundles and Email Connections; that is, which Email Connections belong to which Bundles.
Bundles and Email Templates	ops_bundle_email_tmplt_join	Contains relationship information between Bundles and Email templates; that is, which Email Templates belong to which Bundles.
Bundles and Business Services	ops_bundle_generic_group_join	Contains relationship information between Bundles and Business Services; that is, which Business Services belong to which Bundles.
Bundles and PeopleSoft Connections	ops_bundle_ps_cntn_join	Contains relationship information between Bundles and PeopleSoft Connection; that is, which PeopleSoft Connection records are in which Bundles.
Bundles and Virtual Resources	ops_bundle_resource_join	Contains relationship information between Bundles and Virtual Resources; that is, which Virtual Resources belong to which Bundles.
Bundles and SAP Connections	ops_bundle_sap_cntn_join	Contains relationship information between Bundles and SAP Connection; that is, which SAP Connection records are in which Bundles.
Bundles and Scripts	ops_bundle_script_join	Contains relationship information between Bundles and Script; that is, which Scripts belong to which Bundles.
Bundles and SNMP Managers	ops_bundle_snmp_cntn_join	Contains relationship information between Bundles and SNMP Manager; that is, which SNMP Managers belong to which Bundles.
Promotion Targets	ops_bundle_target	Contains details about Promotion Target records.
Bundles and Tasks	ops_bundle_task_join	Contains relationship information between Bundles and Tasks; that is, which Tasks are in which Bundles.
Bundles and Triggers	ops_bundle_trigger_join	Contains relationship information between Bundles and Triggers; that is, which Triggers are in which Bundles.
Bundles and Variables	ops_bundle_variable_join	Contains relationship information between Bundles and Global variables; that is, which Global variables belong to which Bundles.
Calendar Custom Days	ops_cal_cust_join	Contains details about which Custom Days are associated with which Calendar records.
Calendar Custom Days Versions	ops_cal_cust_join_v	Contains previous versions of the association between Custom Days and Calendar records.

Calendars	ops_calendar	Contains details about Calendar records.
Calendars Versions	ops_calendar_v	Contains previous versions of Calendar records.
Chart Colors	ops_chart_color	Contains details about colors used in Chart reports.
Cluster Lock	ops_cluster_lock	(For internal use only.)
Cluster Nodes	ops_cluster_node	Provides details about cluster nodes.
Cluster Nodes Notifications	ops_cluster_notification	Contains Email and SNMP notification records associated with the cluster node.
Command	ops_command	(For internal use only.)
Command Response	ops_command_response	(For internal use only.)
Properties	ops_config	Contains Universal Controller System Properties.
Connector Notifications	ops_connector_notification	Contains Email Notification and SNMP Notification data associated with Agents and OMS Servers.
Counter	ops_count	(For internal use only.)
Credentials	ops_credentials	Login credentials used by the Controller to access remote machines.
Credentials Versions	ops_credentials_v	Contains previous versions of Credentials records.
Custom Days	ops_custom_day	Contains details about defined Custom Days.
Custom Days Versions	ops_custom_day_v	Contains previous versions of Custom Days records.
Dashboards	ops_dashboard	Contains details about Dashboards.
Dashboards Portlets	ops_dashboard_portlet	Contains details about the content (Widgets) on the Dashboards.
Database Connections	ops_database_connection	Contains details about [Database Connections defined in the Controller database.
Database Connections Versions	ops_database_connection_v	Contains previous versions of [Database Connections records.
Email Notifications	ops_email_cluster_notification	Contains Email Notification records associated with Cluster Nodes.
Email Notifications	ops_email_conn_notification	Contains Email Notification-specific data associated with Agents and OMS Servers.
Email Connections	ops_email_connection	Contains details about Email Connections resources.
Email Connections Versions	ops_email_connection_v	Contains previous versions of Email Connections records.
Email Notifications	ops_email_notification	Contains details about Email Notifications associated with tasks.
Email Notifications Versions	ops_email_notification_v	Contains previous versions of Email Notifications associated with tasks. Note that a new version is created only when the task is updated.
Email Templates	ops_email_template	Contains details about Email templates.
Email Templates Versions	ops_email_template_v	Contains previous versions of Email template records.

Event Email	ops_event_email	(For internal use only.)
Event Exec Defined	ops_event_exec_defined	(For internal use only.)
Event Exec Resource Order Filled	ops_event_exec_ordfill	(For internal use only.)
Event Exec Exclusive Order Filled	ops_event_exec_ordfill_ex	(For internal use only.)
Event Exec Propagate State	ops_event_exec_prop_state	(For internal use only.)
Event Exec Skip Child	ops_event_exec_skip_child	(For internal use only.)
Event Exec Start	ops_event_exec_start	(For internal use only.)
Event Exclusive	ops_event_exclusive	(For internal use only.)
Event Resource	ops_event_resource	(For internal use only.)
Event SNMP	ops_event_snmp	(For internal use only.)
Event SQL	ops_event_sql	(For internal use only.)
Event Trigger	ops_event_trigger	(For internal use only.)
Event Trigger Component	ops_event_trigger_comp	For internal use only.)
Event UAC	ops_event_uac	(For internal use only.)
Event UAC Job Abend	ops_event_uac_jobabend	(For internal use only.)
Event UAC Job Complete	ops_event_uac_jobcomp	(For internal use only.)
Event UAC Job End	ops_event_uac_jobend	(For internal use only.)
Event UAC Job Log	ops_event_uac_joblog	(For internal use only.)
Event UAC Job Launch	ops_event_uac_joblaunch	(For internal use only.)
Event UAC Job Start	ops_event_uac_jobstart	(For internal use only.)
Event UAC Job Restart Confirmation	ops_event_uac_rstrt_conf	(For internal use only.)
Event UAC Step End	ops_event_uac_stepend	(For internal use only.)
Exclusive Requests	ops_exclusive_order	Contains any outstanding requests by a task instance to run mutually exclusively.
All Task Instances	ops_exec	Task instance activity (running tasks).
Application Control Task Instances	ops_exec_application_control	Contains details about Application Control task instances.
Email Task Instances	ops_exec_email	Contains details about Email task instances.

Email Monitor Task Instances	ops_exec_email_monitor	Contains details about Email Monitor task instances.
Advanced Criteria	ops_exec_email_criteria	Contains details about Email Monitor task instances Advanced Criteria.
File Monitor Instances	ops_exec_file_monitor	Contains details about File Monitor task instances.
File Transfer Task Instances	ops_exec_ftp	Contains details about File Transfer task instances.
FTP File Monitor Instances	ops_exec_ftp_file_monitor	Contains details about FTP File Monitor task instances.
Universal Command Task Instances	ops_exec_indesca	Contains details about Universal Command task instances.
Manual Task Instances	ops_exec_manual	Contains details about Manual task instances.
Task Monitor Instances	ops_exec_monitor	Contains details about Task Monitor task instances.
Output	ops_exec_output	Contains any output (such as STDOUT) attached to task instances.
PeopleSoft Task Instances	ops_exec_peoplesoft	Contains PeopleSoft task instance records.
PeopleSoft Task Parameters	ops_exec_peoplesoft_rt_param	Contains Parameter records associated with PeopleSoft task instances.
Task Instances Run Criteria	ops_exec_run_criteria	Contains run criteria information for task instances within a Workflow.
SAP Task Instances	ops_exec_sap	Contains SAP task instance records.
Timer Task Instances	ops_exec_sleep	Contains details about Timer task instances.
SQL Task Instances	ops_exec_sql	Contains details about SQL task instances.
Stored Procedure Task Instances	ops_exec_stored_proc	Contains details about Stored Procedure task instances.
Stored Procedure Task Parameters	ops_exec_stored_proc_param	Contains Parameter records associated with Stored Procedure task instances.
System Monitor Task Instances	ops_exec_system_monitor	Contains System Monitor task task instance records.
Task Instance Virtual Resources	ops_exec_to_resource	Contains relationship information between Virtual Resources and task instances; that is, which task instances are assigned to which Virtual Resources.
Universal Task Instances	ops_exec_universal	Contains details about Universal Task instances.
Linux/Unix Task Instances	ops_exec_unix	Contains details about Linux/Unix task instances.
Variable Monitor Task Instances	ops_exec_variable_monitor	Contains Variable Monitor task task instance records.
Windows Task Instances	ops_exec_windows	Contains details about Windows task instances.

Workflow Task Instances	ops_exec_workflow	Contains details about Workflow task instances.
Workflow Task Instance Dependencies	ops_exec_workflow_edge	Contains information about the conditions specified between task instances within workflows.
Workflow Task Instance Vertices	ops_exec_workflow_vertex	Contains relationship information between workflow instances and task instances; that is, which tasks are running in which workflows.
z/OS Task Instances	ops_exec_zos	Contains details about z/OS task instances.
Restart Confirmations	ops_exec_ zos_confirm	Contains details about any restart confirmations performed on z/OS tasks.
Job Step Files Data	ops_exec_zos_files	Contains details about jobsteps in a z/OS task.
Restartable Job Steps	ops_exec_zos_jobsteps	Contains historical details about restartable job steps in a z/OS task.
Restartable Job Steps	ops_exec_zos_jobstepsui	Contains details about restartable job steps in a z/OS task.
Restart Criteria	ops_exec_zos_rstrt_criteria	Contain information about z/OS task restart criteria.
Step Conditions	ops_exec_zos_stepcond	Contains details about z/OS task instance step conditions.
Externalizable	ops_externalizable	Contains an internal table for events.
Business Services	ops_generic_group	Contains details about Business Services.
Business Services Versions	ops_generic_group_v	Contains previous versions of Business Service records.
Group Roles	ops_group_has_role	Contains relationship information between Universal Controller User Groups and Roles; that is, which Groups have been assigned which Roles.
History	ops_history	Contains a history of task activity.
LDAP	ops_ldap	Identifies where LDAP Settings are stored.
Licenses	ops_license	Contains information about the Controller license.
List Grid Filters	ops_list_grid_filter	Identifies where persistent filters are stored.
List Grid Pin Filters	ops_list_grid_pin_filter	Identifies where pinned filters are stored.
List Grid Preferences	ops_list_grid_pref	Contains information about list layouts.
Local Custom Days	ops_local_custom_days	Contains details about Local Custom Days.
Local Custom Days Versions	ops_local_custom_days_v	Contains previous versions of Local Custom Days.
Local Variables	ops_local_variable	Contains details about task and trigger variables (also called local variables), entered into the Variables tab on a task or trigger record.
Local Variables Versions	ops_local_variable_v	Contains previous versions of Local variables associated with tasks or triggers. (New version records are created only when a task or trigger is updated.
Maps	ops_map	(For internal use only.)

Navigator	ops_nav_tree_pref	Contains Navigation Tree Configuration data.
Notes	ops_note	Contains details about Notes attached to Controller records.
Notes Versions	ops_note_v	Contains previous versions of Notes records.
All Actions	ops_notification	Contains details about all task actions: Abort Action, Email Notifications, Set Variable, SNMP Notification, and System Operation.
All Actions Versions	ops_notification_v	Contains details about previous versions of all task actions: Abort Action, Email Notifications, Set Variable, SNMP Notification, and System Operation. New versions of Action records are created when a task record is updated.
OMS Servers	ops_oms_server	Provides details about OMS Servers.
Output Messages	ops_output_msg	(For internal use only.)
PeopleSoft Connections	ops_peoplesoft_connection	Contains PeopleSoft Connection records.
PeopleSoft Connections Versions	ops_peoplesoft_connection_v	Contains previous versions of PeopleSoft Connection records.
Permissions	ops_permission	Contains details about Universal Controller Permissions assigned to Universal Controller Users and Universal Controller User Groups.
Promotion History	ops_promotion_history	Contains a list of Bundles that have been promoted into the current database.
Promotion History Items	ops_promotion_history_item	Contains a list of records that have been promoted into the current database. If a record has been promoted more than once, each version is listed separately.
Promotion Schedule	ops_promotion_schedule	Contains a list of Promotion Schedules.
Reports	ops_report	Contains information about Controller Reports.
Outstanding Requests	ops_resource_order	Contains any outstanding requests for a Virtual Resource by a task instance.
Currently In Use By	ops_resource_usage	Contains details about Virtual resource usage, as displayed in the Currently In Use By tab.
SAP Connections	ops_sap_connection	Contains SAP Connection records.
SAP Connections Versions	ops_sap_connection_v	Contains previous versions of SAP Connection records.
Schemas	ops_schema	Contains version information about database schemas.
Scripts	ops_script	Contains Script records.
Scripts Versions	ops_script_v	Contains previous versions of Script records.
SNMP Notifications	ops_snmp_cluster_notification	Contains SNMP notifications defined for Cluster Nodes.
SNMP Notifications	ops_snmp_conn_notification	Contains SNMP Notification-specific data associated with Agents and OMS Servers.
SNMP Managers	ops_snmp_connection	Contains SNMP Manager records.
SNMP Managers Versions	ops_snmp_connection_v	Contains previous versions of SNMP Manager records.
SNMP Notifications	ops_snmp_notification	Contains SNMP notifications defined for Tasks.

SNMP Notifications Versions	ops_snmp_notification_v	Contains previous versions of SNMP notifications defined for Tasks. (Versions are created only when a task is updated.
SQL Results Set	ops_sql_results	Contains output from SQL tasks.
SQL Warnings Set	ops_sql_warnings	Contains warnings returned by executed SQL statements.
Stored Procedure Parameters	ops_stored_proc_param	Contains Parameter records associated with Stored Procedure tasks.
Stored Procedure Parameters Versions	ops_stored_proc_param_v	Contains previous versions of Parameter records associated with Stored Procedure tasks. (Versions are created only when the task is updated.
Subscription	ops_subscription	(For internal use only.)
System Operations	ops_system_operation	Contains details about System Operation actions.
System Operations Versions	ops_system_operation_v	Contains details about previous versions of System Operation actions. (Versions of records are created only when a record is updated.)
All Tasks	ops_task	Contains details about tasks of every type, along with associated Task Instance information.
Application Control Tasks	ops_task_application_control	Contains details about Application Control tasks.
Application Control Task Versions	ops_task_application_control_v	Shows previous versions of Application Control tasks.
Email Tasks	ops_task_email	Contains details about Email tasks.
Email Task Versions	ops_task_email_v	Contains previous versions of Email task records.
Email Monitor Tasks	ops_task_email_monitor	Contains details about Email Monitor tasks.
Email Monitor Task Versions	ops_task_email_monitor_v	Contains previous versions of Email Monitor task records.
Advanced Criteria	ops_task_email_criteria	Contains details about Email Monitor task Advanced Criteria.
File Monitors	ops_task_file_monitor	Contains details about File Monitor tasks.
File Monitor Versions	ops_task_file_monitor_v	Contains previous versions of File Monitor task records.
File Transfer Tasks	ops_task_ftp	Contains details about File Transfer tasks.
File Transfer Tasks Versions	ops_task_ftp_v	Contains previous versions of File transfer task records.
FTP File Monitors	ops_task_ftp_file_monitor	Contains details about FTP File Monitor tasks.
FTP File Monitors Versions	ops_task_ftp_file_monitor_v	Contains previous versions of FTP File Monitor task records.
Universal Command Tasks	ops_task_indesca	Contains details about Universal Command tasks.
Universal Command Task Versions	ops_task_indesca_v	Contains previous versions of Universal Command task records.

Manual Tasks	ops_task_manual	Contains details about Manual tasks.
Manual Task Versions	ops_task_manual_v	Contains previous versions of Manual task records.
Task Monitors	ops_task_monitor	Contains details about Task Monitor tasks.
Task Monitors Versions	ops_task_monitor_v	Contains previous versions of Task Monitor task records.
PeopleSoft Tasks	ops_task_peoplesoft	Contains PeopleSoft task records.
PeopleSoft Parameters	ops_task_peoplesoft_rt_param	Contains Parameter records associated with PeopleSoft tasks.
PeopleSoft Parameters Versions	ops_task_peoplesoft_rt_param_v	Contains previous versions of Parameter records associated with PeopleSoft tasks. (Versions are created only when the task is updated.
PeopleSoft Tasks Versions	ops_task_peoplesoft_v	Contains previous versions of PeopleSoft task records.
Task Run Criteria	ops_task_run_criteria	Contains run criteria information for tasks within Workflows.
Task Run Criteria Versions	ops_task_run_criteria_v	Contains previous versions of run criteria information for tasks within Workflow. (Versions are created only when the Workflow task is updated.
SAP Tasks	ops_task_sap	Contains SAP task records.
SAP Tasks Versions	ops_task_sap_v	Contains previous versions of SAP task records.
Timer Tasks	ops_task_sleep	Contains details about Timer tasks.
Timer Tasks Versions	ops_task_sleep_v	Contains previous versions of Timer tasks records.
SQL Tasks	ops_task_sql	Contains details about SQL tasks.
SQL Tasks Versions	ops_task_sql_v	Contains previous versions of SQL tasks records.
Mutually Exclusive	ops_task_to_exclusive	Contains relationship information between tasks and mutually exclusive tasks; that is, which tasks are mutually exclusive with each other.
Mutually Exclusive Versions	ops_task_to_exclusive_v	Contains previous versions of relationship information between tasks and mutually exclusive tasks.
Stored Procedure Tasks	ops_task_stored_proc	Contains details about Stored Procedure tasks.
Stored Procedure Tasks Versions	ops_task_stored_proc_v	Contains previous versions of Stored Procedure tasks records.
System Monitors	ops_task_system_monitor	Contains System Monitor task records.
System Monitors Versions	ops_task_system_monitor_v	Contains previous versions of System Monitor task records.
Task Virtual Resources	ops_task_to_resource	Contains relationship information between Virtual Resources and tasks; that is, which tasks are assigned to which Virtual Resources.
Task Virtual Resources Versions	ops_task_to_resource_v	Contains previous versions of relationship information between Virtual Resources and tasks.
Universal Tasks	ops_task_universal	Contains details about Universal tasks.

Universal Tasks Versions	ops_task_universal_v	Contains previous versions of Universal task records.
Linux/Unix Tasks	ops_task_unix	Contains details about Linux/Unix tasks.
Linux/Unix Tasks Versions	ops_task_unix_v	Contains previous versions of Linux/Unix task records.
All Tasks Versions	ops_task_v	Contains previous versions of all task records.
Variable Monitor Tasks	ops_task_variable_monitor	Contains details about Variable Monitor tasks.
Variable Monitor Tasks Versions	ops_task_variable_monitor_v	Contains previous versions of Variable Monitor task records.
Windows Tasks	ops_task_windows	Contains details about Windows tasks.
Windows Tasks Versions	ops_task_windows_v	Contains previous versions of Windows task records.
Workflow Tasks	ops_task_workflow	Contains details about Workflow tasks.
Task Workflow Dependencies	ops_task_workflow_edge	Contains information about the conditions specified between tasks in workflows.
Workflow Task Edges	ops_task_workflow_edge_v	Contains previous versions of information about the conditions specified among tasks in workflows. (New versions of records are created only when the Workflow task is updated.
Workflow Tasks Versions	ops_task_workflow_v	Contains previous versions of workflow task records.
Workflow Tasks Vertices	ops_task_workflow_vertex	Contains relationship information between tasks and workflows; that is, which tasks are in which workflows.
Workflow Tasks Vertices Versions	ops_task_workflow_vertex_v	Contains previous versions of the relationship between tasks and workflows. (Versions are created only when the workflow task is updated.
z/OS Tasks	ops_task_zos	Contains details about z/OS tasks.
Restart Criteria	ops_task_zos_rstrt_criteria	Contain information about z/OS task restart criteria.
Restart Criteria	ops_task_zos_rstrt_criteria_v	Contains previous versions of z/OS task restart criteria.
Step Conditions	ops_task_zos_stepcond	Contains details about z/OS task step conditions
Step Conditions	ops_task_zos_stepcond_v	Contains previous versions of z/OS task step conditions
z/OS Tasks Versions	ops_task_zos_v	Contains previous versions of z/OS task records.
Time Zones	ops_time_zone	Stores information on time zones.
Timer	ops_timer	(For internal use only.)
All Triggers	ops_trigger	Contains details about triggers of every type.
Application Monitor Triggers	ops_trigger_appl_monitor	Contains details about Application Monitor triggers.
Application Monitor Triggers Versions	ops_trigger_appl_monitor_v	Contains details about previous versions of Application Monitor triggers.

All Components	ops_trigger_component	Contains details about all Composite trigger components.
Email Monitor Components	ops_trigger_component_em	Contains details about Email Monitor components of Composite Triggers.
Email Monitor Components	ops_trigger_component_em_v	Contains details about previous versions of Email Monitor components of Composite Triggers.
File Monitor Components	ops_trigger_component_fm	Contains details about File Monitor components of Composite Triggers.
File Monitor Components	ops_trigger_component_fm_v	Contains details about previous versions of File Monitor components of Composite Triggers.
Time Components	ops_trigger_component_time	Contains details about Time components of Composite Triggers.
Time Components	ops_trigger_component_time_v	Contains details about previous versions of Time components of Composite Triggers.
Variable Monitor Components	ops_trigger_component_vm	Contains details about Variable Monitor components of Composite Triggers.
Variable Monitor Components	ops_trigger_component_vm_v	Contains details about previous versions of Variable Monitor components of Composite Triggers.
Task Monitor Components	ops_trigger_component_tm	Contains details about Task Monitor components of Composite Triggers.
Task Monitor Components	ops_trigger_component_tm_v	Contains details about previous versions of Task Monitor components of Composite Triggers.
All Components	ops_trigger_component_v	Contains details about previous versions of all Composite trigger components.
Composite Triggers	ops_trigger_composite	Contains details about Composite trigger records.
Composite Triggers	ops_trigger_composite_v	Contains details about previous versions of Composite trigger records.
Cron Triggers	ops_trigger_cron	Contains details about Cron trigger records.
Cron Trigger Versions	ops_trigger_cron_v	Contains previous versions of Cron trigger records.
Email Monitor Triggers	ops_trigger_em	Contains details about Email Monitor trigger records.
Email Monitor Trigger Versions	ops_trigger_em_v	Contains previous versions of Email Monitor trigger records.
File Monitor Triggers	ops_trigger_fm	Contains details about File Monitor triggers.
File Monitor Triggers Versions	ops_trigger_fm_v	Contains previous versions of File Monitor trigger records.
Forecasts	ops_trigger_forecast	Contains details about trigger forecasts.
Manual Triggers	ops_trigger_manual	Contains Manual trigger records.
Manual Trigger Versions	ops_trigger_manual_v	Contains previous versions of Manual trigger records.
Temporary Triggers	ops_trigger_temp	Contains details about Temporary triggers.
Temporary Triggers Versions	ops_trigger_temp_v	Contains previous versions of Temporary trigger records.

Time Triggers	ops_trigger_time	Contains details about Time triggers.
Time Triggers Versions	ops_trigger_time_v	Contains previous versions of Time trigger records.
Task Monitor Triggers	ops_trigger_tm	Contains details about Task Monitor triggers.
Task Monitor Triggers Versions	ops_trigger_tm_v	Contains previous versions of Task Monitor trigger records.
All Triggers Versions	ops_trigger_v	Contains previous versions of Trigger records.
Variable Monitor Triggers	ops_trigger_vm	Contains details about Variable Monitor triggers.
Variable Monitor Triggers Versions	ops_trigger_vm_v	Contains previous versions of Variable Monitor trigger records.
Linux/Unix Agents	ops_unix_agent	Contains details about Linux/Unix agent resources.
Linux/Unix Agent Clusters	ops_unix_agent_cluster	Contains details about Linux/Unix agent clusters.
Linux/Unix Agents In Cluster	ops_unix_agent_cluster_join	Shows relationship information between Unix agents and Unix agent clusters, that is, which agents belong to which clusters.
Linux/Unix Agents In Cluster Versions	ops_unix_agent_cluster_join_v	Shows previous versions of relationship information between Unix agents and Unix agent clusters.
Linux/Unix Agent Clusters Versions	ops_unix_agent_cluster_v	Contains previous versions of Linux/Unix cluster records.
Universal Templates	ops_unv_tmplt	Contains details about Universal Templates.
Universal Template Fields	ops_unv_tmplt_field	Contains details about Universal Template Fields.
Universal Template Field Choice Values	ops_unv_tmplt_field_choice	Contains details about Universal Templates. (Requires ops_admin or ops_universal_template_admin role.)
Users	ops_user	Contains details about User records.
Group Members	ops_user_grmember	Contains relationship information between Universal Controller User Groups and Universal Controller Users; that is, which Users belong to which Groups.
Groups	ops_user_group	Contains details about Universal Controller User Groups.
User Roles	ops_user_has_role	Contains details about Users and Roles, including which Users have which Roles.
User Preferences	ops_user_preference	Contains information about Universal Controller User Preferences.
User Roles	ops_user_role	Contains information about available user roles.
User Roles Contains	ops_user_role_contains	Contains information about roles that comprise parent roles user roles.
User Tokens	ops_user_token	Contains information about user sessions.
Variables	ops_variable	Contains details about Global variables, entered by selecting Variables from the Navigation pane.
Set Variables	ops_variable_action	Contains details about Set Variable actions.

Set Variables	ops_variable_action_v	Contains previous versions of Set Variable actions.
Variables Versions	ops_variable_v	Contains previous versions of Global variables.
Virtual Resources	ops_virtual_resource	Contains details about Virtual resource records.
Virtual Resources Versions	ops_virtual_resource_v	Contains previous versions of Virtual resources.
Widgets	ops_widget	Contains details about all Widgets.
Widgets Activity	ops_widget_activity	Contains details about Activity Widgets.
Widgets Report	ops_widget_report	Contains details about Report Widgets.
Widgets System	ops_widget_system	Contains details about System Widgets.
Windows Agents In Cluster	ops_win_agent_cluster_join	Shows relationship information between Windows agents and Windows agent clusters, that is, which agents belong to which clusters.
Windows Agents In Cluster Versions	ops_win_agent_cluster_join_v	Shows previous versions of relationship information between Windows agents and Windows agent clusters.
Windows Agents	ops_windows_agent	Contains details about Windows agents.
Windows Agent Clusters	ops_windows_agent_cluster	Contains details about Windows agent clusters.
Windows Agent Clusters Versions	ops_windows_agent_cluster_v	Contains previous versions of Windows Agent Cluster records.
z/OS Agents	ops_zos_agent	Contains details about z/OS agents.
All Step Actions	ops_zos_step_action	Contains details about z/OS step actions.
System Operations	ops_zos_step_action_sysop	Contains details about z/OS System Operation step actions.
System Operations Versions	ops_zos_step_action_sysop_v	Contains details about previous versions of z/OS System Operation step actions. (Versions are created only when a record is updated.)
Step Actions	ops_zos_step_action_v	Contains previous versions of z/OS step actions. (Versions are created only when a record is updated.)

Universal Templates

Universal Templates

The following pages are provided for Universal Templates:

- Universal Templates Overview
- Creating a Universal Template
- Copying Universal Templates

Universal Templates Overview

- Introduction
- Universal Template Scripts
- Universal Template Fields
- Universal Template Variables
- Setting Up Universal Templates and Tasks
- Restrictions on Universal Template Changes
  - Restriction Conditions
  - List of Restrictions

Introduction

Universal Templates allows you to create the templates on which Universal Tasks are based.

Within each Universal Template, you:

- Enter a script that will be executed by any Universal Task based on that Universal Template.
- Create Fields that the Universal Controller:
  - Assigns matching variables for use in the Universal Template script.
  - Adds matching fields to the Details of any Universal Task that you create based on that Universal Template.

When you create a Universal Template, the Controller creates a Universal Task type, under the Universal Tasks folder in the Automation Center navigation pane, based on that Universal Template. When you create a Universal Task for that Universal Task type, its Details display - among other fields - the fields that you created in the Universal Template. When you run the Universal Task, it executes the script in the Universal Template, and the variables in the script are resolved to the user-defined values of their matching fields in the Universal Task instance.

Note
Administration of Universal Templates requires the ops_universal_template_admin or ops_admin role.

Universal Template Scripts

A Universal Template can contain any user-defined script. Any script variables to be resolved to Universal Task field values when the task executes the script must be in a specific format.

If you change the script in a Universal Template, the Universal Tasks based on that template execute that changed script when they are run. With Universal Task / Universal Template, you do not have to change the scripts in multiple tasks, just in the template.

Universal Template Fields

For each Field that you create for a Universal Template, the Controller:

- Assigns it a matching variable for use in the Universal Template script.
- Adds a matching field to the Details of all Universal Tasks based on that template.

When a Universal Task is run, it executes the script, and the system-assigned script variables are resolved to the user-defined values of their matching fields in the Universal Task instance.

You can enter seven types of Fields in a Universal Template:

- Text
- Integer
- Boolean
- Choice
- Credential
- Script
- Array

For each Field, you specify information regarding its appearance in the task Details for any Universal Task based on that template, including:

- Value
- Location
- Required or optional

Note
You must refresh the list of Universal Tasks that are based on a Universal Template in order for any changes to the Universal Template Fields to be applied to the Universal Task Details.

For detailed information about these Fields, see Creating Universal Template Fields.

Universal Template Variables

For each Field that you create for a Universal Template, the Controller assigns it a variable and adds the Field to the Details of all Universal Tasks based on that template.

These system-assigned variables are provided for use in the Universal Template script. When a Universal Task based on the template is run, it executes the script in the template, and all system-assigned variables in the script are resolved to the values of their matching fields in the Universal Task.

The system-assigned variables that are available for use in a Universal Template script must be in this format: `ops_<Variable Prefix>_<Field Name>`

`ops_`	Controller prefix used for all built-in variables and system-assigned variable.
`<Variable Prefix>`	Value of the user-defined Variable Prefix field in the Universal Template Details, followed by an underscore (_) character.
`<Field Name>`	Name (not Label) of the user-defined Universal Template field to which the Controller assigns this variable.

Note
If a Universal Template Field is required (either directly via the Required field in the Universal Template Field Details or indirectly via the Required If Field field), and its matching field in the Details of a Universal Task Instance is undefined after variable resolution, the Universal Task Instance will transition into the Start Failure status.

If a Universal Template Field is not Required, and its matching field in Details of a Universal Task Instance is undefined after variable resolution, the system-assigned variable for that Field will resolve to blank.

If a Universal Template Field with Type = Choice has a Choice with a NULL (or blank) Value at run time, a Universal Task Instance will transition into the Start Failure status.

Setting Up Universal Templates and Tasks

Step 1	Create a Universal Template, which includes selecting the type of Agent(s) on which Universal Tasks based on this Universal Template can be run, and a variable prefix used for script variables that you want resolved when a Universal Task executes the script in this Universal Template.
Step 2	Enter a script in the Universal Template that all Universal Tasks based on this Universal Template will execute when they are run.
Step 3	After you have entered/selected any other desired values in the Universal Template Details, save the Universal Template.
Step 4	For each parameter in the script that you want to replace with a variable, create a Universal Template Field of an appropriate Field type. The Controller automatically assigns a variable (format: `ops_<Variable Prefix>_<Field Name>`) to each Field, using the variable prefix that you specified in Step 1, and will place those Fields in the Details of all Universal Tasks based on this Universal Template.
Step 5	Replace the appropriate parameters in the script with the system-assigned variables.
Step 6	Update the Universal Template. Now that the Universal Template has one or more defined Fields, the Controller creates a Universal Task type for it and adds the Universal Task type to the Automation Center navigation pane. (You must refresh the Automation Center navigation pane in order to see the new Universal Task type.
Step 7	Create a Universal Task for that Universal Task type. The Universal Task Details will contain the fields that you created in the Universal Template for that Universal Task type.
Step 8	Enter/change values in the Universal Task fields that match the Universal Template fields, based on how you want their matching variables in the script to be resolved.
Step 9	Run the task, which executes the script. The variables in the script are resolved to the values of their matching fields in the Universal Task.

Restrictions on Universal Template Changes

There are restrictions on the changes that you can make on Universal Templates, because some changes (such as adding a new field with a default value), can automatically change existing Universal Task and Universal Task Instances based on that Template.

Some Universal Template changes are restricted, based on the existence of Universal Tasks and Universal Task Instances.

Universal Templates do not have versioning; therefore, reverting a Universal Template change must be done manually, and the restrictions still apply.

Some changes cannot be reverted; for example, you cannot broaden the Agent Type, and then narrow it. Universal Tasks do have versioning, but changes to a Universal Template that automatically change a Universal Task, such as adding a new field with a Default Value, do not generate a new version.

Any promoted Bundle that includes Universal Template changes cannot be restored.

Restriction Conditions

Restrictions on changing Universal Templates (see List of Restrictions, below) depend on the following conditions:

Condition	Restrictions
Both Universal Tasks and Universal Task Instances exist.	All restrictions apply.
Universal Tasks exist, but no Universal Task Instances exist.	All restrictions apply.
Universal Task Instances exist, but no Universal Tasks exist.	All restrictions apply if the Universal Task Instances are still active.
Neither Universal Tasks nor Universal Task Instances exist.	None of the restrictions apply unless otherwise noted.

List of Restrictions

Action	Restriction
For Universal Templates	The following Delete and Update actions refer to Universal Templates and the fields in Universal Template Details.
Delete a Template	• Prohibited.
Update a Template	
• Name	• Allowed.
• Variable Prefix	• Allowed; Requires a corresponding Script change.
• Agent Type	• Broadening Allowed (Windows to Any, Linux/Unix to Any) • Narrowing Not Allowed (Any to Windows, Any to Linux/Unix, Windows to Linux/Unix, Linux/Unix to Windows)
• Use Common Script • Script • Linux/Unix Script • Windows Script • Windows Script Type	• Allowed.
For Universal Template Fields	The following Add, Delete, and Update actions refer to the user-defined Fields that are added to a Universal Template.

Add a Field	• Allowed (with conditions); Requires a corresponding Script change. • Prohibited if either Required or Required If Field/Required If Field Value(s) are specified. • Default Value applied to all Universal Tasks, but not to Universal Task Instances.

Delete a Field	• Allowed (with conditions); Requires a corresponding Script change.
	• Prohibited if the Field is the only Field in the Universal Template Details; User can either:
	  • Update the only Field.
	  • Create a new Field prior to deleting the only Field.
	
	Note
	This restriction applies regardless of the existence of Universal Task/Task Instances associated with the Universal Template.
	
	• NULL value is applied to deleted Text, Integer, Choice, and Credential Fields in all Universal Tasks, but not Universal Task Instances.
	• A boolean False value is applied to a deleted Boolean Field for all Universal Tasks, but not Universal Task Instances.

Update a Field	
• Name	• Prohibited.
• Required	• Allowed (with conditions). • Unchecking the Required field; Allowed (without conditions). • Checking the Required field; Allowed only if all Universal Tasks based on the Template have a value specified for this Template Field (does not apply to Universal Task Instances).
• Require If Field • Require If Field Value(s)	• Allowed (with conditions). • Removing a Require If Field specification; Allowed (without conditions). • Adding a Require If Field specification; Allowed only if all Universal Tasks based on this Template have a value specified for this Template Field (condition does not apply to Universal Task Instances).
• Type	• Prohibited.
• Mapping	• Prohibited.
• Default Value	• Allowed. • No Universal Task data will be updated; multi-update can be performed to apply any required changes to pre-existing Universal Task data.

• Length	• Allowed. • No Universal Task data will be updated, as it may not comply with updated Length constraint.
• Minimum • Maximum	• Allowed. • No Universal Task data will be updated, as it may not comply with updated Minimum/Maximum constraint.
• Boolean Value Type • Boolean Yes Value • Boolean No Value	• Allowed.

• Field Display:
  • Label
  • Hint
  • Sequence
  • Form Column Span
  • Form Start Row
  • Form End Row
  • Add To Default List View
	• Allowed.

For Universal Template Field Choices	The following Add, Delete, and Update actions refer to the Choices that are defined for a Universal Template Field type of Choice.
Add a Choice	• Allowed.

Delete a Choice	• Allowed (with conditions).
	• Prohibited if the Template Field Choice is the only Choice; user can either:
	  • Update the Choice Value.
	  • Create a new Choice prior to removing the Choice.
	
	Note
	This restriction applies regardless of the existence of Universal Task/Task Instances associated with the Universal Template.
	
	• Any Universal Tasks using the Choice will still display the value, and substitute the old value into the Script; however, the drop-down will no longer display that Choice as an option.

Update a Choice	
• Value	• Allowed • Any Universal Task using the previous value will be updated with the new value, but not Universal Task Instances.

• Use Value For Label	• Allowed.
• Label	• Allowed.
• Sequence	• Allowed.

Creating a Universal Template

- Introduction
- Creating a Universal Template
  - Universal Template Details
  - Universal Template Details Field Descriptions
- Creating Universal Template Fields
  - Field Details Field Descriptions
- Creating Universal Template Field Choices
  - Choice Details Field Descriptions

Introduction

This page tells you how to create a Universal Template, Universal Template Fields, and Universal Template Field Choices.

You must create Universal Templates in order to create Universal Tasks. For each Universal Template that you create, Universal Controller creates a Universal Task type for which you can create one or more Universal Tasks.

Each Universal Field that you create for a Universal Template becomes a field in every Universal Task based on the corresponding Universal Task type.

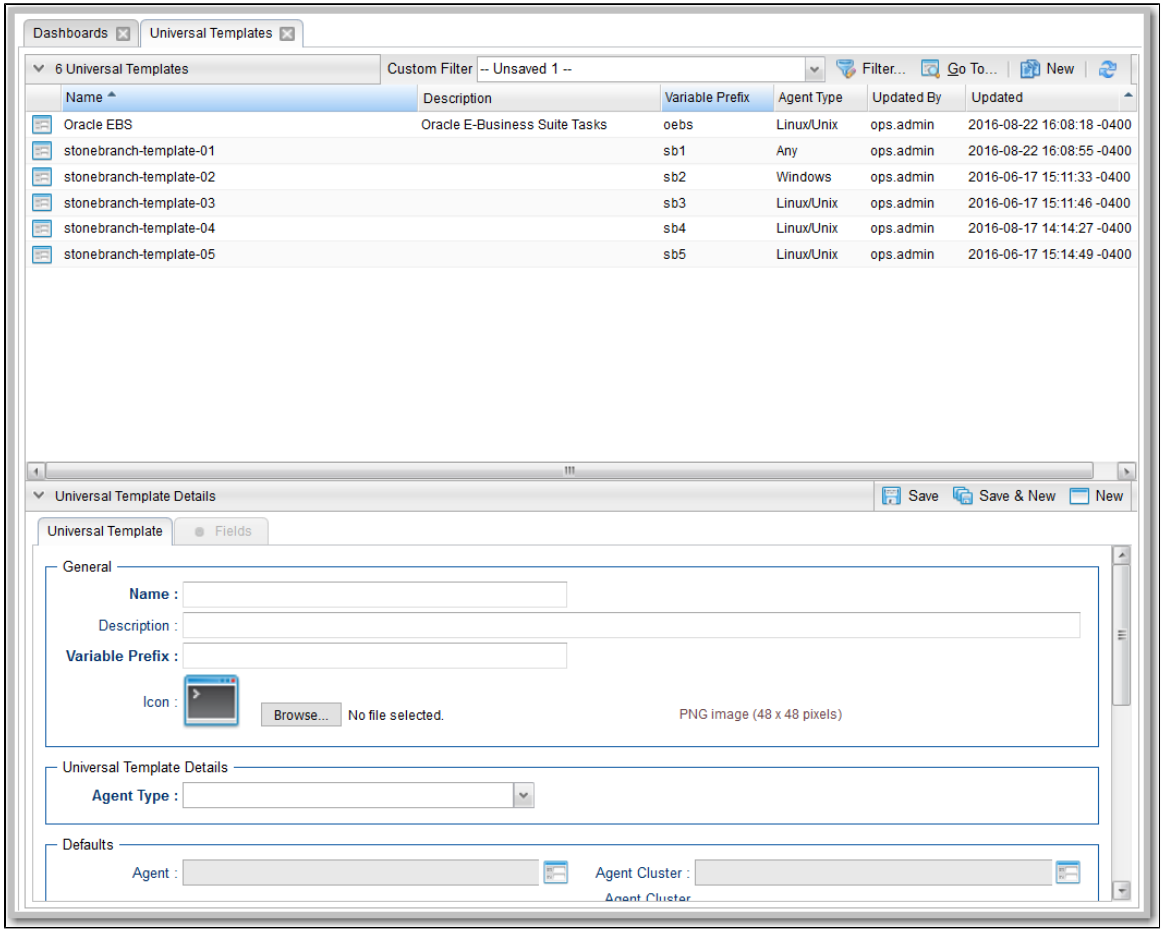
If the Universal Template Field that you create is a Choice (drop-down list) field, you must create the choices.

For detailed information on Universal Templates and Fields, see Universal Templates Overview.

Creating a Universal Template

Step 1 From the Administration navigation pane, select **Configuration > Universal Templates**. The Universal Templates list displays.

Below the list, Universal Template Details for a new Universal Template displays.



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

- Required fields display in **boldface**.
- Default values for fields, if available, display automatically.

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

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

Step 3	Click a **Save** button. The template is added to the database, and all buttons and tabs in the Universal Template Details are enabled.

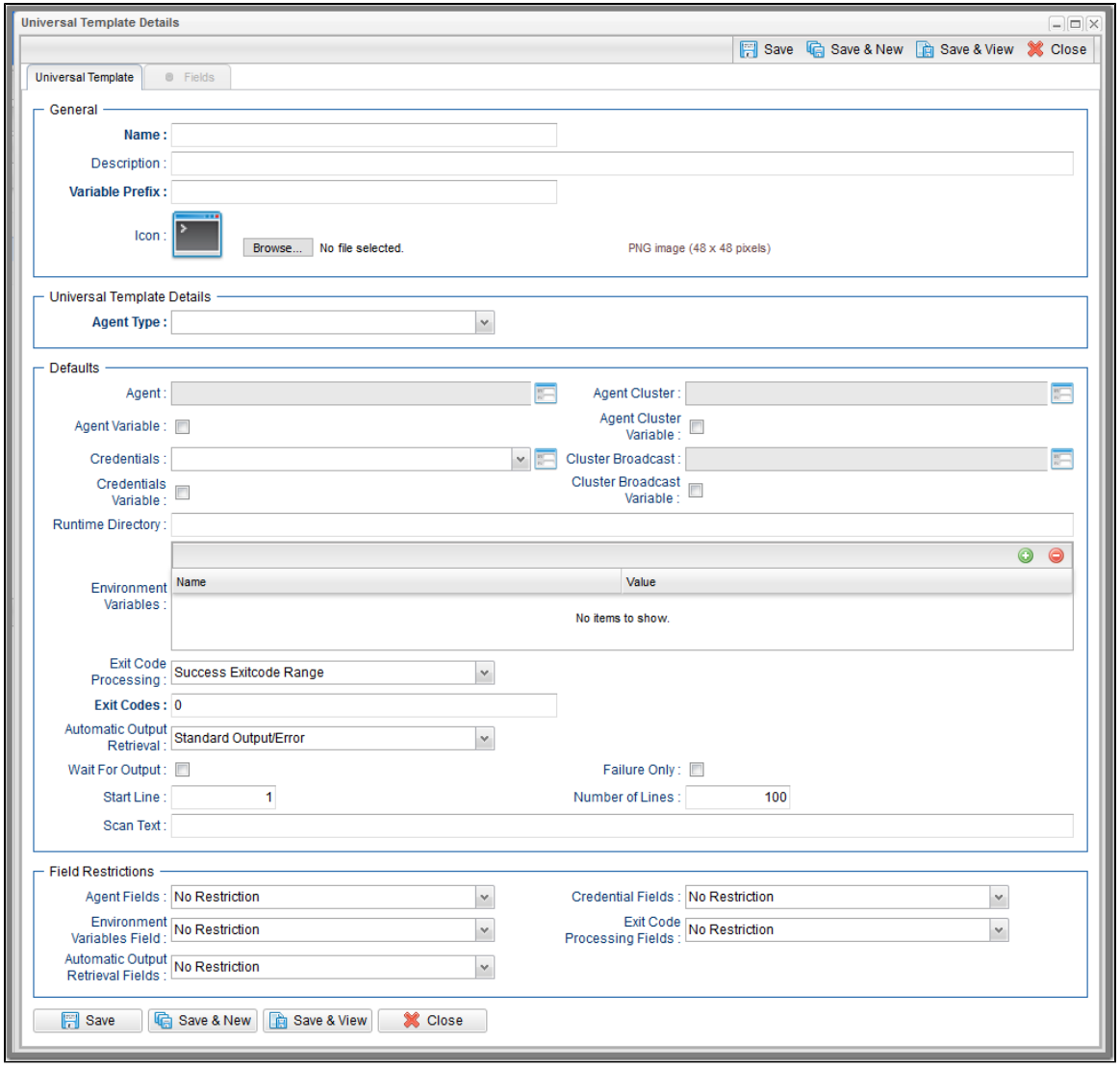
Note
To open an existing record on the list, either:

- 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).

Universal Template Details

The following Universal Template Details is for a new Universal Template, which does not yet contain any user-defined Fields. (See Creating Universal Template Fields for an existing Universal Template Details containing user-defined fields.)

Depending on the values that you enter / select for these fields, more (or less) other fields may display. See the field descriptions, below, for a description of all fields that may display in the Universal Template Details.



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

Universal Template Details Field Descriptions

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

Field Name	Description
General	This section contains general information about the template.
Name	Name of this Universal Template.
Description	Description of this Universal Template.
Variable Prefix	Variable prefix to append to the default prefix (ops_) for the system-assigned variables that are provided for the user-defined Fields in this Universal Template. The format of a system-assigned variable is: `ops_`, followed by the specified Variable Prefix, followed by the underscore character _, followed by the **Name** (not the **Label**) of the user-defined Field. For example: `ops_oebs_username`. System-assigned variables are meant to be incorporated into the Script specified for the Universal Template. All system-assigned variables embedded in a Universal Template Script will be resolved when the Universal Task created from the template executes the Script.
Icon	Icon used for all Universal Tasks based on this Universal Template. The icon displays in the following locations: • Automation Center Navigation Pane. • Automation Center Navigation Tree Configuration. • **New** button drop-down list on the All Tasks list task bar. • **New** button on the Universal Tasks list task bar. • Workflow Editor canvas and Task Find list. A default icon displays in the Icon field for every Universal Template (see Universal Template Details, above). If you want to select a custom icon, click the **Browse** button and then search and select that icon. Any custom icon must be a PNG image, 48 x 48 pixels. **Note** The button that lets you search for an icon file, and the text message alongside it, is browser-dependent. In this example, which shows a **Browse...** button and **No file selected.** text, the browser was Firefox. After you select a custom icon, the file name for that icon displays next to the **Browse** button. When you save / update the Universal Template, the icon displays in the **Icon** field, but the file name no longer displays. If you selected a custom icon but want to restore the default icon, right-click anywhere in the Universal Template Details and, in the Action menu, click **Restore Default Icon**.
Universal Template Details	This section contains assorted detailed information about the template.
Agent Type	Type of Agent on which Universal Tasks based on this template can be run. Options: • Any • Linux/Unix • Windows
Use Common Script	If Agent Type is Any; Indication that the specified Script can be executed by both Linux/Unix and Windows Agents.

Script	If Use Common Script is enabled; Script to be executed by the specified Agent.
Linux/Unix Script	If Agent Type is Linux/Unix or Any (and Use Common Script is not enabled); Script to be executed by the Linux/Unix Agent.
Windows Script	If Agent Type is Windows or Any (and Use Common Script is not enabled); Script to be executed by the Windows Agent.
Windows Script File Type	If Agent Type is Windows or Any; Type of Windows script to be executed by the Windows Agent. Options: • bat • cmd • js • ps1 • py • uapy • vbs • wsf • Other... (any user-specified script file type)
Defaults	This section contains assorted default fields that will display for every Universal Task based on this template.
Agent	Name of the Agent resource that identifies the machine where the operation will run.
Agent Cluster	Group of Agents, one of which the Controller will choose to run this task (compare with Cluster Broadcast). You can specify an agent cluster in addition to or in place of a specific Agent. If you specify an Agent and an agent cluster, the Controller first tries to run the task on the specific agent. If the Agent is not available, the Controller reverts to the agent cluster. See Agent Clusters for more information.
Agent Variable	Indication of whether the Agent field is a reference field for selecting a specific Agent (unchecked) or a text field for specifying the Agent as a variable (checked). Use the format: ${variable name}. The variable must be a supported type as described in Variables and Functions. **Note** When updating multiple Tasks, to change from using an Agent reference to using an Agent variable, you must change the **Agent Variable** field to **Yes** and specify the Agent variable in the **Agent Unresolved** field. Conversely, to change from using an Agent variable to using an Agent reference, you must change the **Agent Variable** field to **No** and specify the Agent reference in the **Agent** field.

Agent Cluster Variable	Indication of whether the Agent Cluster field is a reference field for selecting a specific Agent Cluster (unchecked) or a text field for specifying the Agent Cluster as a variable (checked). Use the format: ${variable name}. The variable must be a supported type as described in Variables and Functions. **Note** When updating multiple Tasks, to change from using an Agent Cluster reference to using an Agent Cluster variable, you must change the **Agent Cluster Variable** field to **Yes** and specify the Agent Cluster variable in the **Agent Cluster Unresolved** field. Conversely, to change from using an Agent Cluster variable to using an Agent Cluster reference, you must change the **Agent Cluster Variable** field to **No** and specify the Agent Cluster reference in the **Agent Cluster** field.
Credentials	Credentials under which an Agent runs this task. These Credentials override any Credentials provided in the Agent Details for any Agent running this task. If the user does not have a login shell, add a - character in front of the runtime credentials name. The Controller will provide a shell for that user and strip the - character from the name.
Credentials Variable	Indication of whether the Credentials field is a reference field for selecting a specific Credential (unchecked) or a text field for specifying the Credential as a variable (checked). Use the format: ${variable name}. The variable must be a supported type as described in Variables and Functions. **Note** When updating multiple Tasks, to change from using a Credentials reference to using a Credentials variable, you must change the **Credentials Variable** field to **Yes** and specify the Credentials variable in the **Credentials Unresolved** field. Conversely, to change from using a Credentials variable to using a Credentials reference, you must change the **Credentials Variable** field to **No** and specify the Credentials reference in the **Credentials** field.
Cluster Broadcast	Group of Agents, all of which will run this task (compare with Agent Cluster). You can specify a Cluster Broadcast in place of a specific Agent and/or agent cluster. Each instance of the task running on its own Agent becomes a separate task instance record in the database and displays separately on the Activity Monitor.
Cluster Broadcast Variable	Indication of whether the Cluster Broadcast field is a reference field for selecting a specific Cluster Broadcast (unchecked) or a text field for specifying the Cluster Broadcast as a variable (checked). Use the format: ${variable name}. The variable must be a supported type as described in Variables and Functions.

Run with Highest Privileges	If Agent Type is Windows or Any; Execute the task using an elevated privileges token, rather than one subject to User Account Control (UAC) restrictions. An elevated token allows a process to execute with all the privileges available to its specified credentials. For example, a task executed with an administrative account will behave as though it received permission via a UAC dialog to perform a privileged operation. This option will **not** give a user account privileges that have are not already granted to it. For example, taking ownership of a file is a privileged operation by default. A task will still fail even with this option selected if it is run with a regular user account that has not been granted the ability to change file ownership. **Note** This option only will affect tasks executed on Windows systems that support User Account Control (UAC). It will have no affect on tasks run on Windows releases prior to Vista (for example, Windows XP, Server 2003).
Runtime Directory	Directory from which the application should be executed. Variables supported.
Interact with Desktop	If Agent Type is Windows or Any; Specification that a Universal Task running an application with a GUI will require some manual actions from a user (for example, clicking buttons or entering values). **Note** This option is effective only for tasks executed on Windows XP or Server 2003. Windows Vista introduced the desktop isolation feature, which prevents tasks from accessing the interactive desktop session on Vista, Windows 7, Server 2008, Windows 8, and Server 2012. The Windows agent will execute the task, but the **Interact with Desktop** option has no effect. Therefore, an interactive application's GUI will not be visible on those platforms.
Create Console	If Interact with Desktop is enabled; Allocates a new console for the process, rather than having it inherit one.
Environment Variables	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.

Exit Code Processing	Specifies how the Controller should determine whether the executed command failed or completed successfully. Options: • Success Exitcode Range Command is considered completed successfully if its exit code falls within the range specified in the Exit Codes field. • Failure Exitcode Range Command is considered failed if its exit code falls within the range specified in the Exit Codes field. • Success Output Contains Command is considered completed successfully if its output contains the text specified in the Scan Output For field. • Failure Output Contains Command is considered failed if its output contains the text specified in the Scan Output For field. • Step Conditions (z/OS only) Command is considered completed successfully/failed if any of its specified condition codes falls within the range specified under the Step Conditions tab (see Creating Step Conditions).
Output Type	Required if Exit Code Processing = Success Output Contains or Failure Output Contains; type of output. Options: • Standard Output (STDOUT) • Standard Error (STDERR) • File
Scan Output For	Required if Exit Code Processing = Success Output Contains or Failure Output Contains; text for which the Controller should scan the output file. The Controller will process this field as a regular expression.
Output File (for Exit Code Processing)	Required if Output Type = File; path and file name of the output file that should be scanned for the text in the Scan Output For field.
Exit Codes	Required if Exit Code Processing = Success Exitcode Range or Failure Exitcode Range; range of exit codes. Format: Numeric. Use commas to list a series of exit codes; use hyphens to specify a range. Example: 1,5, 22-30. Variables are supported.

Automatic Output Retrieval	Specifies whether you want the Controller to automatically retrieve any output from the job and attach it to the task instance record. Options: • None Do not attach any output to the task instance record. • Standard Output Attach all standard output. • Standard Error Attach standard error output. • File Attach the file specified in the Output File field. • Standard Output/Error Attach all standard output and standard error output. **Note** Tasks specifying Automatic Output Retrieval will fail with Start Failure if the Agent Output Prohibited field is true in the Details of the specified Agent.
Wait For Output	If Automatic Output Retrieval = Standard Output, Standard Error, File, or Standard Output/Error, and Failure Only is not enabled (checked); Specification that the task should wait for the requested output before completing.
Failure Only	If Automatic Output Retrieval = Standard Output, Standard Error, File, or Standard Output/Error, and Wait For Output is not enabled (checked); Indication for whether output should be retrieved on task failure only.
Start Line	If Automatic Output Retrieval = Standard Output, Standard Error, File, or Standard Output/Error; Instructs the Controller to retrieve data beginning at the line indicated. • If a **Start Line** value is not specified, the default is 1. • If the **Start Line** value is **-1**, data will be retrieved starting at the end of the file.
Number of Lines	If Automatic Output Retrieval = Standard Output, Standard Error, File, or Standard Output/Error; Allows you to limit the retrieved data to the number of lines specified. If a Number of Lines value is not specified, the default is the value of the Retrieve Output Default Number Of Lines Universal Controller system property.
Scan Text	If Automatic Output Retrieval = Standard Output, Standard Error, File, or Standard Output/Error; Regex pattern that the Controller will search for a match for in STDOUT/STDERR or a specified file. The Controller will include the **Number of Lines** above and below the first line matched. if the Regex pattern is not found, the following message is returned: OPSWISE WARNING - Scan text string not found.
Output File (for Automatic Output Retrieval)	Required if Automatic Output Retrieval = File; path and file name containing the output that you want automatically retrieved and attached to the task instance.

Field Restrictions	This section lets you specify how fields in the Defaults section of the Universal Template are displayed in Universal Tasks based on the template. The Field Restrictions section places the fields in the Default section into five groups, as shown below: Agent, Credential, Environment Variables, Exit Code Processing, Automatic Output Retrieval. All fields in a field group share the same restriction. The Restriction options are the same for each field group: • No Restriction No restrictions apply to any fields in this group. {This is the default selection for all field groups.) • Read Only All fields in the field group display as Read Only in the Universal Task. • Hidden All fields in the field group are hidden in the Universal Task.
Agent Fields	Restriction for the following Agent fields: Agent, Agent Variable, Agent Cluster, Agent Cluster Variable, and Cluster Broadcast.
Credential Fields	Restriction for the following Credential fields: Credentials, Credentials Variable, Run with Highest Privileges, Runtime Directory, Interact with Desktop, and Create Console.
Environment Variables Fields	Restriction for the following Environment Variable field: Environment Variables.
Exit Code Processing Fields	Restriction for the following Exit Code Processing fields: Exit Code Processing, Exit Codes, Output Type, Scan Output for, and Output File.
Automatic Output Retrieval Fields	Restriction for the following Automatic Output Retrieval Fields: Automatic Output Retrieval, Wait For Output, Failure Only, Start Line, Number of Lines, Scan Text, and Automatic Output File.
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.

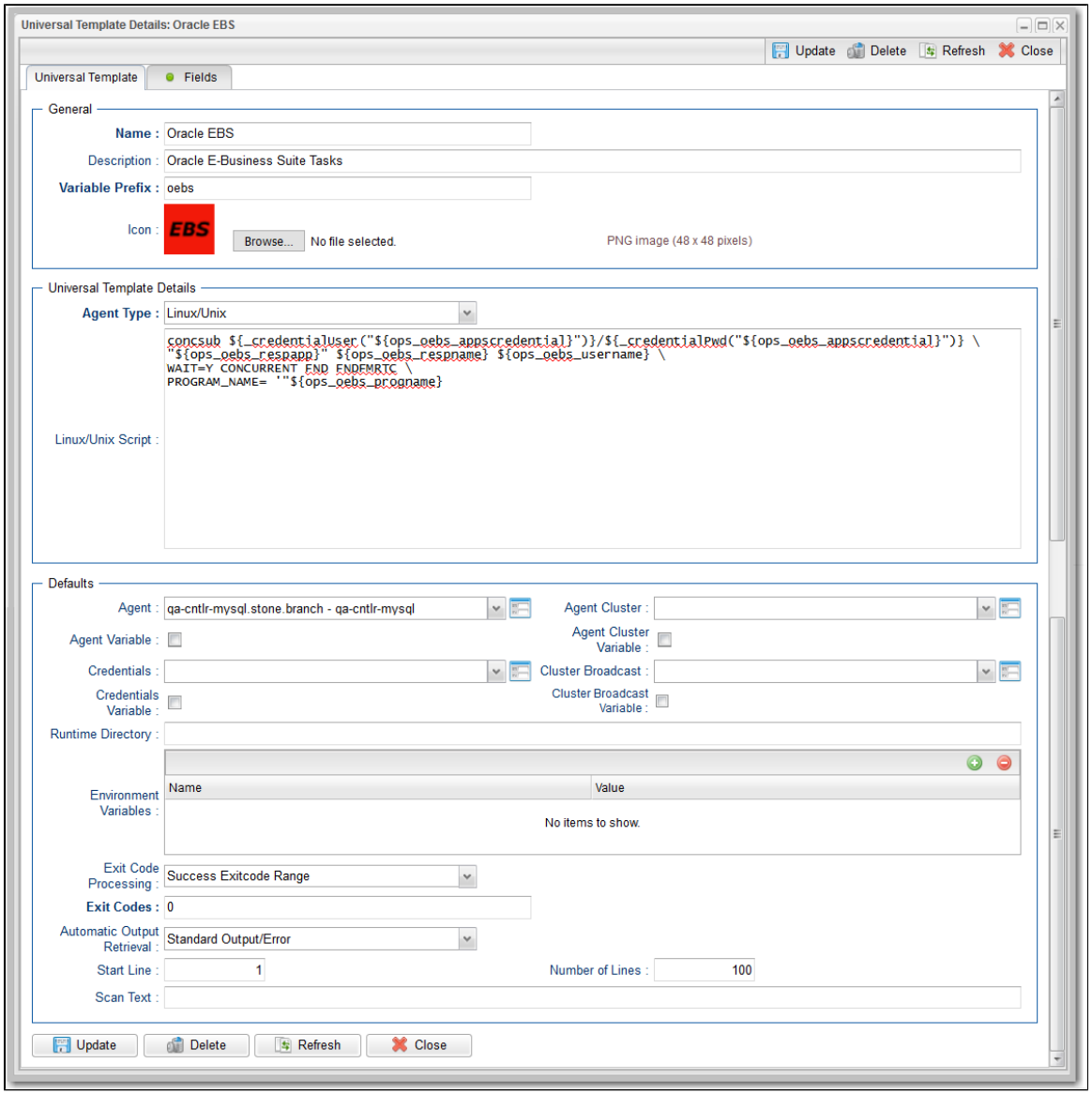
Automatic Output Retrieval	Specifies whether you want the Controller to automatically retrieve any output from the job and attach it to the task instance record. Options: • None Do not attach any output to the task instance record. • Standard Output Attach all standard output. • Standard Error Attach standard error output. • File Attach the file specified in the Output File field. • Standard Output/Error Attach all standard output and standard error output.
Buttons	This section identifies the buttons displayed above and below the Universal Template Details that let you perform various actions.
Save	Saves a new Universal Template record in the Controller database.
Save & New	Saves a new Universal Template record in the Controller database and redisplays empty Details so that you can create another Universal Template.
Save & View	Saves a new Universal Template 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	Updates the Universal Template record in the Controller database.
Delete	Delete the currently open Universal Template.
Refresh	Refreshes any dynamic data displayed in the Universal Template Details.
Close	For pop-up view only; closes the pop-up view of this Universal Template.
Tabs	This section identifies the tabs across the top of the Universal Template Details that provide access to additional information about the template.
Fields	Allows you to create the user-defined fields that will display in the Universal Tasks based on this template.

Creating Universal Template Fields

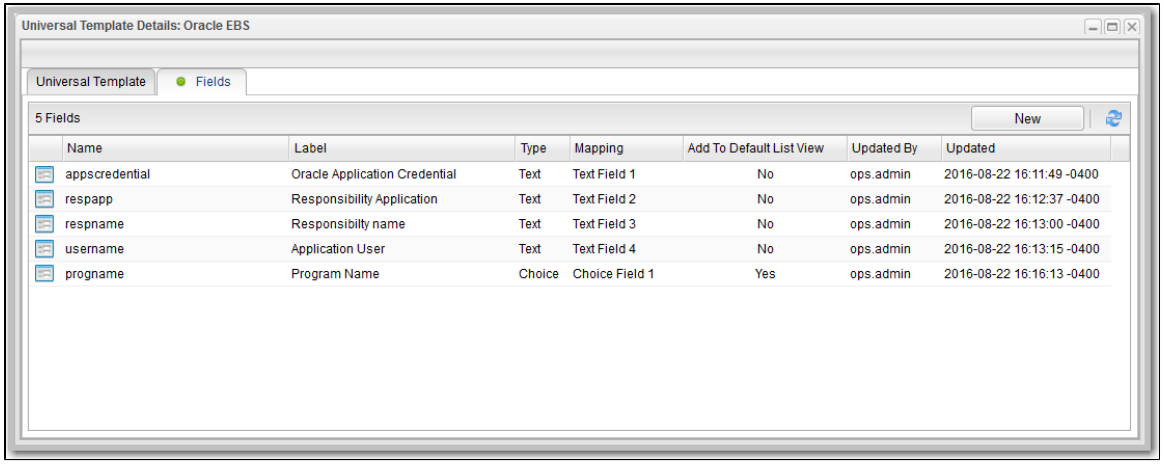
Universal Template Fields are assigned variables to be used in the Universal Template script and placed in the Details of any Universal Task based on the Universal Template.

Step 1	From the Administration navigation pane, select **Configuration > Universal Templates**. The Universal Templates list displays.

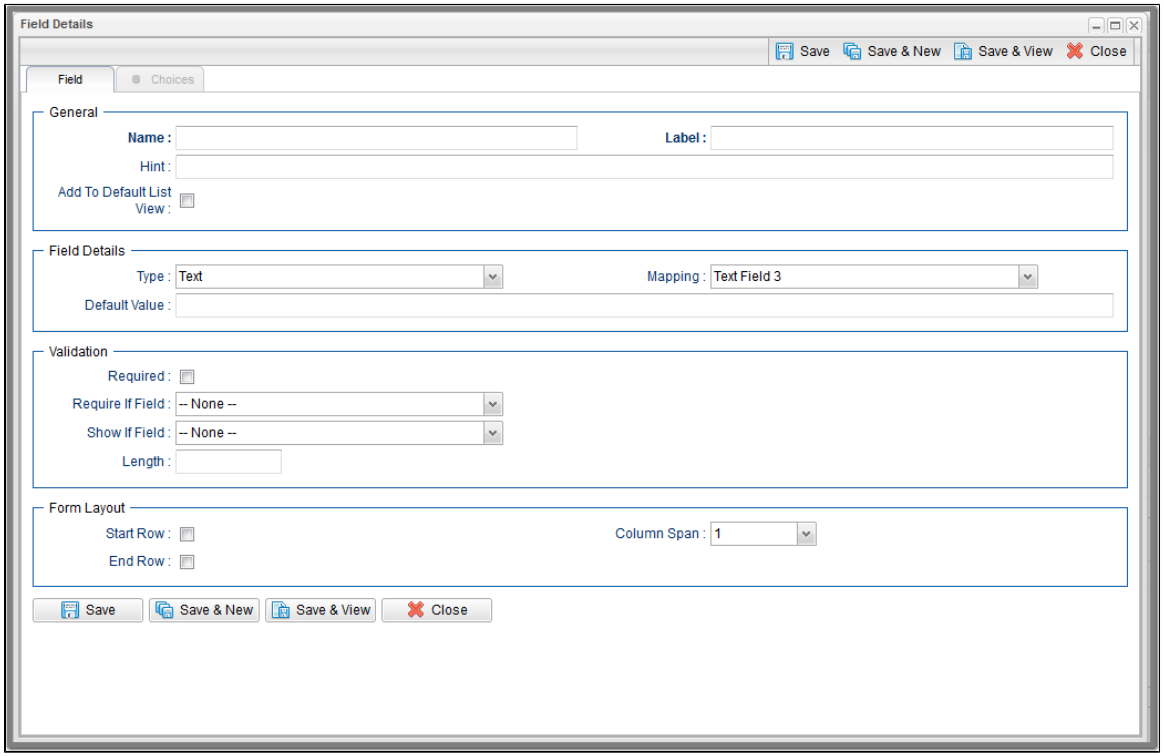
Step 2 Open an existing Universal Template for which you want to create Fields.



Step 3 Click the **Fields** tab to display the Fields list.



Step 4 Click the **New** button to display Field Details for a new Field.



Step 5	Enter / select Details for a new Field, using the field descriptions below as a guide. • Required fields display in **boldface**. • Default values for fields, if available, display automatically.
Step 6	Click a **Save** button. The Field is added to the list of Universal Template Fields. If you click the **Save** or **Save & View** button after creating a Choice Field (Type = Choice), the Choices tab (under which is an empty Choices list) is enabled, and an empty Choice Details automatically displays, which lets you create your first Choice. If you click the **Save & New** button after creating a Choice Field, in order to create one or more other Fields, you will have to manually open that Choice Field, click the enabled Choices tab, and then click the **New** button to create your first Choice.

Field Details Field Descriptions

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

Field Name	Description
General	This section contains general information about the Field.
Name	Name of this Field in the Controller database. (Name is used as the suffix for the Universal Template Variable based on this Field.) • Maximum 28 characters. • Name must begin with an alphabetic character and can consist of: alphabetics (a-z, A-Z), numerics 0-9, _ (underscore). • White spaces are not permitted. • Names are not case-sensitive.
Label	Name of this Field to be displayed in the Controller user interface.
Hint	Field hint for this Field in the Controller user interface.
Add To Default List View	If enabled; Specification that the Label of this Field will display, by default, in the list of Universal Tasks based on this template.
Field Details	This section contains detailed information about the Field.

Type	Field type for this Field. Options: • Text (default) • Integer • Boolean • Choice • Credential • Script • Array
Mapping	Field, from a pool of available fields provided for use in a Universal Template, that this Field is mapped to. Options: • If Type is Text: Text Field 1 - Text Field 20, Large Text Field 1 - Large Text Field 2. • If Type is Integer: Integer Field 1 - Integer Field 10. • If Type is Boolean: Boolean Field 1 - Boolean Field 10. • If Type is Choice: Choice Field 1 - Choice Field 10. • If Type is Credential: Credential Field 1 - Credential Field 4. • If Type is Script: Script Field 1 - Script Field 2. • If Type is Array: Array Field 1 - Array Field 2. **Note** A field (from the pool of fields provided for use in a Universal Template) that is mapped to a Universal Template Field is not available to be mapped to any other Universal Template Field.

Default Value	If Type is Text, Integer, or Choice; Default value for this Field. (Text and Choice: Maximum length = 255; Integer: Maximum length = 11.) Also if Type is Choice; In order for a Choice to display as the default for this Field in the Universal Task Details, Default Value must be the Choice Value, not the Choice Label. If Type is Boolean; Specification (a check mark) that the Yes value for this field is the default. If Type is Credential; Default Credential to be used for this Universal Template Field. You can select a Credential from the Default Value drop-down list or click the Details icon next to the Default Value field to create a new Credential. **Note** Since only Resolvable Credentials can be embedded in a Universal Template script, only Resolvable Credentials display in the Default Value drop-down list for a Credential. If you click the Details icon to create a new Credential, Resolvable is pre-selected for the Type field in the Credential Details and cannot be changed. If Type is Script; Default Script to be used for this Universal Template Field. You can select a Script from the Default Value drop-down list or click the Details icon next to the Default Value field to create a new Script. **Note** Since only Data Scripts can be embedded in a Universal Template script, only Data Scripts display in the Default Value drop-down list for a Script. If you click the Details icon to create a new Script, Data is pre-selected for the Type field in the Script Details and cannot be changed. If Type is Array; There is no default.
Boolean Value Type	If Type is Boolean: Type of Boolean value for this Field. Options: • true/false (default) • 1/0 • Custom
Yes Value:	If Boolean Value Type is Custom; Boolean Yes value for this Field. (Maximum length = 255 characters).
No Value:	If Boolean Value Type is Custom; Boolean No value for this Field. (Maximum length = 255 characters).
Choice Sort Option	If Type is Choice; Specification for how Choices will be listed in the Choice field drop-down list in the Universal Task Details. Options: • Sequence: Choices will be displayed in the sequence they were created. You can change this sequence manually on the Choices list. • Label: Choices will be displayed alphabetically by Label. Default is Sequence.

<table>
<tr><td>Allow Empty Choice</td><td>If Type is Choice; Specification for whether or not an empty (blank) option is available for this Choice field in any Universal Task based on this template, allowing the user to clear the value of this field.</td></tr>
<tr><td>Name Title</td><td>If Type is Array; Option to change the default Name column for the Array field on any Universal Task based on this template to any other column title (for example, Customer Name).</td></tr>
<tr><td>Value Title</td><td>If Type is Array; Option to change the default Value column for the Array field on any Universal Task based on this template to any other column title (for example, Customer ID).</td></tr>
<tr><td>Validation</td><td>This section contains validation information about the Field.</td></tr>
<tr><td>Required</td><td>If Type is Text, Integer, Credential, or Script; Specification for whether this Field in the template is required (checked) or optional (not checked). If it is required, it will display in boldface in any Universal Tasks based on this template.</td></tr>
<tr><td>Require If Field</td><td>If Required is not checked and a Show If Field is not specified; Specification that this Field in the template will be required in any Universal Tasks based on this template if the Choice Field (Choice Field 1-10) or the Boolean Field (Boolean Field 1-10) selected as the Require If Field has a value corresponding to the value(s) defined in the Require If Field Value(s) field.

The Require If Field Value(s) field is not available until you make a Require If Field selection.

Options:

• -- None --
• Boolean Field 1 - Boolean Field 10.
• Choice Field 1 - Choice Field 10.</td></tr>
<tr><td>Require If Field Value(s)</td><td>If Require If Field is a Choice field, Require If Field Value(s) is a comma-separated list of Choice values.

For example:

<table><tr><th>Require If Field Value(s)</th><th>Description</th></tr><tr><td>1</td><td>Field is required if the Require If Field has a choice value of 1 selected.</td></tr><tr><td>1,2</td><td>Field is required if the Require If Field has a choice value of 1 or 2 selected.</td></tr><tr><td></td><td>Field is required if the Require If Field has the empty choice selected.</td></tr><tr><td>,1</td><td>Field is required if the Require If Field has the empty choice selected or a choice value of 1 selected.</td></tr><tr><td>,1,2</td><td>Field is required if the Require If Field has the empty choice selected or a choice value of 1 or 2 selected.</td></tr></table>
If Require If Field is a Boolean field, Require If Field Value(s) is either true or false.</td></tr>
</table>

<table>
<tr><td>Show If Field</td><td>If Required is not checked and a Require If Field is not specified; Specification that this Field in the template will be visible in any Universal Tasks based on this template if the Choice Field (Choice Field 1-10) or the Boolean Field (Boolean Field 1-10) selected as the Show If Field has a value corresponding to the value(s) defined in the Show If Field Value(s) field.

The Show If Field Value(s) field is not available until you make a Show If Field selection.

Options:

• -- None --
• Boolean Field 1 - Boolean Field 10.
• Choice Field 1 - Choice Field 10.</td></tr>
<tr><td>Show If Field Value(s)</td><td>If Show If Field is a Choice field, the Show If Field Value(s) is a comma-separated list of Choice values.

For example:

<table><tr><th>Show If Field Value(s)</th><th>Description</th></tr><tr><td>1</td><td>Field is visible if the Show If Field has a choice value of 1 selected.</td></tr><tr><td>1,2</td><td>Field is visible if the Show If Field has a choice value of 1 or 2 selected.</td></tr><tr><td></td><td>Field is visible if the Show If Field has the empty choice selected.</td></tr><tr><td>,1</td><td>Field is visible if the Show If Field has the empty choice selected or a choice value of 1 selected.</td></tr><tr><td>,1,2</td><td>Field is visible if the Show If Field has the empty choice selected or a choice value of 1 or 2 selected.</td></tr></table>
If Show If Field is a Boolean field, the Show If Field Value(s) is either true or false.</td></tr>
<tr><td>Require If Visible</td><td>If Show If Field is not - - None - -; If selected, specification that the Field is required if it is visible (see Show If Field).</td></tr>
<tr><td>No Space If Hidden</td><td>If Show If Field is not - - None - -; If selected, specification that a space should not be reserved in place of the hidden field.</td></tr>
<tr><td>Length</td><td>If Type is Text or Integer; Length of this Field.

Maximum Lengths:

• Text = 255
• Large Text = 4000
• Integer = 11</td></tr>
<tr><td>Minimum</td><td>If Type is Integer; Minimum value for this field.</td></tr>
<tr><td>Maximum</td><td>If Type is Integer; Maximum value for this field.</td></tr>
</table>

Form Layout	This section contains information about the location of this Field in the Details of Universal Tasks based on this template. **Note** All user-defined Fields in a Universal Template will be located between the Credentials Variable and Runtime Directory fields in the Details section of Universal Tasks based on this template.
Start Row	If enabled; Specification that this Field will start a new row.
End Row	If enabled; Specification that this Field will end the current row.
Column Span	Number of columns (width) in the Universal Task Details for this Field. Options: • 1 • 2 • 3 Default is 1.
Sequence	For existing Fields only; System-defined; Sequence of this Field among all user-defined Universal Template Fields to be displayed in the Universal Task Details. Starting sequence is 0 for the first defined Field. **Note** You can change the Sequence of user-defined Universal Template Fields by dragging them to new locations on the Fields list.
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 Field Details that let you perform various actions.
Save	Saves a new Field record in the Controller database.
Save & New	Saves a new Field record in the Controller database and redisplays empty Details so that you can create another Field.

Save & View	Saves a new Field record in the Controller database and continues to display that record.
New	Displays empty (except for default values) Details for creating a new Field.
Update	Updates the Field record in the Controller database.
Delete	Delete the currently open Field. **Note** You cannot delete a field if it is the only field in the Template.
Refresh	Refreshes any dynamic data displayed in the Field Details.
Close	Closes the Field Details.
Tabs	This section identifies the tabs across the top of the Field Details that provide access to additional information about the Field.
Choices	If Type is Choice; Allows you to define the Choices for this Field in the template.

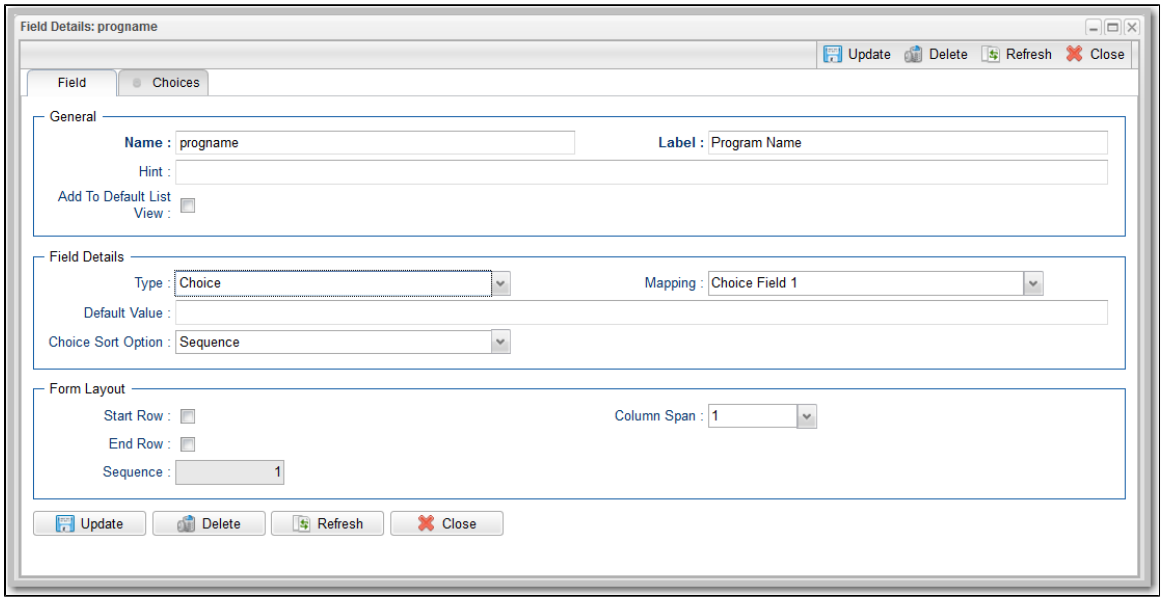
Creating Universal Template Field Choices

If you created a Choice Field (Type = Choice) for a Universal Template, you must create Choices for that Choice Field that will display in a drop-down list in all Universal Tasks based on this Universal Template.

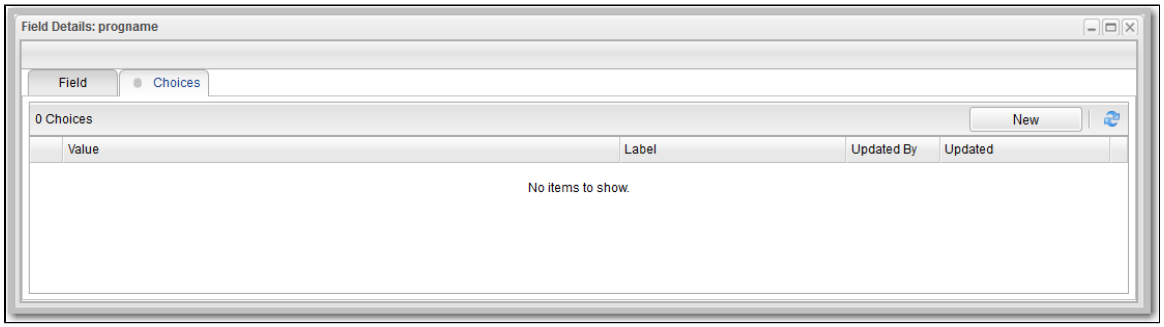
- If you click the **Save** button after creating the Choice Field, the Choices tab (under which is an empty Choices list) is enabled, and an empty Choice Details automatically displays, which lets you create your first Choice.
- If you click the **Save & New** button after creating a Choice Field, so that you can immediately create one or more other Fields, you will have to manually open that Choice Field, click the enabled Choices tab, and then click the **New** button to create your first Choice.

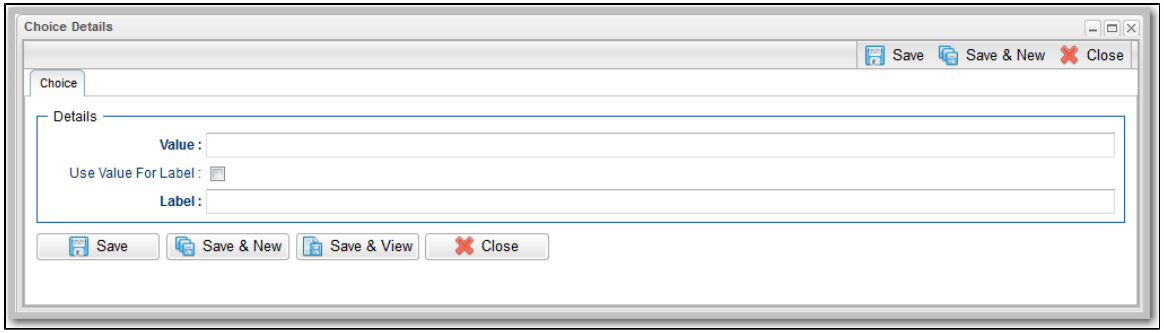
The following procedure assumes that you have created a Choice Field but not yet created any Choices for it.

Step 1 On the Fields list for the Universal Template, open the Choice Field (Type = Choice) whose Choices you want to create.



Step 2 Click the **Choices** tab to display an empty Choices list.



Step 3	Click **New** to display Choice Details for a new Choice. 
Step 4	Enter Details for a new Choice Field, using the field descriptions below as a guide.
Step 5	Click a **Save** button. Each Choice that you define is added to the Choices list.

Choice Details Field Descriptions

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

Field Name	Description
General	This section contains general information about the Field.
Value	Value of this Choice. (Maximum length = 255 characters.)
Use Value For Label	If the Value field value is 50 characters or less; Use the Value field value as the Label field value (which is a maximum 50 characters).
Label	If Use Value For Label is not checked; Name that will display for this Choice in the drop-down list on a Universal Task. (Maximum = 50 characters.)
Sequence	For existing Choices only; System-defined sequence of this Choice among all Choices defined for this Field. Starting sequence is 0 for the first defined Choice. **Note** If you select Sequence in the Choice Sort Option field in the Details for this Choice Field, you can sort the Choices by clicking and dragging them to any position on the Choices List. In the Details of any Universal Task based on this Universal Template, the Labels for these Choices will display in the Choice Field drop-down list in the order you select.
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 Choice Details that let you perform various actions.
Save	Saves a new Choice record in the Controller database.
Save & New	Saves a new Choice record in the Controller database and redisplays empty Details so that you can create another Choice.
Save & View	Saves a new Choice record in the Controller database and continues to display that record.
New	Displays empty (except for default values) Details for creating a new Choice.
Update	Updates the Choice record in the Controller database.
Delete	Deletes the currently open Choice. **Note** You cannot delete a Choice if it is the only Choice for the Field.
Refresh	Refreshes any dynamic data displayed in the Choice Details.
Close	Closes the Choice Details.

Copying Universal Templates

- Overview
- Copying One or More Universal Templates from a Universal Templates List
- Copying a Universal Template from the Universal Template Details
- Copy Permissions

Overview

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

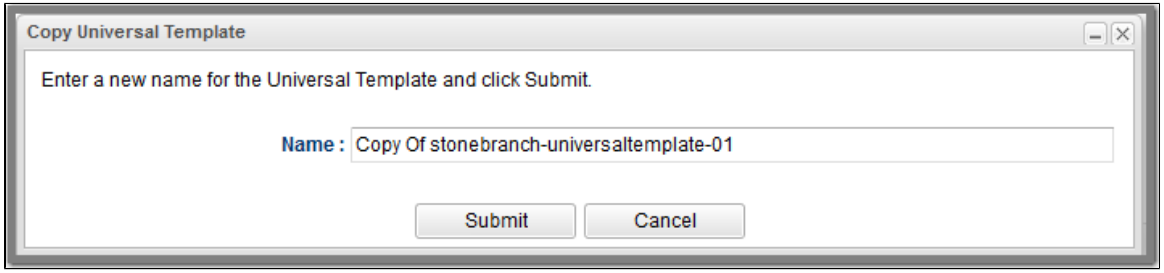
However, you also can use the Copy action on the Universal Template Action menu or the Copy button in the Universal Template Details.

Copying a Universal Template will copy the following:

- Universal Template record.
- Universal Template Field records for the Universal Template parent record.
- Universal Template Field Choice records for the Choice type Universal Template Field parent records.

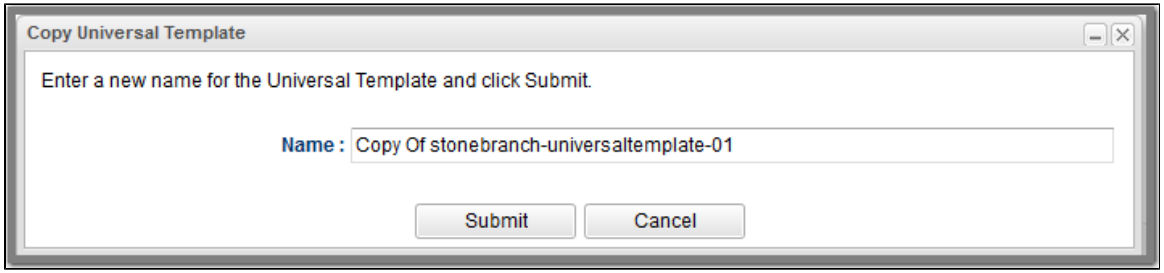
Copying One or More Universal Templates from a Universal Templates List

Step 1	From the Administration navigation pane, select **Configuration> Universal Templates** to display the Universal Templates list.
Step 2	Locate the Universal Template(s) you want to copy (see Filtering).

Step 3	Copy the Universal Template(s): **Copy One Universal Template** 1. Right-click the **Universal Template Name**. 2. On the Action menu, select **Copy**. A Copy Universal Template pop-up dialog displays.  3. Enter a new name for the Universal Template. 4. Click **Submit** to create a copy of the Universal Template. **Copy Multiple Universal Templates** 1. Ctrl-Click the Universal Templates you want to copy. 2. Right-click any of the selected Universal Templates. 3. On the Action menu, select **Copy**. 4. On the Confirmation pop-up that displays, click **OK**. The copied Universal Templates are added to the list, with **Copy of** added as a prefix to the Universal Template Name for each Universal Template. If a Universal Template with that **Copy of** name already exists, a numerical suffix is added to the Universal Template Name.

Copying a Universal Template from the Universal Template Details

Step 1	Select a Universal Template from the Universal Template list. The Universal Template Details for that Universal Template displays.

Step 2	Either: • Click the **Copy** button. • Right-click the Details to display the Action menu, and then click **Copy**. A Copy Universal Template pop-up dialog displays. 
Step 3	Enter a new name for the Universal Template.
Step 4	Click **Submit** to create a copy of the Universal Template.

Copy Permissions

To copy a Universal Template, you must have either the ops_admin or ops_universal_template_admin role.

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