# Oracle® Exadata

# Exadata Fleet Update Administrator's Guide

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Oracle Exadata Exadata Fleet Update Administrator's Guide,

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# What's New in Exadata Fleet Update

Oracle is constantly adding new capabilities to Exadata Fleet Update service. This section provides a brief overview of new features as they are released.



## Rollback Updates Applied to the Targets

- **Services:** Database
- **Release Date:** December 11, 2024

With this enhancement, you can roll back updates applied to targets from the most recent successful maintenance cycle. Rollback is possible only if the cycle has completed successfully and the cleanup action has neither been triggered nor is currently in progress.

**Related Topics**

- Rollback Updates Applied to All Targets in the Collection
  To rollback the updates applied to the targets in a maintenance cycle, use this procedure.
- Clean Up the Maintenance Cycle
  You can optionally clean up the maintenance cycle.

## Create or Patch a Collection of Targets with Oracle Database and Grid Infrastructure Version 23ai

- **Services:** Database
- **Release Date:** September 18, 2024

Oracle Database 23ai is a regular production release available on Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C) and Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D). With this release, you can perform all the lifecycle operations on the 23ai databases.

**Related Topics**

- Create a Collection
  To create a collection, be prepared to provide values for the fields required for configuring the collection.

- Create a Maintenance Cycle
  For a given collection, create Maintenance Cycles, representing a full patching event to a specific target version. Each Collection may have zero or more maintenance cycles. If more than one, then only one maintenance cycle may be active at a time.

# Patch a Fleet of Clusters with a Custom Grid Infrastructure Image

- **Services:** Database
- **Release Date:** July 31, 2024

This enhancement allows you to:

- Discover Grid Infrastructure targets using a specified custom Grid Infrastructure software image during Collection creation or while performing a Fleet Software Update Discovery search.
- Specify a custom Grid Infrastructure software image as the goal version for a Maintenance Cycle.
- Patch a fleet of clusters using the specified custom Grid Infrastructure software image.

**Related Topics**

- Create a Collection
  To create a collection, be prepared to provide values for the fields required for configuring the collection.
- Create a Maintenance Cycle
  For a given collection, create Maintenance Cycles, representing a full patching event to a specific target version. Each Collection may have zero or more maintenance cycles. If more than one, then only one maintenance cycle may be active at a time.
- Create a Custom Oracle Grid Infrastructure Software Image

# Enable Incident Logs and Trace Collection

- **Services:** Database
- **Release Date:** July 31, 2024

Enable diagnostics collection and notifications to help Oracle Cloud Operations and you identify, investigate, track, and resolve Exadata VM cluster issues quickly and effectively. For more information, see Getting Started with Events.

**Related Topics**

- Create a Maintenance Cycle
  For a given collection, create Maintenance Cycles, representing a full patching event to a specific target version. Each Collection may have zero or more maintenance cycles. If more than one, then only one maintenance cycle may be active at a time.
- Edit a Maintenance Cycle
  To edit a maintenance cycle, be prepared to provide values for the fields required for editing the maintenance cycle.

# Exadata Fleet Update

- **Services:** Database
- **Release Date:** August 02, 2023

Exadata Fleet Update simplifies, standardizes, and enhances the Oracle Database and Grid Infrastructure patching experience. Exadata Fleet Update achieves this by grouping components based on the customers' business needs into collections that can be patched as one entity within a given maintenance cycle.

Exadata Fleet Update brings this patching engine to OCI as a native cloud service, accessible from the OCI Console, OCI API, and via the OCI CLI.

Exadata Fleet Update is available free of charge on Oracle's Exadata Database Service including Cloud@Customer (ExaDB-C@C) and Exadata Database Service on Dedicated Infrastructure (ExaDB-D).

For more information, see:

- Exadata Fleet Update Overview
- Exadata Fleet Update service API

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# Exadata Fleet Update Overview

Learn how to update all chosen components in the database stack in a single maintenance window

- Exadata Fleet Update Overview
  Exadata Fleet Update provides you with a way to automate database cloud fleet updates without custom development. It also orchestrates updates across the stack in a single maintenance window.
- Terms Associated with Exadata Fleet Update
  Learn about what terms are used with Exadata Fleet Update.
- Behavior of Exadata Fleet Update Service While Patching a Database in an Oracle Data Guard Environment
  Learn about what terms are used with Exadata Fleet Update.

## Exadata Fleet Update Overview

Exadata Fleet Update provides you with a way to automate database cloud fleet updates without custom development. It also orchestrates updates across the stack in a single maintenance window.

Exadata Fleet Update leverages the fleet update capabilities of Fleet Patching and Provisioning (FPP). Exadata Fleet Update offers a simple and uniform "look and feel" for operations across:

- **Multiple database versions:** All Oracle Database versions supported in the Cloud.
- **Multiple database types:** Oracle Real Application Clusters (Oracle RAC).
- **Dynamic runtime environments:** Exadata Fleet Update adjusts to shifting runtime environments such as instance failovers to other nodes, service failovers, unavailable nodes, and so on.

In addition, two key specialized characteristics of Exadata Fleet Update offer major intrinsic benefits:

- **Resume:** When patching across a cluster of nodes and/or a set of distributed database instances, if a failure occurs, it is difficult for the Fleet Administrators or Database Administrators to not only determine the cause of failure and resolve the issue such as `/tmp` space running low, but to figure out how far the patching has progressed and at what step the patching needs to be resumed in order to finish up the rest of the patching.

  Exadata Fleet Update comes to the rescue of Database Administrators. Internally, Exadata Fleet Update keeps checkpoints of every step of the patching process it performs, and records the results. You can retry the same operation from the console or by running the same CLI/API call after the original failure is resolved. Exadata Fleet Update tracks through these checkpoints, skips all of the successful steps, and resumes actions from the last failure point observed.
- **Rollback:** When there is a failure in patching for various reasons, you may want to revert to the original software home. Exadata Fleet Update offers a very convenient and intuitive way of allowing you to perform a rollback operation by simply interchanging the source and

target on the API. Exadata Fleet Update is able to internally determine that a rollback is needed and executes the required actions automatically.

# Terms Associated with Exadata Fleet Update

Learn about what terms are used with Exadata Fleet Update.

**Collection**: A group of Exadata Fleet Update target resources, Oracle Database and Grid Infrastructure to patch.

Collection lifecycle states:

- **Creating**: Collection is being created.
- **Updating**: Collection member targets or attributes are being updated.
- **Active**: Collection is ready to use and create Maintenance Cycle.
- **Deleting**: Collection deletion in progress.
- **Failed**: Collection creation has failed.

**Targets**: Exadata Infrastructure resources, Grid Infrastructure, and Oracle Database. Targets can be added from multiple compartments to a Collection.

**Maintenance Cycle**: A maintenance cycle represents a full software update event to a specific target version. A maintenance cycle will include actions to run prechecks, stage software, and apply the software update. The logs and trace files associated with the jobs performing these actions are made available to Oracle operations to identify, investigate, and resolve issues. Each Collection can have zero or more Maintenance Cycles. However, only one maintenance cycle can be active at a time for a Collection.

Maintenance Cycle lifecycle states:

- **Active**: Maintenance Cycle is created.
- **Updating**: Attributes of a Maintenance Cycle are being updated.
- **Maintenance In Progress**: An action is running the Maintenance Cycle.
- **Needs Attention**: Indicates that a warning has been identified but has not yet been adequately addressed or resolved. You can either ignore the warning and proceed with the next action, or address the reported warnings and then retry the action marked as "needs attention."
- **Succeeded**: Apply update completed successfully. The Cleanup action would become available.

**Action**: A Maintenance Cycle has associated actions that can be scheduled to run or run on demand.

- **Precheck (stage)**: Prechecks are run to identify issues such as software dependencies, one-off patch conflicts that need to be re-applied post-patching, and so on that may prevent the infrastructure maintenance from succeeding. Precheck can be run as part of Stage software and Apply update actions. It can also be run independently prior to running Stage software and Apply update actions. Note that running prechecks do not impact database availability.
- **Stage software**: Stages the target home software for the version or image selected on the Guest VMs in the collection. Note that running Stage software action does not impact database availability.
- **Precheck (apply)**: Prechecks are run to identify issues such as software dependencies, one-off patch conflicts that need to be re-applied post-patching, and so on that may

prevent the infrastructure maintenance from succeeding. Precheck can be run as part of Stage software and Apply update actions. It can also be run independently prior to running Stage software and Apply update actions. Note that running prechecks do not impact database availability.

- **Apply update**: Updates all Grid Infrastructure or Oracle Database targets in a collection. Staging software must have been completed successfully before applying the updates. The maintenance method and how the application connects to the database, using Application Continuity or not, determine whether an update impacts availability. Databases not being updated shouldn't have an impact on availability.
- **Cleanup**: Applies only if the Apply update action succeeds on a target and no Database instances or Grid Infrastructure is running from the Database or Grid Home. The Cleanup action will not delete the source Database Home if it is not empty. In the console, the associated job would have a **Needs Attention** status with a tooltip that states the Database Home was not deleted because it's not empty.
  Optionally, after the Maintenance Cycle completes successfully, you can manually delete the source Database Home by first manually deleting all the databases within it.
- **Rollback** and **Remove targets**: Applies only if Apply update fails on a target.

Action lifecycle states:

- **Scheduled**: An action is scheduled to run.
- **Canceled**: A scheduled action run is canceled.
- **In Progress**: A scheduled action runs or when an action is run on demand.
- **Needs Attention**: Indicates that a warning has been identified but has not yet been adequately addressed or resolved. You can either ignore the warning and proceed with the next action, or address the reported warnings and then retry the action marked as "needs attention."
- **Succeeded**: All jobs associated with a scheduled action or an action run on demand complete successfully.
- **Failed**: One or more jobs associated with a scheduled action or an action run on demand fail.

**Jobs**: Created to do the background processing initiated by the maintenance cycle actions. Jobs will allow visibility into the progress, associated messages, and errors of an action for the respective target.

**Database Software Images**: Customized Oracle Database software configuration that includes your chosen updates (Release Updates (RUs) and Monthly Recommended Patches (MRP)), and optionally, a list of one-off (or interim) patches or an Oracle Home inventory file. This reduces the time required to provision and configure your databases, and makes it easy for your organization to create an approved "gold image" for developers and database administrators.

**Maintenance method**: Maintenance method determines how VMs in a VM Cluster are batched and which nodes are updated together when applying the software updates.

- **One node at a time (rolling)**: (Default) Database instances are updated on one VM in the cluster at a time while the other instances remain operational.
- **Smart batch (rolling)**: Database instances are updated on one or more VMs at a time. VMs are batched based on the database services configured. This ensures that all services remain available as long as they are configured on multiple nodes while minimizing the total number of batches needed.

- **Non-rolling**: All database instances across all VMs in the cluster are updated in parallel incurring full downtime.
- **50/50 (rolling)**: The database instances on half of the VMs are updated in one batch, while the other half in another batch. The two batches are determined by the configuration of the database services. This ensures that all services remain available.
  - **Enable one batch at a time**: Updates are applied to one batch at a time. After applying the update to the first batch, the Apply action will wait to be continued before starting the second batch.

**Maximum drain timeout (in seconds):**: Drain Timeout in seconds between nodes. This would be used during a rolling update to provide time for database connection relocation. The drain timeout used will be the maximum of this value or the maximum configured drain timeout of the services running on a particular instance. Default is 600.

**Infrastructure Fleet Admin**: Manages one or more cloud Exadata Infrastructures in the customer OCI tenancy. Has privileges to view and manage these infrastructures in one or more compartments.

**VM Cluster Fleet Admin**: Manages one or more Exadata Cloud VM Clusters and the Exadata System and GI software on the VMs. Has privileges to view and manage these VM Clusters.

**DB Fleet Admin**: Manages one or more databases across one or more VM Clusters.

# Behavior of Exadata Fleet Update Service While Patching a Database in an Oracle Data Guard Environment

Learn about what terms are used with Exadata Fleet Update.

To patch databases in an Oracle Data Guard Configuration, apply a software update to the standby database before applying a software update to the primary database.

Peer databases (primary and standby) cannot be included in the same Exadata Fleet Update Collection.

> **Note:**
>
> The patches must be Data Guard first installable. It is imperative to specify the exact same patches in the primary and standby maintenance cycles.

For more information, see:

- Use Oracle Data Guard with Exadata Database Service on Cloud@Customer
- Use Oracle Data Guard with Exadata Cloud Infrastructure

**Procedure**

1. Create an Exadata Fleet Update Collection of standby databases, if such a Collection does not already exist.
   Create a separate Exadata Fleet Update Collection of primary databases, if such a Collection does not already exist.

   In the case of **cross-region Oracle Data Guard configuration**, the Exadata Fleet Update Collections will exist in different regions.

For more information, see Create a Collection.

2. Create a Maintenance Cycle for the Exadata Fleet Update Collection of standby databases, specifying the desired goal version or database software image, and complete Exadata Fleet Update Stage Action.
   For more information, see:
   - Create a Maintenance Cycle
   - Run Stage, Precheck, and Apply Actions
3. Create a Maintenance Cycle for the Exadata Fleet Update Collection of primary databases, specifying the identical goal version or database software image, and complete Exadata Fleet Update Stage Action.
   For more information, see:
   - Create a Maintenance Cycle
   - Run Stage, Precheck, and Apply Actions
4. Schedule Apply Exadata Fleet Apply Action for the Exadata Fleet Update Collection of standby databases.
5. Upon the successful completion of Exadata Fleet Update Apply action for the Exadata Fleet Update Collection of standby databases, schedule Exadata Fleet Update Apply Action for the Exadata Fleet Update Collection of primary databases.

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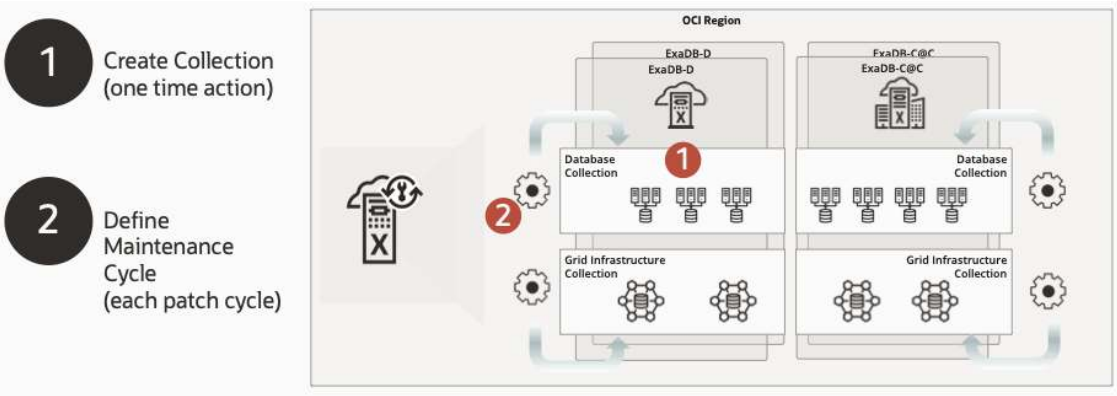
# Getting Started

Before you can get started with Exadata Fleet Update as shown in the diagram here, there are some prerequisites that need to be met. Review the prerequisites listed below carefully.

**Figure 3-1 Exadata Fleet Update**




- Required Network Setup
  Review the security rules to use with your ExaDB-D Infrastructure. Security rules control the types of traffic allowed for the client network and backup network of the Exadata's compute nodes.
- Required IAM Policies to Manage Collections
  Review the IAM policies required to manage an Exadata Fleet Update collection of Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D) or Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C) resources.
- Required IAM Policies to Manage Maintenance Cycles
  Review the IAM policies required to manage Exadata Fleet Update Maintenance Cycle and Action resources for Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D) or Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C) resources.
- Policy Builder
  Use the policy builder to generate policy statements and create the policy if you have the necessary permissions.

## Required Network Setup

Review the security rules to use with your ExaDB-D Infrastructure. Security rules control the types of traffic allowed for the client network and backup network of the Exadata's compute nodes.

**Security Rules for Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D)**

**Client Network**

Client ingress rule 1: Allows TCP traffic from within the subnet ExaDB-D resides or Allows TCP traffic from within the ExaDB-D client subnet.

```
Stateless: No (all rules must be stateful)
Source Type: CIDR
Source CIDR: Client subnet's CIDR
IP Protocol: TCP
Source Port Range: All
Destination Port Range: 7085
Description: Optionally, add a meaningful description of the rule. For
example, Allow access to Exadata Fleet Update private endpoint within the
subnet.
```

General egress rule 1: Allows all egress traffic.

```
Stateless: No (all rules must be stateful)
Destination Type: CIDR
Destination CIDR: 0.0.0.0/0
IP Protocol: All
```

# Required IAM Policies to Manage Collections

Review the IAM policies required to manage an Exadata Fleet Update collection of Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D) or Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C) resources.

To use Oracle Cloud Infrastructure, you must be granted security access by an administrator using IAM policies. This access is required whether you're using the Console or the REST API with an SDK, CLI, or other tool. If you get a message that you don't have permission or are unauthorized, verify with your administrator what type of access you have and which compartment you should work in. If you're new to policies, see Getting Started with Policies and Common Policies.

**Policies to Manage an Exadata Fleet Update Collection of Oracle Databases or CloudVmClusters on Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D)**

The following policies give permission to the example group *CollectionAdmins* to manage an Exadata Fleet Update collection of Oracle Databases or CloudVmClusters on Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D). The statements provide the minimum access needed to complete administrative tasks with Exadata Fleet Update collections. Access is limited to resources in the specified example compartments.

```
allow group CollectionAdmins to manage fleet-software-update-discoveries in
compartment ABC
allow group CollectionAdmins to manage fleet-software-update-collections in
compartment ABC
allow group CollectionAdmins to read fleet-software-update-work-requests in
compartment ABC
allow group CollectionAdmins to inspect database-software-images in
compartment ABC
allow group CollectionAdmins to inspect db-homes in compartment ABC
allow group CollectionAdmins to inspect databases in compartment ABC
allow group CollectionAdmins to inspect cloud-exadata-infrastructures in
```

```
compartment ABC
allow group CollectionAdmins to inspect db-nodes in compartment ABC
allow group CollectionAdmins to use cloud-vmclusters in compartment ABC
allow group CollectionAdmins to use vcns in compartment ABC
allow group CollectionAdmins to use subnets in compartment ABC
allow group CollectionAdmins to use vnics in compartment ABC
allow group CollectionAdmins to use private-ips in compartment ABC
allow group CollectionAdmins to use network-security-groups in compartment ABC
```

> **Note:**
>
> If you do not include *<identity_domain_name>* before *<group_name>*, then the policy statement is evaluated as though the group belongs to the default identity domain.

**Policies to Manage an Exadata Fleet Update Collection of Oracle Databases or VmClusters on Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C)**

The following policies give permission to the example group *CollectionAdmins* to manage an Exadata Fleet Update collection of Oracle Databases or VmClusters on Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C). The statements provide the minimum access needed to complete administrative tasks with Exadata Fleet Update collections. Access is limited to resources in the specified example compartments.

```
allow group CollectionAdmins to manage fleet-software-update-discoveries in
compartment ABC
allow group CollectionAdmins to manage fleet-software-update-collections in
compartment ABC
allow group CollectionAdmins to read fleet-software-update-work-requests in
compartment ABC
allow group CollectionAdmins to inspect database-software-images in
compartment ABC
allow group CollectionAdmins to inspect db-homes in compartment ABC
allow group CollectionAdmins to inspect databases in compartment ABC
allow group CollectionAdmins to inspect exadata-infrastructures in
compartment ABC
allow group CollectionAdmins to inspect vmclusters in compartment ABC
allow group CollectionAdmins to inspect db-nodes in compartment ABC
```

> **Note:**
>
> If you do not include *<identity_domain_name>* before *<group_name>*, then the policy statement is evaluated as though the group belongs to the default identity domain.

# Required IAM Policies to Manage Maintenance Cycles

Review the IAM policies required to manage Exadata Fleet Update Maintenance Cycle and Action resources for Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D) or Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C) resources.

To use Oracle Cloud Infrastructure, you must be granted security access by an administrator using IAM policies. This access is required whether you're using the Console or the REST API

with an SDK, CLI, or other tool. If you get a message that you don't have permission or are unauthorized, verify with your administrator what type of access you have and which compartment you should work in. If you're new to policies, see Getting Started with Policies and Common Policies.

In addition, for some operations, you are required to authorize Exadata Fleet Update resources as principal actors that can act on other resources.

**Step 1: Create a Dynamic Group**

Create a dynamic group (example name: *fsu-action-dyn-group*) using one of the following matching rules. For more information about dynamic groups, refer to Managing Dynamic Groups and Writing Matching Rules to Define Dynamic Groups. You need this dynamic group in order to authorize Exadata Fleet Update Actions to make API calls against other services, as needed. Exadata Fleet Update Actions typically need permission to use Oracle Cloud Infrastructure Database service resources.

This matching rule defines a dynamic group that includes all Exadata Fleet Update Actions as members.

```
resource.type='fsuaction'
```

**Step 2: Create a Policy for the Dynamic Group**

After creating the dynamic group, you create a policy for the dynamic group. This type of policy is referred to as a resource principal policy because it authorizes a resource as a principal actor that can act on other resources.

The following policy gives members of dynamic group *fsu-action-dyn-group* permission to create Database Homes and update Oracle Databases or CloudVmClusters on Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D). The statements provide the minimum access needed to complete administrative tasks with Exadata Fleet Update Maintenance Cycles and Actions. Access is limited to resources in the specified example compartments.

```
allow dynamic-group fsu-action-dyn-group to read db-nodes in compartment ABC
allow dynamic-group fsu-action-dyn-group to use database-software-images in
compartment ABC
allow dynamic-group fsu-action-dyn-group to manage db-homes in compartment
ABC where any {request.permission='DB_HOME_CREATE',
request.permission='DB_HOME_UPDATE', request.permission='DB_HOME_INSPECT'}
allow dynamic-group fsu-action-dyn-group to manage databases in compartment
ABC where any {request.permission='DATABASE_CREATE',
request.permission='DATABASE_UPDATE', request.permission='DATABASE_INSPECT'}
allow dynamic-group fsu-action-dyn-group to use cloud-vmclusters in
compartment ABC
allow dynamic-group fsu-action-dyn-group to use vcns in compartment ABC
allow dynamic-group fsu-action-dyn-group to use subnets in compartment ABC
allow dynamic-group fsu-action-dyn-group to use vnics in compartment ABC
allow dynamic-group fsu-action-dyn-group to use private-ips in compartment ABC
allow service fppcsprod to use cloud-vmclusters in compartment ABC
```

The following policy gives members of dynamic group *fsu-action-dyn-group* permission to create Database Homes and update Oracle Databases or VmClusters on Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C). The statements provide the minimum

access needed to complete administrative tasks with Exadata Fleet Update Maintenance Cycles and Actions. Access is limited to resources in the specified example compartments.

```
allow dynamic-group fsu-action-dyn-group to read db-nodes in compartment ABC
allow dynamic-group fsu-action-dyn-group to inspect exadata-infrastructures
in compartment ABC
allow dynamic-group fsu-action-dyn-group to use database-software-images in
compartment ABC
allow dynamic-group fsu-action-dyn-group to manage db-homes in compartment
ABC where any {request.permission='DB_HOME_CREATE',
request.permission='DB_HOME_UPDATE', request.permission='DB_HOME_INSPECT'}
allow dynamic-group fsu-action-dyn-group to manage databases in compartment
ABC where any {request.permission='DATABASE_CREATE',
request.permission='DATABASE_UPDATE', request.permission='DATABASE_INSPECT'}
allow dynamic-group fsu-action-dyn-group to use vmclusters in compartment ABC
```

The following policy gives members of dynamic group *fsu-action-dyn-group* permission to delete Database Homes as part of a Cleanup action.

```
allow dynamic-group fsu-action-dyn-group to manage db-homes in compartment
ABC where request.permission='DB_HOME_DELETE'
allow dynamic-group fsu-action-dyn-group to manage databases in compartment
ABC where request.permission='DATABASE_DELETE'
```

> **Note:**
>
> If you do not include <identity_domain_name> before <dynamic_group_name>, then the policy statement is evaluated as though the dynamic group belongs to the default identity domain.

**Step 3: Add a Policy for Users**

The following policies give permission to the example group CycleAdmins to manage Exadata Fleet Update Maintenance Cycle and Action resources.

```
allow group CycleAdmins to use fleet-software-update-collections in
compartment ABC
allow group CycleAdmins to manage fleet-software-update-cycles in compartment
ABC
allow group CycleAdmins to manage fleet-software-update-actions in
compartment ABC
allow group CycleAdmins to manage fleet-software-update-jobs in compartment
ABC
allow group CycleAdmins to manage fleet-software-update-work-requests in
compartment ABC
allow group CycleAdmins to use database-software-images in compartment ABC
allow group CycleAdmins to manage db-homes in compartment ABC
allow group CycleAdmins to use cloud-vmclusters in compartment ABC
allow group CycleAdmins to manage databases in compartment ABC where any
{request.permission='DATABASE_CREATE', request.permission='DATABASE_UPDATE',
request.permission='DATABASE_INSPECT'}
```

```
allow group CycleAdmins to use vmclusters in compartment ABC
allow group CycleAdmins to inspect exadata-infrastructures in compartment ABC
```

> **Note:**
>
> If you do not include <identity_domain_name> before <dynamic_group_name>, then the policy statement is evaluated as though the dynamic group belongs to the default identity domain.

# Policy Builder

Use the policy builder to generate policy statements and create the policy if you have the necessary permissions.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click **Policy builder**.
   IAM policy builder page is displayed.
3. Select the criteria and Oracle will auto-generate policy statements to be included in a policy.
   You can change the criteria and add as many statements as you want.
4. Click **View policy** to validate the policy statements generated are correct.
5. Click **Close** after verifying the policy statements.
   Copy the statements and send them to the administrators for review.
6. Click **Create Policy** if you are the administrator and have permission to create policies using the IAM policy statements.
7. In the resulting Create policy page:
   - Enter a descriptive policy name.
   - Select the compartment.
   - Add tags.
8. Click **Create**.
   `IAM policy is successfully created.` message is displayed if the policy creation is successful.

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# How-to Guides

A collection of tasks and procedures for managing Exadata Fleet Update.

- Exadata Fleet Update Collections
  Learn to create and manage Exadata Fleet Update collections.
- Exadata Fleet Update Maintenance Cycles
  Learn to create and mange Exadata Fleet Update maintenance cycles.
- Exadata Fleet Update Actions
  Learn to manage Exadata Fleet Update actions and jobs.

## Exadata Fleet Update Collections

Learn to create and manage Exadata Fleet Update collections.

- Create a Collection
  To create a collection, be prepared to provide values for the fields required for configuring the collection.
- View the List of Collections
  To the list of collections and filter them compartment and state, use this procedure.
- View the Details of a Collection
  To the details of a collections, use this procedure.
- Add Targets to an Existing Collection
  Add targets that are not part of an active maintenance cycle.
- Remove Targets from an Existing Collection
  To remove targets from a collection, be prepared to provide values for the fields required for removing the targets.
- Edit a Collection
  You can only edit the name of the collection.
- Delete a Collection
  Be cautious, you cannot recover a deleted Collection.

### Create a Collection

To create a collection, be prepared to provide values for the fields required for configuring the collection.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click **Create Collection**.
   **Create collection** page is displayed.

   In the **Create collection** page, provide the requested information:

   - **Enter attributes:**
     - **Collection name:** Enter a descriptive name.

- **Compartment:** The compartment for the collection. Targets may be added from multiple compartments to a collection.
- **Collection type:** Select database or Grid Infrastructure.
- **Cloud service:** Select Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C) or Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D).
- **Current major version:** Select the current major version. Target in a collection must be of the same version, but can be of different patch levels.
- **Show Advanced Options:** You have the option to configure advanced options.
  - **Tags:** (Optional) You can choose to apply tags. If you have permission to create a resource, then you also have permission to apply free-form tags to that resource. To apply a defined tag, you must have permission to use the tag namespace. For more information about tagging, see Resource Tags. If you are not sure if you should apply tags, then skip this option (you can apply tags later) or ask your administrator.
- Click **Next**.

- **Add targets:**
  **Search Criteria** page is displayed.

  a. Click **Edit search criteria.**
  Search for targets that you would like to add to the collection. Search results will only include targets that match all criteria. Fields left empty will return all values

  - **Compartment:** Select a compartment.
    Compartment is a required field. Other fields are disabled until a value is entered for the **Compartment** field.

    Click **Another compartment** to add more compartments to expand your search.
  - The available choices vary depending on your Collection type (database or Grid Infrastructure).
    - **Database:**
      - **Database release update:** Select one or more database release updates.
      - **Custom database software image:** Select one or more custom database software images.
      - **Exadata infrastructure:** Select one or more Exadata infrastructures.
      - **VM cluster:** Select one or more VM Clusters.

        This field is disabled until you select an Exadata infrastructure. When enabled, this field displays only the VM Clusters that belong to the selected compartments and infrastructures.
      - **Database home name:** Enter a comma-delimited list of database home names. Use asterisk (*) for wildcard searches.
      - **Database name:** Enter a comma-delimited list of database names. Use asterisk (*) for wildcard searches.
      - **Database unique name:** Enter a comma-delimited list of database unique names. Use asterisk (*) for wildcard searches.
    - **Grid Infrastructure:**

    - **Grid Infrastructure release update:** Select one or more Grid Infrastructure release updates.
    - **Custom Grid Infrastructure software image:** Select one or more custom Grid Infrastructure software images.
      For more information, see Create a Custom Oracle Grid Infrastructure Software Image.
    - **Exadata infrastructure:** Select one or more Exadata infrastructures.
    - **VM cluster:** Select one or more VM Clusters.

      This field is disabled until you select an Exadata infrastructure. When enabled, this field displays only the VM Clusters that belong to the selected compartments and infrastructures.
- **Database release update:** Select database one or more release updates.
- **Custom database software image:** Select one or more custom database software images.
- **Exadata infrastructure:** Select one or more Exadata infrastructures.
- **VM cluster:** Select one or more VM Clusters.
  This field is disabled until you select an Exadata infrastructure. When enabled, this field displays only the VM Clusters that belong to the selected compartments and infrastructures.
- **Database home name:** Enter a comma-delimited list of database home names. Use asterisk (*) for wildcard searches.
- **Database name:** Enter a comma-delimited list of database names. Use asterisk (*) for wildcard searches.
- **Database unique name:** Enter a comma-delimited list of database unique names. Use asterisk (*) for wildcard searches.
- **Collection name:** Select one or more collection names.
- **Include targets already in an active maintenance cycle in another collection:** Select this checkbox if you want to add targets that are already in an active maintenance cycle in another collection.

  > **Note:**
  >
  > Each target can only belong to one active maintenance cycle at a time. Adding targets that are already in an active maintenance cycle in another collection will not allow a maintenance cycle to be created until the other maintenance cycle(s) have been completed or these targets have been removed from the collection.

- **Tags:** (Optional) You can choose to apply tags. If you have permission to create a resource, then you also have permission to apply free-form tags to that resource. To apply a defined tag, you must have permission to use the tag namespace. For more information about tagging, see Resource Tags. If you are not sure if you should apply tags, then skip this option (you can apply tags later) or ask your administrator.

> **Note:**
>
> If you attempt to clear a compartment, then the system displays the **Clear associated criteria** dialog box to clear the associated criteria first. Similarly, if you attempt to clear an Exadata infrastructure, then the system displays the **Clear associated criteria** dialog box to clear the associated criteria first.

– Click **Apply search criteria**.
The search may take a few minutes to complete. Results will be populated once they are available.

i. To cancel the search, click **Cancel search**.

> **Note:**
>
> Leaving the search page or canceling the search before it completes will not yield any results.

**Cancel search** dialog is displayed.

ii. Click **Cancel search**.

If you have selected to include targets in active maintenance cycles, then an info block is displayed.

i. Click **Unselect targets in active maintenance cycle** to remove the targets.

If you go back and change the collection type, cloud service, or current major version value, then the system will clear all selected criteria and target search results in the subsequent step.

**Changing value will clear target search results** dialog is displayed.

i. Click **Change value and clear target search results** to proceed.

b. Click **Next**.

- **Review:**
Review the list of selected targets and then click **Create collection**.

# View the List of Collections

To the list of collections and filter them compartment and state, use this procedure.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.

## Filter Collections by Compartment

To find Collections specific to an individual compartment, you can use List Scope to filter Collections by compartment

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Under **List Scope**, select a compartment from the list.

## Filter Collections by State

Filter Collections by selecting a state from the list of states.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Under **Filters**, select a state from the list.

## View the Details of a Collection

To the details of a collections, use this procedure.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to view details.
   **Collection details** page is displayed.

## Add Targets to an Existing Collection

Add targets that are not part of an active maintenance cycle.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to add targets.
   **Collection details** page is displayed.

   Under **Resources**, **Targets** is selected by default.

   The **Target** section displays the list of targets in the collection.
3. Click **Add Targets**.
   **Add Targets** page is displayed.
4. Click **Edit search criteria**.
   **Edit search criteria** screen is displayed.
5. Select a compartment from where you want to search the targets.
   Targets may be added from multiple compartments to a collection.
6. Click **Another compartment** to add more compartments to expand your search.
7. Click **Apply search criteria**.
   The search may take a few minutes to complete. Results will be populated once they are available.

   If the search result includes targets that are already part of an active maintenance cycle, then a banner is displayed with an option to **Unselect targets in active maintenance cycle**.

   The **Database name** includes appropriate information and warning icons to indicate whether the targets are already part of this collection or they are part of collections that are part of an active maintenance cycle.

> **Note:**
>
> - If a collection is part of an active maintenance cycle and the targets are also part of an active maintenance cycle in another collection, then those targets will be disabled and may not be added to this collection.
> - If the Collection has an active Maintenance cycle and if you try to add Targets after a successful **Stage software** Acion, then the system displays an alert message indicating that you will have to rerun the **Stage software** action after adding the Targets.
> - If you try to add or remove Targets after an **Apply update** Action has run but not successfully completed, then the system displays an alert message indicating that you cannot add or remove Targets until the **Apply update** Action completes successfully.
> - If the targets are not part of an active maintenance cycle, then those targets will be enabled and can be added to this collection.

The **Select targets from all pages** and **Unselect targets from all pages** buttons are displayed only when the search returns 21 or more targets.

8. Click **Next**.
9. Review the list of selected targets and then click **Add Targets**.
   The status of the collection changes to **Updating**.
10. Under **Resources**, click **Work requests** to view the progress.

The status of the collection changes to **Available** when adding targets to the collection completes successfully.

## Remove Targets from an Existing Collection

To remove targets from a collection, be prepared to provide values for the fields required for removing the targets.

> **Note:**
>
> If you try to add or remove Targets after an **Apply update** Action has run but not successfully completed, then the system displays an alert message indicating that you cannot add or remove Targets until the **Apply update** Action completes successfully.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to add targets.
   **Collection details** page is displayed.

   Under **Resources**, **Targets** is selected by default.

   The **Target** section displays the list of targets in the collection.
3. Click **Remove targets**, or in the list of targets, click the Actions icon (three dots) for a target, and then click **Remove Target**.

**Remove Targets** page is displayed.

4. Click **Edit search criteria** to identify the targets to remove.
   **Edit search criteria** screen is displayed.
5. Enter appropriate values to narrow down your search criteria.
   For example, select Exadata infrastructure and the associated VM Clusters.
6. Click **Select targets from all pages**.
7. Review the list of selected targets.
8. Click **Remove targets**.
   The status of the collection changes to **Updating**.
9. Under **Resources**, click **Work requests** to view the progress.

The status of the collection changes to **Available** when removing targets from the collection completes successfully.

# Edit a Collection

You can only edit the name of the collection.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to edit.
   **Collection details** page is displayed.
3. Click **Edit**.
   **Edit collection** dialog is displayed.
4. Edit the name and the click **Save**.

## Move a Collection to a Different Compartment

To change the compartment that contains your Collection, use this procedure.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to move.
   **Collection details** page is displayed.
3. Click **Move Resource**.
   **Move Resource to a Different Compartment** dialog is displayed.
4. Choose a compartment where you want to move the resource, and then click **Submit**.

# Delete a Collection

Be cautious, you cannot recover a deleted Collection.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to delete.
   **Collection details** page is displayed.
3. Click **Delete**.
   Or, click the Actions icon (three dots), and then click **Delete**..

   **Delete** dialog is displayed.

4. Enter the name of the Collection, and then click **Delete**.

# Exadata Fleet Update Maintenance Cycles

Learn to create and mange Exadata Fleet Update maintenance cycles.

- Create a Maintenance Cycle
  For a given collection, create Maintenance Cycles, representing a full patching event to a specific target version. Each Collection may have zero or more maintenance cycles. If more than one, then only one maintenance cycle may be active at a time.
- View the List of Maintenance Cycles
  You can view the list of all Maintenance cycles for all Collections.
- Edit a Maintenance Cycle
  To edit a maintenance cycle, be prepared to provide values for the fields required for editing the maintenance cycle.
- Delete a Maintenance Cycle
  Be cautious, you cannot recover a deleted Maintenance Cycle.

## Create a Maintenance Cycle

For a given collection, create Maintenance Cycles, representing a full patching event to a specific target version. Each Collection may have zero or more maintenance cycles. If more than one, then only one maintenance cycle may be active at a time.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to edit.
   **Collection details** page is displayed.
3. Under **Resources**, click **Maintenance cycles**.
4. Click **Create maintenance cycle**.
   **Create maintenance cycle** page is displayed.
5. In the **Create maintenance cycle** page, provide the requested information:
   - **Maintenance cycle name:** Enter a descriptive name.
   - The available choices vary depending on your Collection type (database or Grid Infrastructure).
     - **Database:**
       * **Target database image:** Defaults to the latest Oracle-provided image. Click **Change database image** to select a different target database image.
         * **Oracle-provided database software images:** These images contain generally available versions of Oracle Database software.
         * **Custom database software images:** These images are created by your organization and contain customized configurations of software updates and patches.
           * Choose a **Compartment**.
           * Choose a **Region**.
             Region filter defaults to the currently connected region and lists all the software images created in that region. When you choose a different

region, the software image list is refreshed to display the software images created in the selected region.

        - **Database home:** As part of the software update, databases will be moved to a new home at the target image version. A new home may be created during the maintenance cycle or an existing home may be reused if one already exists in the VM Cluster.
            - **Create new home:** When creating new homes, the databases in the collection will maintain a similar structure. Databases in a shared home (shared with other databases) prior to the software update will be moved to a shared home as part of the update. Databases not in a shared home prior to the software update will be moved into a separate home as part of the update.
            - **Use existing home if available:** When using an existing home, all database targets in the same VM Cluster will be moved to a shared database home. If an existing home for the selected image is not found in the VM Cluster for a target database, then a new home will be created. If more than one existing home for the selected image is found, then the home with the least number of databases will be used. If multiple homes have the least number of databases, then a home will be selected at random.
            - **Database home display name prefix:** Display name for new database homes created as part of the maintenance cycle. An ordinal number will be appended to the name of the database home to make it unique.
    - **Grid Infrastructure:**
        - **Target Grid Infrastructure image:** Defaults to the latest Oracle-provided image. Click **Change Grid Infrastructure** image to select a different target Grid Infrastructure image.
            - **Oracle-provided Grid Infrastructure software images:** These images contain generally available versions of Oracle Grid Infrastructure software.
            - **Custom Grid Infrastructure software images:** These images are created by your organization and contain customized configurations of software updates and patches. For more information, see Create a Custom Oracle Grid Infrastructure Software Image.
                - Choose a **Compartment**.
                - Choose a **Region**.
                  Region filter defaults to the currently connected region and lists all the software images created in that region. When you choose a different region, the software image list is refreshed to display the software images created in the selected region.
- **Maintenance method:** Maintenance method determines how VMs in a VM Cluster are batched and which nodes are updated together when applying the software updates.
    - **One node at a time (rolling):** (Default) Database instances are updated on one VM in the cluster at a time while the other instances remain operational.
    - **Smart batch (rolling):** Database instances are updated on one or more VMs at a time. VMs are batched based on the database services configured. This ensures that all services remain available as long as they are configured on multiple nodes while minimizing the total number of batches needed.
    - **Non-rolling:** All database instances across all VMs in the cluster are updated in parallel incurring full downtime.

  - **50/50 (rolling):** The database instances on half of the VMs are updated in one batch, while the other half in another batch. The two batches are determined by the configuration of the database services. This ensures that all services remain available.
    - **Enable one batch at a time:** Select this checkbox to apply updates to one batch at a time.
      After applying the update to the first batch, the Apply action will wait to be continued before starting the second batch.

- **Stage software start time:** Optionally, set the start time for staging the software.
- **Apply update start time:** Optionally, set the start time for applying the update. Apply update start time must be at least 24 hours after the stage software start time.
  Apply update action will not run until the Stage Software action has been completed.
- **Enable Incident Logs and Trace Collection:** Allow Oracle to collect incident logs and traces to enable fault diagnosis and issue resolution.

  > **Note:**
  >
  > Any changes to this configuration are only supported when all actions for the maintenance cycle are in a scheduled state. You cannot make changes to this setting once any action for the maintenance cycle has started.

  **Enable for all targets for this cycle and future events:** Enable diagnostics log collection for all targets for this cycle and future events. Oracle recommends this for easy troubleshooting and better support.

  **Enable for all targets for this cycle only:** Enable diagnostic log collection for all targets only in the current maintenance cycle. After the cycle finishes, log collection settings will revert to the settings before the start of the maintenance cycle.

  **Use existing diagnostic log collection settings:** Only collect logs for targets with log collection already enabled.

  For more information, see:

  - Incident Logs and Trace Files and Database Service Events in the *Exadata Database Service on Cloud@Customer Administrator's Guide*.
  - Incident Logs and Trace Files and Database Service Events in the *Exadata Database Service on Dedicated Infrastructure Administrator's Guide*.
  - DataCollectionOptions Reference in the *Database Service API documentation*.

- **Advanced options:**
  - **Database start/stop options:**
    - **Maximum drain timeout (in seconds):** Specify a Drain Timeout in seconds between nodes. This would be used during a rolling update to provide time for database connection relocation. The drain timeout used will be the maximum of this value or the maximum configured drain timeout of the services running on a particular instance. Default is 600.
    - **Keep service placement:** When enabled, database service will be restored to the placement prior to the **Apply update** action.
  - **Software update options:**

        - **Ignore missing bug fixes:** Select this checkbox to perform the move as part of the software update even though the target home is missing patches for bug fixes present in the source home.
            - **Bug numbers to ignore:** Optionally, enter the bug numbers to ignore. If you don't specify a bug number, then any bug that is fixed in the source but not in the target is ignored.
        - **Force rolling patch:** Select this checkbox to force the patch operation to be performed in a rolling manner even with any non-rolling patches.
    - **Tags:** (Optional) You can choose to apply tags. If you have permission to create a resource, then you also have permission to apply free-form tags to that resource. To apply a defined tag, you must have permission to use the tag namespace. For more information about tagging, see Resource Tags. If you are not sure if you should apply tags, then skip this option (you can apply tags later) or ask your administrator.

6. Click **Create maintenance cycle**.

**Maintenance Cycle lifecycle states**:

- Maintenance Cycle will be in an **Active** state when created. It may go into an **Updating** state, if needed, when attributes are being updated.
- When an action is executing the Maintenance Cycle will go into a **Maintenance In Progress** state.
- If any action has failed jobs, and a subsequent action hasn't yet been run to successfully complete the failed jobs, the maintenance cycle will be in a **Needs Attention** state.
- Once the Apply action has succeeded, the maintenance cycle will move into a **Succeeded** state and the cleanup action would become available.
  The cleanup action is an optional action on the maintenance cycle. Run the cleanup action to delete the maintenance cycle's source database and Grid Infrastructure homes, for the databases and Grid Infrastructures in the collection, after the maintenance cycle completes successfully. You can schedule a cleanup or cleanup immediately.

> **Note:**
>
> If you try to create another maintenance cycle if a maintenance cycle already exists, then the system displays a dialog intimating that only one active maintenance cycle can exist on a collection.

## Enable One Batch at a Time

When you choose the 50/50 (rolling) Maintenance method, the system provides an additional checkbox Enable one batch at a time appears to apply updates to one batch at a time.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to edit.
   **Collection details** page is displayed.
3. Under **Resources**, click **Maintenance cycles**.
4. Click **Create maintenance cycle**.
   **Create maintenance cycle** page is displayed.
5. In the **Create maintenance cycle** page, provide the requested information.

When you choose the 50/50 (rolling) Maintenance method, an additional checkbox **Enable one batch at a time** appears. Select this checkbox to apply updates to one batch at a time.

After applying the update to the first batch, the Apply action will wait to be continued before starting the second batch.

6. Click **Create maintenance cycle**.
If you have scheduled, then the **Stage software** and **Apply update** Actions will run at the scheduled time.

   The **Actions** section on the **Maintenance details** page provides those details.

   If the scheduled **Stage software** and **Apply precheck** Actions are successful, then the first batch begins the update process.

   After applying the update to the first batch, the status of the **Maintenance cycle** changes to **Needs Attention**. The status of the **Apply update** for the second batch remains **Waiting**.

7. Click **Apply update**.
**Apply update Action** details page is displayed.

8. Click **Continue apply**.
The status of the **Apply update** for the second batch changes to **In Progress**.

   The status of the **Maintenance cycle** changes to **In Progress**.

   After applying the update to the second batch, the status of the **Maintenance cycle** changes to **Succeeded**.

   The status of the **Apply update** for the second batch changes to **Succeeded**.

## View the List of Maintenance Cycles

You can view the list of all Maintenance cycles for all Collections.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click **Maintenance cycles**.
3. Under **List Scope**, select the **Compartment** to view the Maintenance cycles associated with that compartment.
4. Under **Filters**, select a state.
**Any state** is selected by default.
5. Select the **Show historical maintenance cycles** to list all the maintenance runs.
By default, only the latest maintenance cycles are listed for each collection.
6. In the list of Maintenance cycles, click the name of the maintenance cycle to view details, or click the Actions icon (three dots) for a target, and then click **View Details**.
7. From the shortcut menu, you can select the options to **Add tags** to the Maintenance cycle and **Delete** the Maintenance cycle.

### Filter Maintenance Cycles by Compartment

To find Maintenance Cycles specific to an individual compartment, you can use List Scope to filter Maintenance Cycles by compartment.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
Under **Exadata Fleet Update**, **Collections** is selected by default.

2. Click **Maintenance Cycles**.
3. Under **List Scope**, select a compartment from the list.

## Filter Maintenance Cycles by State

Filter Maintenance Cycles by selecting a state from the list of states.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click **Maintenance Cycles**.
3. Under **Filters**, select a state from the list.

# Edit a Maintenance Cycle

To edit a maintenance cycle, be prepared to provide values for the fields required for editing the maintenance cycle.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to edit.
   **Collection details** page is displayed.
3. Under **Resources**, click **Maintenance cycles**.
4. In the list of maintenance cycles, click the name of the maintenance cycle to view details, or click the Actions icon (three dots) for a target, and then click **View Details**.
   **Maintenance cycle** details page is displayed.
5. Click **Edit maintenance cycle**.
6. Enter appropriate values in the required fields.

> **Note:**
>
> The Target image can only be modified prior to the Apply being executed. Once an Apply is executed, then you cannot edit this field.

- **Enable Incident Logs and Trace Collection:** Allow Oracle to collect incident logs and traces to enable fault diagnosis and issue resolution.

  > **Note:**
  >
  > Any changes to this configuration are only supported when all actions for the maintenance cycle are in a scheduled state. You cannot make changes to this setting once any action for the maintenance cycle has started.

  **Enable for all targets for this cycle and future events:** Enable diagnostics log collection for all targets for this cycle and future events. Oracle recommends this for easy troubleshooting and better support.

**Enable for all targets for this cycle only:** Enable diagnostic log collection for all targets only in the current maintenance cycle. After the cycle finishes, log collection settings will revert to the settings before the start of the maintenance cycle.

**Use existing diagnostic log collection settings:** Only collect logs for targets with log collection already enabled.

For more information, see:

- Incident Logs and Trace Files and Database Service Events in the *Exadata Database Service on Cloud@Customer Administrator's Guide*.
- Incident Logs and Trace Files and Database Service Events in the *Exadata Database Service on Dedicated Infrastructure Administrator's Guide*.
- DataCollectionOptions Reference in the *Database Service API documentation*.

7. Click **Save Changes**.

## Delete a Maintenance Cycle

Be cautious, you cannot recover a deleted Maintenance Cycle.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**. Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click **Maintenance Cycles**.
3. Click the name of the maintenance cycle that you want to delete. **Maintenance cycle details** page is displayed.
4. Click **More actions**, and then select **Delete**. Or, click the Actions icon (three dots), and then click **Delete**.

   **Delete** dialog is displayed.
5. Enter the name of the Maintenance Cycle, and then click **Delete**.

# Exadata Fleet Update Actions

Learn to manage Exadata Fleet Update actions and jobs.

- Run Stage, Precheck, and Apply Actions
  For each Maintenance Cycle, perform Actions on the targets in the collection. You can run the Actions manually or configure to run at a scheduled date and time.
- Re-Run Jobs While Action In Progress
  You can restart a failed job while the Action is still in progress.
- View or Download Job Logs
  To view the progress of a job or to download the logs for a job, use this procedure.
- Download Failed Job Logs
  To download the logs for a failed job, use this procedure.
- Retry Failed Actions and Jobs
  Hover the mouse over the tooltip icon for the canceled action to view the reason why the Action was canceled.
- Rollback and Remove Failed Target
  To rollback and remove the failed targets, use this procedure.
- Rollback Updates Applied to All Targets in the Collection
  To rollback the updates applied to the targets in a maintenance cycle, use this procedure.

- Clean Up the Maintenance Cycle
  You can optionally clean up the maintenance cycle.

# Run Stage, Precheck, and Apply Actions

For each Maintenance Cycle, perform Actions on the targets in the collection. You can run the Actions manually or configure to run at a scheduled date and time.

The Actions for a Maintenance Cycle are run sequentially in the same order as follows: Precheck (Stage) > Stage software > Precheck (Apply) > Apply update.

You can run the Apply action at a scheduled date and time but you cannot run it until the Stage action has been completed successfully. A Precheck is available to run for the Stage and Apply actions respectively. You can manually run a precheck. However, prechecks are run automatically as part of the Stage and Apply actions. You can configure Stage and Apply actions to run at a scheduled date and time or run them on demand.

**Action lifecycle states**:

- Scheduling an action will create the action resource in the **Scheduled** state.
  - If scheduled run is canceled, then the action would go into **Canceled** state.
- When the action runs, it will go into the **In Progress** state
  - When it completes, it will change to **Succeeded** state if all associated jobs complete successfully, or to **Failed** state if one or more of the jobs fail.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to edit.
   **Collection details** page is displayed.
3. Under **Resources**, click **Maintenance cycles**.
4. In the list of maintenance cycles, click the name of the maintenance cycle to view details, or click the Actions icon (three dots) for a target, and then click **View Details**.
   **Maintenance cycle** details page is displayed.

   Under **Resources**, **Actions** is selected by default.
5. Click **Precheck**.
   **Precheck prior to staging software** dialog is displayed.

   In the **Precheck prior to staging software** dialog, do the following:

   a. **Schedule precheck:** Select this option and set the precheck start date and time and then click **Schedule**.

   b. **Run precheck now:** Select this option to run the precheck on demand and then click **Run Precheck**.
      While the precheck is being run, the statuses of both the resources, **Maintenance cycle** and **Action** change to **In Progress**.

      If the precheck fails to run and the issue has not yet been resolved, then the status of the Maintenance cycle changes to **Needs Attention**.

      The **Actions** section provides details about the **Scheduled**, **In Progress**, **Succeeded**, and **Failed** Actions.

      For a failed action, view the errors on the action page, and then retry the action after resolving the errors, or remove the targets from the collection.

      i. To view error details, click the name of the failed Action.

**Action details** page is displayed.

Under **Resources**, **Jobs** is selected by default.

The Jobs section provides details about the **Scheduled**, **In Progress**, **Succeeded**, and **Failed** Jobs.

ii. To view error details, click the Actions icon (three dots) for a target, and then click **View errors**.
View errors page is displayed.

iii. Fix the errors.

iv. To retry failed actions, on the **Maintenance details** page, click the Actions icon (three dots) for an Action, and then click **Run Precheck Now**.
The precheck run succeeds.

6. On the **Maintenance cycle** details page, click **Stage software**.
**Stage software** dialog is displayed.

   In the **Stage software** dialog, do the following:

   a. **Schedule stage:** Select this option and set the Stage software start date and time and then click **Schedule**.

   b. **Stage now:** Select this option to run the Stage software on demand and then click **Stage now**.
   While the Stage software is being run, the statuses of both the resources, Maintenance cycle and Action change to **In Progress**.

      If the Stage software fails to run and the issue has not yet been resolved, then the status of the Maintenance cycle changes to **Needs Attention**.

      The **Actions** section provides details about the **Scheduled**, **In Progress**, **Succeeded**, and **Failed** Actions.

      For a failed action, view the errors on the action page, and then retry the action after resolving the errors, or remove the targets from the collection.

      i. To view error details, click the name of the failed Action.
      **Action details** page is displayed.

         Under **Resources**, **Jobs** is selected by default.

         The Jobs section provides details about the **Scheduled**, **In Progress**, **Succeeded**, and **Failed** Jobs.

      ii. To view error details, click the Actions icon (three dots) for a target, and then click **View errors**.
      View errors page is displayed.

      iii. Fix the errors.

      iv. To retry failed actions, on the **Maintenance details** page, click **Stage software**.
      **Retry stage software** page is displayed.

         If you click to retry a failed target, then the default is to run the action now. Otherwise, the default is to schedule the action.

      v. Click **Retry stage software**.
      The Stage software run succeeds.

7. On the **Maintenance cycle** details page, click **Precheck**.
**Precheck prior to applying software updates** dialog is displayed.

   In the **Precheck prior to applying software updates** dialog, do the following:

a. **Schedule precheck:** Select this option and set the precheck start date and time and then click **Schedule**.

b. **Run precheck now:** Select this option to run the precheck on demand and then click **Run Precheck**.
While the precheck is being run, the statuses of both the resources, **Maintenance cycle** and **Action** change to **In Progress**.

The precheck run succeeds.

8. On the **Maintenance cycle details** page, click **Apply update**.
**Apply software updates** dialog is displayed.

In the **Apply software updates** dialog, do the following:

a. **Schedule update:** Select this option and set the Apply update start date and time and then click **Schedule**.

b. **Apply update now:** Select this option to run the Apply update on demand and then click **Apply update now**.
While the Apply update is being run, the statuses of both the resources, **Maintenance cycle** and **Action** change to **In Progress**.

The **Actions** section provides details about the **Scheduled**, **In Progress**, **Succeeded**, **Failed**, and **Canceled** Actions.

> **Note:**
>
> If the **Stage software** Action does not complete successfully at the scheduled start time for the **Apply update** Action, then the **Apply update** Action is canceled automatically.

## Re-Run Jobs While Action In Progress

You can restart a failed job while the Action is still in progress.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the collection that you want to edit.
**Collection details** page is displayed.
3. Under **Resources**, click **Maintenance cycles**.
4. In the list of maintenance cycles, click the name of the maintenance cycle to view details, or click the Actions icon (three dots) for a target, and then click **View Details**.
**Maintenance cycle** details page is displayed.

   Under **Resources**, **Actions** is selected by default.
5. Click an Action that is In progress, for example, **Stage software**.
**Action details** page is displayed.
6. For a Failed job, click the Actions icon (three dots) for a target, and then click **Retry**.
The **Retry** option is available only when a Stage or Apply Action is running.

   The status of the **Failed** job changes to **In Progress**.

   After completing successfully, the status changes to **Succeeded**.

## View or Download Job Logs

To view the progress of a job or to download the logs for a job, use this procedure.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the maintenance cycle for which you want to download failed job logs.
   **Maintenance cycle** details page is displayed.

   Under **Resources**, **Actions** is selected by default.
3. In the **Actions** section, click the name of the Action for which you want to view or download logs.
   **Action details** page is displayed.

   **Jobs** section displays the list of jobs associated with the selected Action.
4. From the list of jobs, select one, click the Actions icon (three dots), and then click **View log**.
   **View log** page is displayed.

   The log is refreshed every two minutes automatically.
5. Click **Refresh log** to refresh on-demand.
6. Click **Download log** to download the log.

## Download Failed Job Logs

To download the logs for a failed job, use this procedure.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under **Exadata Fleet Update**, **Collections** is selected by default.
2. Click the name of the maintenance cycle for which you want to download failed job logs.
   **Maintenance cycle** details page is displayed.

   Under **Resources**, **Actions** is selected by default.
3. In the **Actions** section, find the action that has the status **Failed**.
4. Click the Actions icon (three dots), and then click **Download failed job logs**.
   (or)
   a. Click the name of the Action.
      **Action Details** page is displayed.
   b. Click **Download failed job logs**.

## Retry Failed Actions and Jobs

Hover the mouse over the tooltip icon for the canceled action to view the reason why the Action was canceled.

1. To view details, click the name of the Action
   **Action details** page is displayed.

   Under **Resources**, **Jobs** is selected by default.

   The **Jobs** section provides details about the **Scheduled**, **In Progress**, **Succeeded**, and **Failed** Jobs.

2. To retry failed job, click the Actions icon (three dots) for a Job, and then click **Retry**.
   The failed job returns to the **In progress** state.
3. Click the Actions icon (three dots) for a Job, and then click **View log**.
   **View log** page is displayed.
4. If there are still failed jobs, then click **Retry failed targets**.
   **Retry apply update** dialog is displayed.

   By default, **Apply update now** is selected if you retry failed targets.
5. Click **Retry apply update**.
   A notification appears indicating that the new action is in progress.
6. Click the link to view details.
   **Apply update (retry)** page is displayed.

   If one of the jobs fails, then you can choose to rollback and remove the target from the collection.
7. Click the Actions icon (three dots) for a failed Job, and then click **Rollback and remove target from collection**.
   **Rollback and remove target** dialog is displayed.
8. Review the information and then click **Rollback and remove target**.
   A notification appears indicating that the Rollback and remove action is in progress.
9. The statuses of both the resources, **Maintenance cycle** and **Action** change to **In Progress**.
   The rollback and remove action succeeds.
10. Click the name of the Action to view details.
    **Action details** page is displayed.

    The status of the resource, Maintenance cycle changes to **Succeeded**.

## Rollback and Remove Failed Target

To rollback and remove the failed targets, use this procedure.

1. To view details, click the name of the Action
   **Action details** page is displayed.

   Under **Resources**, **Jobs** is selected by default.

   The **Jobs** section provides details about the **Scheduled**, **In Progress**, **Succeeded**, and **Failed** Jobs.
2. Click the Actions icon (three dots) for a failed Job, then click **Rollback and remove target from collection**.
   **Rollback and remove target** dialog is displayed.
3. Review the information and then click **Rollback and remove target**.
   A notification appears indicating that the Rollback and remove action is in progress.
4. The statuses of both resources, **Maintenance cycle** and **Action** change to **In Progress**.
   The rollback and remove action succeeds.
5. Click the name of the Action to view details.
   **Action details** page is displayed.

   The status of the resource, Maintenance cycle changes to **Succeeded**.

# Rollback Updates Applied to All Targets in the Collection

To rollback the updates applied to the targets in a maintenance cycle, use this procedure.

1. Open the navigation menu. Under **Oracle Database**, click **Exadata Fleet Update**.
   Under Exadata Fleet Update, Collections is selected by default.
2. Click the name of the collection you want to rollback the applied updates.
   Collection details page is displayed.
3. In the **Last completed maintenance cycle** section, click the link next to **Maintenance cycle**.
   Maintenance cycle details page is displayed.
4. Select **Rollback** from the **More Actions** menu.
5. In the resulting Rollback dialog, enter the name of the collection you want to rollback.
6. Click **Rollback**.
   The status of the rollback operation is displayed as **In progress** in the **Actions** section of the **Maintenance cycle details** page.

## Rollback Operation That Needs Attention

If the rollback operation partially succeeds, the status of the rollback operation is displayed as **Needs attention**. Hover the mouse pointer over the info icon to the view the message, "`There are a few targets without old DB homes. These targets will be skipped in the rollback process. To confirm the rollback, click "Confirm rollback" from the "More Actions" menu.`"

> **Note:**
>
> After the rollback cycle precheck completes successfully, you have one hour to confirm the rollback.

1. Click the Actions icon (three dots) and then click **Confirm Rollback**.
   Confirm rollback dialog is displayed with a list of Skipped targets.
2. Click **Proceed rollback** or **Cancel rollback**.
   If the rollback operation succeeds, a banner is displayed and **Last completed rollback time** in the **General information** is updated with the UTC date and time.

## Failed Rollback Operation

If the rollback operation fails, the status of the rollback operation is displayed as Failed.

1. Click the name of the Action to retry.
   The job details are displayed on the Action details page.

   You can individually select and retry as many failed targets as needed. However, you can do that only when the action is In progress.
2. Click the Actions icon (three dots) and then click **Retry**.

## Example scenario: Rolling Back a Patch Update

1. Applying the Update (19.21 -> 19.23):
   - The update cycle is initiated, moving the current environment from Patch 19.21 to Patch 19.23. Once the **Apply Update** completes successfully, the **Cleanup** action becomes available.
   - If no issues are observed, the system remains on 19.23, and a cleanup operation can be performed to remove residual data related to the previous state, Patch 19.21.
2. Initiating a Rollback Cycle:
   - If any issues or incompatibilities arise after updating to 19.23, you can initiate a Rollback Cycle (RC) to revert to the original source, Patch 19.21.
   - During this rollback process, the environment will move back to Patch 19.21, making it essential to retain all original data tied to this version. Therefore, **Cleanup** is disabled (greyed out) to ensure no necessary data is removed prematurely.
3. After Rollback Cycle Completion:
   - Once the rollback completes, the system has returned to Patch 19.21, and the **Cleanup** action remains unavailable, as cleanup only applies to the original update target (19.21).
   - Any data associated with the reverted update, Patch 19.23, is no longer managed automatically. As a result, manual cleanup is necessary to remove any data or environments tied to 19.23 to avoid lingering dependencies or unnecessary resource consumption.

In summary, this scenario outlines how after performing a rollback, the cleanup operation must be conducted manually for the rolled-back patch target, ensuring the environment is stable and optimized for continued use.

## Clean Up the Maintenance Cycle

You can optionally clean up the maintenance cycle.

The Cleanup action:

- Retrieves the list of source Oracle Database Homes in the collection for the maintenance cycle.
- Deletes a Oracle Database Home only if it’s empty, meaning no databases are using it.
  - If a Oracle Database Home is being used by one or more databases, marks its related jobs as "`NEEDS_ATTENTION`."
  - If all Oracle Database Homes are in use, none can be deleted. The action will end as "`NEEDS_ATTENTION`," allowing the user to free the Oracle Database Homes and retry.

For more information, see Create Oracle Database Homes on an Exadata Cloud Infrastructure System.

The Cleanup action becomes available only after the **Apply Update** completes successfully. You can either schedule the cleanup operation or run it immediately.

> **Note:**
>
> The Cleanup action is unavailable after a Rollback Cycle, and similarly, the Rollback Cycle is unavailable once the Cleanup action is performed.

- **Schedule cleanup:** Select this option and set the Cleanup start date and time and then click **Schedule**.
- **Cleanup now:** Select this option to run the Cleanup on demand and then click **Cleanup now**.

5

# References

Learn about managing Exadata Fleet Update using the REST API calls.

- Exadata Fleet Update API
  Exadata Fleet Update enables you to update large collections of components directly as a single entity, orchestrating the maintenance actions to update all chosen targets in a collection in a single maintenance cycle.
- Using the API to Manage Exadata Fleet Update Resources
  Exadata Fleet Update application programming interfaces (APIs) assist with managing fleet-based software update operations for ExaDB-D and ExaDB-C@C.
- Policy Details for Exadata Fleet Update
  Learn to write policies to control access to Exadata Fleet Update resources.
- Permissions Required for Each API Operation
  Review the list of API operations for Exadata Fleet Update resources in a logical order, grouped by resource type.
- Exadata Fleet Update Events
  Exadata Fleet Update resources emit events, which are structured messages that indicate changes in resources.
- Exadata Fleet Update Limits
  Review the list of Exadata Fleet Update service limits.

## Exadata Fleet Update API

Exadata Fleet Update enables you to update large collections of components directly as a single entity, orchestrating the maintenance actions to update all chosen targets in a collection in a single maintenance cycle.

Use the table of contents and search tool to explore the Exadata Fleet Update API.

**API Endpoints:**

- https://fleet-software-update.af-johannesburg-1.oci.oraclecloud.com
- https://fleet-software-update.ap-chuncheon-1.oci.oraclecloud.com
- https://fleet-software-update.ap-hyderabad-1.oci.oraclecloud.com
- https://fleet-software-update.ap-melbourne-1.oci.oraclecloud.com
- https://fleet-software-update.ap-mumbai-1.oci.oraclecloud.com
- https://fleet-software-update.ap-osaka-1.oci.oraclecloud.com
- https://fleet-software-update.ap-seoul-1.oci.oraclecloud.com
- https://fleet-software-update.ap-singapore-1.oci.oraclecloud.com
- https://fleet-software-update.ap-sydney-1.oci.oraclecloud.com
- https://fleet-software-update.ap-tokyo-1.oci.oraclecloud.com
- https://fleet-software-update.ca-montreal-1.oci.oraclecloud.com

- https://fleet-software-update.ca-toronto-1.oci.oraclecloud.com
- https://fleet-software-update.eu-amsterdam-1.oci.oraclecloud.com
- https://fleet-software-update.eu-frankfurt-1.oci.oraclecloud.com
- https://fleet-software-update.eu-madrid-1.oci.oraclecloud.com
- https://fleet-software-update.eu-marseille-1.oci.oraclecloud.com
- https://fleet-software-update.eu-milan-1.oci.oraclecloud.com
- https://fleet-software-update.eu-paris-1.oci.oraclecloud.com
- https://fleet-software-update.eu-stockholm-1.oci.oraclecloud.com
- https://fleet-software-update.eu-zurich-1.oci.oraclecloud.com
- https://fleet-software-update.il-jerusalem-1.oci.oraclecloud.com
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- https://fleet-software-update.sa-vinhedo-1.oci.oraclecloud.com
- https://fleet-software-update.uk-cardiff-1.oci.oraclecloud.com
- https://fleet-software-update.uk-london-1.oci.oraclecloud.com
- https://fleet-software-update.us-ashburn-1.oci.oraclecloud.com
- https://fleet-software-update.us-phoenix-1.oci.oraclecloud.com
- https://fleet-software-update.us-sanjose-1.oci.oraclecloud.com

# Using the API to Manage Exadata Fleet Update Resources

Exadata Fleet Update application programming interfaces (APIs) assist with managing fleet-based software update operations for ExaDB-D and ExaDB-C@C.

For information about using the API and signing requests, see REST APIs and Security Credentials. For information about SDKs, see Software Development Kits and Command Line Interface.

For more information about using Exadata Fleet Update service APIs, see Exadata Fleet Update service API.

- Fleet Software Update Discoveries
  Review the list of REST API endpoints to manage fleet software update discoveries.
- Fleet Software Update Collections
  Review the list of REST API endpoints to manage fleet software update collections.
- Fleet Software Update Cycles
  Review the list of REST API endpoints to manage fleet software update cycles.
- Fleet Software Update Actions
  Review the list of REST API endpoints to manage fleet software update actions.
- Fleet Software Update Jobs
  Review the list of REST API endpoints to manage fleet software update jobs.

- Fleet Software Update Work Request
  Review the list of REST API endpoints to manage fleet software update work request.

## Fleet Software Update Discoveries

Review the list of REST API endpoints to manage fleet software update discoveries.

- Get a list of all Fleet Software Update Discoveries in a compartment: `ListFsuDiscoveries`
- Create a new Fleet Software Update Discovery: `CreateFsuDiscovery`
- Get a Fleet Software Update Discovery by identifier: `GetFsuDiscovery`
- Update the Fleet Software Update Discovery: `UpdateFsuDiscovery`
- Delete a Fleet Software Update Discovery: `DeleteFsuDiscovery`
- Get a list of all Targets in the results of a Fleet Software Update Discovery: `ListFsuDiscoveryTargets`
- Terminate Fleet Software Update Discovery in progress: `AbortFsuDiscovery`
- Move a resource into a different compartment: `ChangeFsuDiscoveryCompartment`

## Fleet Software Update Collections

Review the list of REST API endpoints to manage fleet software update collections.

- Get a list of all Fleet Software Update Collections in a compartment: `ListFsuCollections`
- Create a new Fleet Software Update Collection: `CreateFsuCollection`
- Get a Fleet Software Update Collection by identifier: `GetFsuCollection`
- Update the Fleet Software Update Collection identified by the ID: `UpdateFsuCollection`
- Delete a provisioned Fleet Software Update Collection: `DeleteFsuCollection`
- Get a list of all Targets that are members of a specific Fleet Software Update Collection: `ListFsuCollectionTargets`
- Add targets to an existing Fleet Software Update Collection: `AddFsuCollectionTargets`
- Remove targets from an existing Fleet Software Update Collection: `RemoveFsuCollectionTargets`
- Move a resource into a different compartment: `ChangeFsuCollectionCompartment`

## Fleet Software Update Cycles

Review the list of REST API endpoints to manage fleet software update cycles.

- Get a list of all Fleet Software Update Cycles in a compartment: `ListFsuCycles`
- Create a new Fleet Software Update Cycle: `CreateFsuCycle`
- Get a Fleet Software Update Cycle by identifier: `GetFsuCycle`
- Update the Fleet Software Update Cycle identified by the ID: `UpdateFsuCycle`
- Delete a Fleet Software Update Cycle resource by identifier: `DeleteFsuCycle`
- Clone existing Fleet Software Update Cycle details into a new Fleet Software Update Cycle resource: `CloneFsuCycle`

- Move a resource into a different compartment: `ChangeFsuCycleCompartment`

## Fleet Software Update Actions

Review the list of REST API endpoints to manage fleet software update actions.

- Get a list of all Fleet Software Update Actions in a compartment: `ListFsuActions`
- Create a new Fleet Software Update Action: `CreateFsuAction`
- Get a Fleet Software Update Action by identifier: `GetFsuAction`
- Update the Fleet Software Update Action identified by the ID: `UpdateFsuAction`
- Delete a Fleet Software Update Action resource by identifier: `DeleteFsuAction`
- Move a resource into a different compartment: `ChangeFsuActionCompartment`
- Resume an Action that has batches waiting to execute: `ResumeFsuAction`
- Cancel a scheduled Action: `CancelFsuAction`
- Get Fleet Software Update Action Output: `GetFsuActionOutputContent`

## Fleet Software Update Jobs

Review the list of REST API endpoints to manage fleet software update jobs.

- List all the Fleet Software Update jobs associated with the specified Fleet Software Update Action: `ListFsuJobs`
- Get a Fleet Software Update job by identifier: `GetFsuJob`
- Update Fleet Software Update Job resource details: `UpdateFsuJob`
- Delete the Fleet Software Update Job resource by identifier: `DeleteFsuJob`
- Retry a failed Fleet Software Update Job: `RetryFsuJob`
- List the Fleet Software Update Job Outputs: `ListFsuJobOutputs`
- Get Fleet Software Update Job Output as a binary file (string): `GetFsuJobOutputContent`

## Fleet Software Update Work Request

Review the list of REST API endpoints to manage fleet software update work request.

- Gets a Fleet Software Update Work Request by identifier: `GetWorkRequest`
- Lists all the Fleet Software Update Work Requests: `ListWorkRequests`
- Lists all the Fleet Software Update Work Request errors: `ListWorkRequestErrors`
- Lists all the Fleet Software Update Work Request logs: `ListWorkRequestLogs`

# Policy Details for Exadata Fleet Update

Learn to write policies to control access to Exadata Fleet Update resources.

> **Note:**
>
> For more information on Policies, see How Policies Work.

- About Resource-Types and Fleet Update Policies
  Learn about resource types that you can use in your policies.
- Resource-Types for Fleet Update
  Review the list of resource-types specific to Fleet Update.
- Supported Variables for Fleet Update
  Use variables when adding conditions to a policy.
- Details for Verb + Resource-Type Combinations
  Review the list of permissions and API operations covered by each verb for Fleet Update.

# About Resource-Types and Fleet Update Policies

Learn about resource types that you can use in your policies.

An aggregate resource type covers the list of individual resource types that directly follow. For example, writing one policy to allow a group to have access to the`fleet-software-update-family` is equivalent to writing separate policies for the group that would grant access to the `fleet-software-update-discoveries`, `fleet-software-update-collections`, `fleet-software-update-cycles`, and the rest of the individual resource types. For more information, see Resource-Types.

**Example Policies**

- Allow **tenancyAdmins** group to manage everything in Fleet Software Update service:

  ```
  Allow group tenancyAdmin to manage fleet-software-update-family in tenancy
  ```

- Allow **hrAdmin** group to manage Fleet Software Update resources in a specific compartment:

  ```
  Allow group hrAdmin to manage fleet-software-update-family in compartment
  hr-resoures
  ```

- Allow **opsTeam** to see action and job details and output for triaging in the HR compartment:

  ```
  Allow group hrOps to read fleet-software-update-actions in compartment hr-
  resoures


  Allow group hrOps to read fleet-software-update-jobs in compartment hr-
  resoures
  ```

- Allow a **specific user** access to an action result output in hr-resources for triaging:

  ```
  Allow user triageUser to {FSU_ACTION_READ_OUTPUT} in compartment hr-
  resources
  ```

- Allow the **on-call** group to use jobs and actions to retry, resume or cancel operations during a patching cycle:

```
Allow group onCallDev to use fleet-software-update-actions in tenancy
```

```
Allow group onCallDev to use fleet-software-update-jobs in tenancy
```

## Resource-Types for Fleet Update

Review the list of resource-types specific to Fleet Update.

**Aggregate Resource-Type**

- `fleet-software-update-family`

**Individual Resource-Types**

- `fleet-software-update-discoveries`
- `fleet-software-update-collections`
- `fleet-software-update-cycles`
- `fleet-software-update-actions`
- `fleet-software-update-jobs`
- `fleet-software-update-work-requests`
- `fleet-software-update-images`
- `fleet-software-update-homes`

## Supported Variables for Fleet Update

Use variables when adding conditions to a policy.

Fleet Update supports only the general variables. For more information, see General Variables for All Requests.

## Details for Verb + Resource-Type Combinations

Review the list of permissions and API operations covered by each verb for Fleet Update.

For more information, see Permissions, Verbs, and Resource-Types.

- Fleet Update Family Resource Types
  Each Fleet Update resource-type verb grants different levels of access.
- fleet-software-update-discoveries
  Review the list of permissions and API operations for `fleet-software-update-discoveries` resource-type.
- fleet-software-update-collections
  Review the list of permissions and API operations for `fleet-software-update-collections` resource-type.
- fleet-software-update-cycles
  Review the list of permissions and API operations for `fleet-software-update-cycles` resource-type.

- fleet-software-update-actions
  Review the list of permissions and API operations for `fleet-software-update-actions` resource-type.
- fleet-software-update-jobs
  Review the list of permissions and API operations for `fleet-software-update-jobs` resource-type.
- fleet-software-update-work-requests
  Review the list of permissions and API operations for `fleet-software-update-work-requests` resource-type.

## Fleet Update Family Resource Types

Each Fleet Update resource-type verb grants different levels of access.

The level of access is cumulative as you go from inspect to read, to use, and to manage. A plus sign (+) in a table cell indicates incremental access compared to the cell directly above it, whereas "no extra" indicates no incremental access.

For example, the `read` verb for the `fleet-software-update-discoveries` resource-type covers no extra permissions or API operations compared to the `inspect` verb. However, the `use` verb includes one more permission, fully covers one more operation, and partially covers another additional operation.

## fleet-software-update-discoveries

Review the list of permissions and API operations for `fleet-software-update-discoveries` resource-type.

| Verbs | Permissions | APIs Fully Covered | APIs Partially Covered |
|---|---|---|---|
| inspect | `FSU_DISCOVERY_INSPECT` | `ListFsuDiscoveries` | *none* |
| read | *INSPECT* + `FSU_DISCOVERY_READ` `FSU_DISCOVERY_INSPECT_MEMBERS` | `GetFsuDiscovery` `ListFsuDiscoveryTargets` | *none* |
| use | *READ* + `FSU_DISCOVERY_ABORT` | `AbortFsuDiscovery` | *none* |
| manage | *USE*+ `FSU_DISCOVERY_CREATE` `FSU_DISCOVERY_UPDATE` `FSU_DISCOVERY_DELETE` `FSU_DISCOVERY_MOVE` | `CreateFsuDiscovery` `UpdateFsuDiscovery` `DeleteFsuDiscovery` `ChangeFsuDiscoveryCompartment` | *none* |

## fleet-software-update-collections

Review the list of permissions and API operations for `fleet-software-update-collections` resource-type.

| Verbs | Permissions | APIs Fully Covered | APIs Partially Covered |
|---|---|---|---|
| inspect | FSU_DISCOVERY_INSPECT | ListFsuDiscoveries | *none* |
| read | *INSPECT* + FSU_DISCOVERY_READ FSU_DISCOVERY_INSPECT_MEMBERS | GetFsuCollection ListFsuCollectionTargets | CreateFsuCollection |
| use | *READ* + *no extra* | ListFsuCollections GetFsuCollection ListFsuCollectionTargets | *none* |
| manage | *USE*+ FSU_COLLECTION_CREATE FSU_COLLECTION_UPDATE FSU_COLLECTION_DELETE FSU_COLLECTION_MOVE FSU_COLLECTION_ADD_TARGETS FSU_COLLECTION_REMOVE_TARGETS | CreateFsuCollection UpdateFsuCollection DeleteFsuCollection ChangeFsuCollectionCompartment AddFsuCollectionTargets RemoveFsuCollectionTargets | *none* |

## fleet-software-update-cycles

Review the list of permissions and API operations for `fleet-software-update-cycles` resource-type.

| Verbs | Permissions | APIs Fully Covered | APIs Partially Covered |
|---|---|---|---|
| inspect | FSU_CYCLE_INSPECT | ListFsuCycles | *none* |
| read | *INSPECT* + FSU_CYCLE_READ | GetFsuCycle | *none* |
| use | *READ* + *no extra* | ListFsuCycles GetFsuCycle | *none* |
| manage | *USE*+ FSU_CYCLE_CREATE FSU_CYCLE_CLONE FSU_CYCLE_UPDATE FSU_CYCLE_DELETE FSU_CYCLE_MOVE FSU_COLLECTION_REMOVE_TARGETS | CreateFsuCycle CloneFsuCycle UpdateFsuCycle DeleteFsuCycle ChangeFsuCycleCompartment RemoveFsuCollectionTargets | *none* |

## fleet-software-update-actions

Review the list of permissions and API operations for `fleet-software-update-actions` resource-type.

| Verbs | Permissions | APIs Fully Covered | APIs Partially Covered |
|---|---|---|---|
| inspect | `FSU_ACTION_INSPECT` | `ListFsuActions` | *none* |
| read | *INSPECT* + `FSU_ACTION_READ` `FSU_ACTION_READ_OUTPUT` | `GetFsuAction` `GetFsuActionOutputContent` | *none* |
| use | *READ* + `FSU_ACTION_RESUME` `FSU_ACTION_CANCEL` | `ResumeFsuAction` `CancelFsuAction` | *none* |
| manage | *USE*+ `FSU_ACTION_CREATE` `FSU_ACTION_UPDATE` `FSU_ACTION_DELETE` `FSU_ACTION_MOVE` | `CreateFsuAction` `UpdateFsuAction` `DeleteFsuAction` `ChangeFsuActionCompartment` | *none* |

## fleet-software-update-jobs

Review the list of permissions and API operations for `fleet-software-update-jobs` resource-type.

| Verbs | Permissions | APIs Fully Covered | APIs Partially Covered |
|---|---|---|---|
| inspect | `FSU_JOB_INSPECT` | `ListFsuJobs` | *none* |
| read | *INSPECT* + `FSU_JOB_READ` `FSU_JOB_READ_OUTPUT` | `GetFsuJob` `ListFsuJobOutputs` | `GetFsuJobOutputContent` |
| use | *READ* + `FSU_JOB_RETRY` | `RetryFsuJob` | *none* |
| manage | *USE*+ `FSU_JOB_DELETE` `FSU_JOB_UPDATE` | `DeleteFsuJob` `UpdateFsuJob` | *none* |

## fleet-software-update-work-requests

Review the list of permissions and API operations for `fleet-software-update-work-requests` resource-type.

| Verbs | Permissions | APIs Fully Covered | APIs Partially Covered |
|---|---|---|---|
| inspect | `FSU_WORK_REQUEST_INSPECT` | `ListWorkRequests` | *none* |

| Verbs | Permissions | APIs Fully Covered | APIs Partially Covered |
|---|---|---|---|
| read | *INSPECT* + `FSU_WORK_REQUEST_READ` | `GetWorkRequest`<br>`ListWorkRequestErrors`<br>`ListWorkRequestLogs` | *none* |
| use | *READ* + *no extra* | `GetWorkRequest`<br>`ListWorkRequestErrors`<br>`ListWorkRequestLogs` | *none* |
| manage | *USE*+ *no extra* | `GetWorkRequest`<br>`ListWorkRequestErrors`<br>`ListWorkRequestLogs` | *none* |

# Permissions Required for Each API Operation

Review the list of API operations for Exadata Fleet Update resources in a logical order, grouped by resource type.

For information about permissions, see Permissions.

**Table 5-1 Resource Kinds and Permissions**

| Resource Kind | Permissions |
|---|---|
| `fleet-software-update-discoveries` | • `FSU_DISCOVERY_INSPECT`<br>• `FSU_DISCOVERY_READ`<br>• `FSU_DISCOVERY_CREATE`<br>• `FSU_DISCOVERY_UPDATE`<br>• `FSU_DISCOVERY_DELETE`<br>• `FSU_DISCOVERY_MOVE`<br>• `FSU_DISCOVERY_ABORT`<br>• `FSU_DISCOVERY_INSPECT_MEMBERS` |
| `fleet-software-update-collections` | • `FSU_COLLECTION_INSPECT`<br>• `FSU_COLLECTION_READ`<br>• `FSU_COLLECTION_CREATE`<br>• `FSU_COLLECTION_DELETE`<br>• `FSU_COLLECTION_UPDATE`<br>• `FSU_COLLECTION_MOVE`<br>• `FSU_COLLECTION_INSPECT_MEMBERS`<br>• `FSU_COLLECTION_ADD_TARGETS`<br>• `FSU_COLLECTION_REMOVE_TARGETS` |

**Table 5-1 (Cont.) Resource Kinds and Permissions**

| Resource Kind | Permissions |
|---|---|
| fleet-software-update-cycles | • FSU_CYCLE_INSPECT<br>• FSU_CYCLE_READ<br>• FSU_CYCLE_CREATE<br>• FSU_CYCLE_CLONE<br>• FSU_CYCLE_UPDATE<br>• FSU_CYCLE_DELETE<br>• FSU_CYCLE_MOVE |
| fleet-software-update-actions | • FSU_ACTION_INSPECT<br>• FSU_ACTION_READ<br>• FSU_ACTION_CREATE<br>• FSU_ACTION_UPDATE<br>• FSU_ACTION_DELETE<br>• FSU_ACTION_MOVE<br>• FSU_ACTION_RESUME<br>• FSU_ACTION_CANCEL<br>• FSU_ACTION_READ_OUTPUT |
| fleet-software-update-jobs | • FSU_JOB_INSPECT<br>• FSU_JOB_READ<br>• FSU_JOB_DELETE<br>• FSU_JOB_UPDATE<br>• FSU_JOB_RETRY<br>• FSU_JOB_READ_OUTPUT |
| fleet-software-update-work-requests | • FSU_WORK_REQUEST_INSPECT<br>• FSU_WORK_REQUEST_READ |

**Table 5-2 Exadata Fleet Update API Operations**

| API Operation | Permissions Required to User the Operation | Description |
|---|---|---|
| ListFsuDiscoveries | FSU_DISCOVERY_INSPECT | Gets a list of all Fleet Software Update Discoveries in a compartment. |
| CreateFsuDiscovery | FSU_DISCOVERY_CREATE | Creates a new Fleet Software Update Discovery. |
| GetFsuDiscovery | FSU_DISCOVERY_READ | Gets a Fleet Software Update Discovery identified by the specified ID. |
| UpdateFsuDiscovery | FSU_DISCOVERY_UPDATE | Updates Fleet Software Update Discovery. |
| DeleteFsuDiscovery | FSU_DISCOVERY_DELETE | Deletes Fleet Software Update Discovery. |
| ListFsuDiscoveryTargets | FSU_DISCOVERY_INSPECT_MEMBERS | Gets a list of all Targets in the results of a Fleet Software Update Discovery. |
| AbortFsuDiscovery | FSU_DISCOVERY_ABORT | Aborts a Fleet Software Update Discovery that is in progress. |

**Table 5-2 (Cont.) Exadata Fleet Update API Operations**

| API Operation | Permissions Required to User the Operation | Description |
|---|---|---|
| ChangeFsuDiscoveryCompartment | FSU_DISCOVERY_MOVE | Moves a resource into a different compartment. |
| ListFsuCollections | FSU_COLLECTION_INSPECT | Gets a list of all Fleet Software Update Collections in a compartment. |
| CreateFsuCollection | FSU_COLLECTION_CREATE & FSU_DISCOVERY_INSPECT_MEMBERS | Creates a new Fleet Software Update Collection.<br>Collections can get members based on the result of a discovery, so permission is required to read the results. |
| GetFsuCollection | FSU_COLLECTION_READ | Gets a Fleet Software Update Collection identified by the specified ID. |
| UpdateFsuCollection | FSU_COLLECTION_UPDATE | Updates a Fleet Software Update Collection identified by the specified ID. |
| DeleteFsuCollection | FSU_COLLECTION_DELETE | Deletes a provisioned Fleet Software Update Collection. |
| ListFsuCollectionTargets | FSU_COLLECTION_INSPECT_MEMBERS | Gets a list of all Targets that are members of a specific Fleet Software Update Collection. |
| AddFsuCollectionTargets | FSU_COLLECTION_ADD_TARGETS | Adds targets to an existing Fleet Software Update Collection. |
| RemoveFsuCollectionTargets | FSU_COLLECTION_REMOVE_TARGETS | Removes targets from an existing Fleet Software Update Collection. |
| ChangeFsuCollectionCompartment | FSU_COLLECTION_MOVE | Moves a resource into a different compartment. |
| ListFsuCycles | FSU_CYCLE_INSPECT | Gets a list of all Fleet Software Update Cycles in a compartment. |
| CreateFsuCycle | FSU_CYCLE_CREATE | Creates a new Fleet Software Update Cycle. |
| GetFsuCycle | FSU_CYCLE_READ | Gets a Fleet Software Update Cycle identified by the specified ID. |
| UpdateFsuCycle | FSU_CYCLE_UPDATE | Updates a Fleet Software Update Cycle identified by the specified ID. |
| DeleteFsuCycle | FSU_CYCLE_DELETE | Deletes a Fleet Software Update Cycle resource identified by the specified ID.. |
| CloneFsuCycle | FSU_CYCLE_CLONE | Clones an existing Fleet Software Update Cycle details into a new Fleet Software Update Cycle resource. |

**Table 5-2 (Cont.) Exadata Fleet Update API Operations**

| API Operation | Permissions Required to User the Operation | Description |
|---|---|---|
| ChangeFsuCycleCompartment | FSU_CYCLE_MOVE | Moves a resource into a different compartment. |
| ListFsuActions | FSU_ACTION_INSPECT | Gets a list of all Fleet Software Update Actions in a compartment. |
| CreateFsuAction | FSU_ACTION_CREATE | Creates a new Fleet Software Update Action. |
| GetFsuAction | FSU_ACTION_READ | Gets a Fleet Software Update Action identified by the specified ID. |
| UpdateFsuAction | FSU_ACTION_UPDATE | Updates the Fleet Software Update Action identified by the specified ID.. |
| DeleteFsuAction | FSU_ACTION_DELETE | Deletes a Fleet Software Update Action resource identified by the specified ID. |
| ChangeFsuActionCompartment | FSU_ACTION_MOVE | Moves a resource into a different compartment. |
| ResumeFsuAction | FSU_ACTION_RESUME | Resumes an Action that has batches waiting to execute. |
| CancelFsuAction | FSU_ACTION_CANCEL | Cancels a scheduled Action. |
| GetFsuActionOutputContent | FSU_ACTION_READ_OUTPUT | Gets Fleet Software Update Action Output. |
| ListFsuJobs | FSU_JOB_INSPECT | Lists all the Fleet Software Update jobs associated with the specified Fleet Software Update Action. |
| GetFsuJob | FSU_JOB_READ | Gets a Fleet Software Update job identified by the specified ID. |
| UpdateFsuJob | FSU_JOB_UPDATE | Update Fleet Software Update Job resource details. |
| DeleteFsuJob | FSU_JOB_DELETE | Deletes the Fleet Software Update Job resource identified by the specified ID. |
| RetryFsuJob | FSU_JOB_RETRY | Retries a failed Fleet Software Update Job. |
| ListFsuJobOutputs | FSU_JOB_READ_OUTPUT | Lists the Fleet Software Update Job Outputs. |
| GetFsuJobOutputContent | FSU_JOB_READ_OUTPUT | Gets Fleet Software Update Job Output as a binary file (string). |
| GetWorkRequest | FSU_WORK_REQUEST_READ | Gets a Fleet Software Update Work Request identified by the specified ID. |
| ListWorkRequests | FSU_WORK_REQUEST_INSPECT | Lists all the Fleet Software Update Work Requests. |

**Table 5-2 (Cont.) Exadata Fleet Update API Operations**

| API Operation | Permissions Required to User the Operation | Description |
|---|---|---|
| ListWorkRequestErrors | FSU_WORK_REQUEST_READ | Lists all the Fleet Software Update Work Request errors. |
| ListWorkRequestLogs | FSU_WORK_REQUEST_READ | Lists all the Fleet Software Update Work Request logs. |

# Exadata Fleet Update Events

Exadata Fleet Update resources emit events, which are structured messages that indicate changes in resources.

- About Exadata Fleet Update Event Types
  Learn about the event types available for Exadata Fleet Update resources.
- Exadata Fleet Update Event Types
  The Exadata Fleet Update resources emit events, which are structured messages that indicate changes in resources.

## About Exadata Fleet Update Event Types

Learn about the event types available for Exadata Fleet Update resources.

Exadata Fleet Update resources emit events, which are structured messages that indicate changes in resources. For more information about Oracle Cloud Infrastructure Events, see Overview of Events. You may subscribe to events and be notified when they occur using the Oracle Notification service, see Notifications Overview.

## Exadata Fleet Update Event Types

The Exadata Fleet Update resources emit events, which are structured messages that indicate changes in resources.

To create rules, see Creating an Events Rule. Note that you must select `FSU` to filter Exadata Fleet Update service events.

**Table 5-3 Exadata Fleet Update Event Types**

| Friendly Name | Event Type |
|---|---|
| FsuAction - Create Begin<br>FsuAction - Create End | com.oraclecloud.fsu.createfsuaction.begin<br>com.oraclecloud.fsu.createaction.end |
| FsuAction - Delete Begin<br>FsuAction - Delete End | com.oraclecloud.fsu.deletefsuaction.begin<br>com.oraclecloud.fsu.deleteaction.end |
| FsuCollection - Create Begin<br>FsuCollection - Create End | com.oraclecloud.fsu.createfsucollection.begin<br>com.oraclecloud.fsu.createcollection.end |

**Table 5-3 (Cont.) Exadata Fleet Update Event Types**

| Friendly Name | Event Type |
|---|---|
| FsuCollection - Delete Begin<br>FsuCollection - Delete End | com.oraclecloud.fsu.deletefsucollection.begin<br>com.oraclecloud.fsu.deletecollection.end |
| FsuCycle - Create Begin<br>FsuCycle - Create End | com.oraclecloud.fsu.createfsucycle.begin<br>com.oraclecloud.fsu.createcycle.end |
| FsuCycle - Delete Begin<br>FsuCycle - Delete End | com.oraclecloud.fsu.deletefsucycle.begin<br>com.oraclecloud.fsu.deletecycle.end |
| FsuDiscovery - Create Begin<br>FsuDiscovery - Create End | com.oraclecloud.fsu.createfsudiscovery.begin<br>com.oraclecloud.fsu.creatediscovery.end |
| FsuDiscovery - Delete Begin<br>FsuDiscovery - Delete End | com.oraclecloud.fsu.deletefsudiscovery.begin<br>com.oraclecloud.fsu.deletediscovery.end |
| FsuAction - Critical | com.oraclecloud.fsu.fsuaction.critical |
| FsuJob - Critical | com.oraclecloud.fsu.fsujob.critical |

**Example 5-1 Exadata Fleet Update Event Types Examples**

**This is a reference event for FSU Action - Create Begin**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrpd4dns24dyplwylk4g4zoby73ctsae6kmx7rxiuxsacp5gkhvnkq",
  "eventType": "com.oraclecloud.fsu.createfsuaction.begin",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.createfsuaction.begin",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "b7e9460a-e042-468a-bff5-7022c1049a0e",
    "eventTime": "2023-03-16T18:30:28.299Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "CreateFsuAction",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "",
      "resourceId": null,
      "availabilityDomain": "AD1",
      "freeformTags": {},
      "definedTags": {
        "ExampleTenant-Standard": {
          "CreatedOn": "2023-03-16T18:30:27.954Z",
```

```
            "OwnerEmail": "abc.def@oracle.com"
          }
        },
        "identity": {
          "principalName": "abc.def@oracle.com",
          "principalId": "ocid1.user.oc1..unique_ID",
          "authType": "natv",
          "callerName": null,
          "callerId": null,
          "tenantId": "ocid1.tenancy.oc1..unique_ID",
          "ipAddress": "138.3.193.241",
          "credentials": "ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26",
          "userAgent": "curl/7.84.0",
          "consoleSessionId": null
        },
        "request": {
          "id": "/F72BF8DC4DF49D29B7B42F6BBD59C43F/
BB1BB83B5C9F817931B12AF6115E61C4",
          "path": "/20220528/fsuActions",
          "action": "POST",
          "parameters": {},
          "headers": {
            "Accept": [
              "*/*"
            ],
            "Authorization": [
              "Signature version=\"1\",keyId=\"ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/
c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26\",algorithm=\"rsa-
sha256\",headers=\"(request-target) date host x-content-sha256 content-type
content-length\",signature=\"*****\""
            ],
            "Content-Length": [
              "400"
            ],
            "Content-Type": [
              "application/json"
            ],
            "Date": [
              "Thu, 16 Mar 2023 18:30:27 GMT"
            ],
            "User-Agent": [
              "curl/7.84.0"
            ],
            "x-content-sha256": [
              "VxOaoPLowmn8Y005tnSJl6wzBMK9AcKebeisAnNOwSg="
            ]
          }
        },
        "response": {
          "status": "201",
          "responseTime": "2023-03-16T18:30:28.299Z",
          "headers": {
            "Content-Length": [
              "820"
```

```
          ],
          "Content-Type": [
            "application/octet-stream"
          ],
          "Date": [
            "Thu, 16 Mar 2023 18:30:28 GMT"
          ],
          "Transfer-Encoding": [
            "chunked"
          ],
          "X-Content-Type-Options": [
            "nosniff"
          ],
          "opc-request-id": [
            "/F72BF8DC4DF49D29B7B42F6BBD59C43F/
BB1BB83B5C9F817931B12AF6115E61C4"
          ],
          "opc-work-request-id": [
            "ocid1.fsuworkrequest.oc1.unique_ID"
          ]
        },
        "payload": {},
        "message": "CreateFsuAction succeeded"
      },
      "stateChange": {
        "previous": {},
        "current": {}
      },
      "additionalDetails": {
        "X-Real-Port": 62743
      }
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuAction - Create Begin",
  "additionalDetails": [
    {
      "name": "X-Real-Port",
      "type": [
        "null",
        "Integer"
      ]
    }
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Action - Create End**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljr6bbtjmqqp2t3erqljyhreujdxtm5psecindkjwycsuf
ssttaaiza",
  "eventType": "com.oraclecloud.fsu.createaction.end",
```

```
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.createaction.end",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "e3dccb6f-8122-46b9-bfc5-a40c1ec02fd7",
    "eventTime": "2023-03-16T18:35:13.753Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "CreateAction",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "auditActionTest2",
      "resourceId": "ocid1.fsuaction.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "ad2",
      "freeformTags": null,
      "definedTags": null,
      "identity": {
        "principalName": null,
        "principalId": null,
        "authType": null,
        "callerName": null,
        "callerId": null,
        "tenantId": null,
        "ipAddress": null,
        "credentials": null,
        "userAgent": null,
        "consoleSessionId": null
      },
      "request": {
        "id": "/F72BF8DC4DF49D29B7B42F6BBD59C43F/
BB1BB83B5C9F817931B12AF6115E61C4",
        "path": "/20180828/fsuActions",
        "action": "POST",
        "parameters": null,
        "headers": null
      },
      "response": {
        "status": "200",
        "responseTime": "2023-03-16T18:35:13.753Z",
        "headers": null,
        "payload": null,
        "message": "CreateAction succeeded"
      },
      "stateChange": {
        "previous": null,
        "current": {
          "auditActionTest2": {
            "compartmentId": "ocid1.compartment.oc1..unique_ID",
            "cycleId": "ocid1.fsucycle.oc1.eu-frankfurt-1.unique_ID",
            "displayName": "auditActionTest2",
            "id": "ocid1.fsuaction.oc1.eu-frankfurt-1.unique_ID",
            "schedule": {
              "concreteClassName":
"com.oracle.fppcs.commons.contract.api.StartTimeScheduleDetailsContract",
```

```
              "startTime": 1679002107000
            },
            "state": "CANCELED",
            "tagSlug":
"AQECAR+LCAAAAAAAAACFkstu2zAQRYF8CgGtKgt6RXK06isFnEUSwEYW3VHkUGJMkfZwJD+C/
Hsku4a7CNpZzgEvz3B488ZeAL12llVJyBb+sTfmFwIoh92KN55VhD1cyE9Q2oI8A8WNH4n8u/
fG0iDNgiQugoWl+z2XnPgKeDdbEreSoxzhiIP5bZA87Szgfce1cULLJCLenMI0jT6RE0kU8T/
lml5vh93RHnrPayMEIklhldoX4vBKXUO1XteYDe3rUNelUbXYsorl42V5kMXTndMcokXtyW1awMh5h
1a7rw65MBAJ18UsvOjn/9K/O9n/QOAE8sn+V34NO0kk0CvocV/
shrLfagXl0FEJ6tgKXba0GdZoIG8zzKDeX+XT/
CKfxmk2i7NZUqySeZXFVVpGd7f575i9h2xp+uYZ3QaQNJwWMS3kwTu71EdY2O8HmtosDdNwmlP7bz2
1Dkcop7MTuuYX5/gv8VhT+nn7y4Mn+ORXjE8FaLm5kvcPdujqpFgCAAA=",
            "tenant": {
              "homeRegion": "phx",
              "id": "ocid1.tenancy.oc1..unique_ID"
            },
            "timeCreated": 1678991428185,
            "timeUpdated": 1678991713575,
            "type": "STAGE",
            "version": 217697
          }
        }
      },
      "additionalDetails": null
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuAction - Create End",
  "additionalDetails": [
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Action - Delete Begin**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljr7633yfyjlsjzqyepzquldlrjpclbnvsmf3i4u55ydek
2dqglx4cq",
  "eventType": "com.oraclecloud.fsu.deletefsuaction.begin",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.deletefsuaction.begin",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "15adcdb7-4850-4add-baf4-a604611772c2",
    "eventTime": "2023-03-16T17:59:49.060Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "DeleteFsuAction",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "",
```

```
      "resourceId": "ocid1.fsuaction.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "AD2",
      "freeformTags": {},
      "definedTags": {
        "ExampleTenant-Standard": {
          "CreatedOn": "2023-03-16T17:19:59.253Z",
          "OwnerEmail": "abc.def@oracle.com"
        }
      },
      "identity": {
        "principalName": "abc.def@oracle.com",
        "principalId": "ocid1.user.oc1..unique_ID",
        "authType": "natv",
        "callerName": null,
        "callerId": null,
        "tenantId": "ocid1.tenancy.oc1..unique_ID",
        "ipAddress": "138.3.193.241",
        "credentials": "ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26",
        "userAgent": "curl/7.84.0",
        "consoleSessionId": null
      },
      "request": {
        "id": "/
6440B7EDB972038FF1BEDD94DF02DF24/9DF2ACB7B76B59FF89A5D4B57767D7EE",
        "path": "/20220528/fsuActions/ocid1.fsuaction.oc1.eu-
frankfurt-1.unique_ID",
        "action": "DELETE",
        "parameters": {},
        "headers": {
          "Accept": [
            "*/*"
          ],
          "Authorization": [
            "Signature version=\"1\",keyId=\"ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/
c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26\",algorithm=\"rsa-
sha256\",headers=\"(request-target) date host\",signature=\"*****\""
          ],
          "Date": [
            "Thu, 16 Mar 2023 17:59:47 GMT"
          ],
          "User-Agent": [
            "curl/7.84.0"
          ]
        }
      },
      "response": {
        "status": "202",
        "responseTime": "2023-03-16T17:59:49.061Z",
        "headers": {
          "Content-Length": [
            "0"
          ],
          "Content-Type": [
            "application/octet-stream"
```

```
            ],
            "Date": [
              "Thu, 16 Mar 2023 17:59:48 GMT"
            ],
            "Transfer-Encoding": [
              "chunked"
            ],
            "X-Content-Type-Options": [
              "nosniff"
            ],
            "opc-request-id": [
              "/
6440B7EDB972038FF1BEDD94DF02DF24/9DF2ACB7B76B59FF89A5D4B57767D7EE"
            ],
            "opc-work-request-id": [
              "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID"
            ]
          },
          "payload": {},
          "message": "DeleteFsuAction succeeded"
        },
        "stateChange": {
          "previous": {
            "compartmentId": "ocid1.compartment.oc1..unique_ID",
            "displayName": "updatedAuditActionTest",
            "fsuCycleId": "ocid1.fsucycle.oc1.eu-frankfurt-1.unique_ID",
            "id": "ocid1.fsuaction.oc1.eu-frankfurt-1.unique_ID",
            "lifecycleState": "SUCCEEDED",
            "scheduleDetails": {
              "type": "START_TIME"
            },
            "timeCreated": "2023-03-16T17:19:59.970Z",
            "timeStarted": "2023-03-16T17:21:32.505Z",
            "timeUpdated": "2023-03-16T17:50:42.671Z",
            "type": "STAGE"
          },
          "current": {}
        },
        "additionalDetails": {
          "X-Real-Port": 62032
        }
      }
    },
    "serviceName": "FSU",
    "displayName": "FsuAction - Delete Begin",
    "additionalDetails": [
      {
        "name": "X-Real-Port",
        "type": [
          "null",
          "Integer"
        ]
      }
    ],
    "timeCreated": "2023-06-27T22:00:00.000Z",
```

```
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


### This is a reference event for FSU Action - Delete End


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrdeymhkigpz635vzgazfs472xtsb6rw7bbi6ochakthd
zee7ajw6a",
  "eventType": "com.oraclecloud.fsu.deleteaction.end",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.deleteaction.end",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "aedf5eb1-eb20-4335-94db-6876d7df8a44",
    "eventTime": "2023-03-16T17:59:55.546Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "DeleteAction",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "updatedAuditActionTest",
      "resourceId": "ocid1.fsuaction.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "ad1",
      "freeformTags": null,
      "definedTags": null,
      "identity": {
        "principalName": null,
        "principalId": null,
        "authType": null,
        "callerName": null,
        "callerId": null,
        "tenantId": null,
        "ipAddress": null,
        "credentials": null,
        "userAgent": null,
        "consoleSessionId": null
      },
      "request": {
        "id": "/6440B7EDB972038FF1BEDD94DF02DF24",
        "path": "/20180828/fsuActions",
        "action": "DELETE",
        "parameters": null,
        "headers": null
      },
      "response": {
        "status": "200",
        "responseTime": "2023-03-16T17:59:55.546Z",
        "headers": null,
        "payload": null,
        "message": "DeleteAction succeeded"
      },
      "stateChange": {
```

```
        "previous": null,
        "current": null
      },
      "additionalDetails": null
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuAction - Delete End",
  "additionalDetails": [
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Collection - Create Begin**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljr7wainp3ma5xcmzxbya6lydbgrp5c2r5deg7pwhnlpzx
t26f642fa",
  "eventType": "com.oraclecloud.fsu.createfsucollection.begin",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.createfsucollection.begin",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "67bef97d-8640-4787-9e8d-334585faa20a",
    "eventTime": "2023-03-13T23:03:14.608Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "CreateFsuCollection",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "",
      "resourceId": null,
      "availabilityDomain": "AD2",
      "freeformTags": {},
      "definedTags": {
        "ExampleTenant-Standard": {
          "CreatedOn": "2023-03-13T23:03:14.243Z",
          "OwnerEmail": "abc.def@oracle.com"
        }
      },
      "identity": {
        "principalName": "abc.def@oracle.com",
        "principalId": "ocid1.user.oc1..unique_ID",
        "authType": "natv",
        "callerName": null,
        "callerId": null,
        "tenantId": "ocid1.tenancy.oc1..unique_ID",
        "ipAddress": "138.3.193.241",
        "credentials": "ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26",
        "userAgent": "curl/7.84.0",
```

```
        "consoleSessionId": null
      },
      "request": {
        "id": "/
A75E9A6AA7B99E7175B15D9011E512B5/9E8A9BC4E3DEFCD71873CFECE0FF91E9",
        "path": "/20220528/fsuCollections",
        "action": "POST",
        "parameters": {},
        "headers": {
          "Accept": [
            "*/*"
          ],
          "Authorization": [
            "Signature version=\"1\",keyId=\"ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/
c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26\",algorithm=\"rsa-
sha256\",headers=\"(request-target) date host x-content-sha256 content-type
content-length\",signature=\"*****\""
          ],
          "Content-Length": [
            "438"
          ],
          "Content-Type": [
            "application/json"
          ],
          "Date": [
            "Mon, 13 Mar 2023 23:03:12 GMT"
          ],
          "User-Agent": [
            "curl/7.84.0"
          ],
          "x-content-sha256": [
            "O8wY2agtPYKQo2f4r1hGV+hpidibccLBBy+bIAZYcEA="
          ]
        }
      },
      "response": {
        "status": "201",
        "responseTime": "2023-03-13T23:03:14.608Z",
        "headers": {
          "Content-Length": [
            "834"
          ],
          "Content-Type": [
            "application/octet-stream"
          ],
          "Date": [
            "Mon, 13 Mar 2023 23:03:14 GMT"
          ],
          "Transfer-Encoding": [
            "chunked"
          ],
          "X-Content-Type-Options": [
            "nosniff"
          ],
          "opc-request-id": [
```

```
            "/
A75E9A6AA7B99E7175B15D9011E512B5/9E8A9BC4E3DEFCD71873CFECE0FF91E9"
          ],
          "opc-work-request-id": [
            "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID"
          ]
        },
        "payload": {},
        "message": "CreateFsuCollection succeeded"
      },
      "stateChange": {
        "previous": {},
        "current": {}
      },
      "additionalDetails": {
        "X-Real-Port": 53407
      }
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuCollection - Create Begin",
  "additionalDetails": [
    {
      "name": "X-Real-Port",
      "type": [
        "null",
        "Integer"
      ]
    }
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Collection - Create End**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrqisneh7pnm6hqomz5eizpxvjtfe4s4ijgpqe2ojymxv
eymtqqlna",
  "eventType": "com.oraclecloud.fsu.createcollection.end",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.createcollection.end",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "8f521308-e3ba-46ae-a16c-4408017a0a8a",
    "eventTime": "2023-03-13T23:09:51.088Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.unique_ID",
      "eventName": "CreateCollection",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "auditCollectionTest",
```

```
      "resourceId": "ocid1.fsucollection.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "ad2",
      "freeformTags": null,
      "definedTags": null,
      "identity": {
        "principalName": null,
        "principalId": null,
        "authType": null,
        "callerName": null,
        "callerId": null,
        "tenantId": null,
        "ipAddress": null,
        "credentials": null,
        "userAgent": null,
        "consoleSessionId": null
      },
      "request": {
        "id": "/
A75E9A6AA7B99E7175B15D9011E512B5/9E8A9BC4E3DEFCD71873CFECE0FF91E9",
        "path": "/20180828/fsuCollections/ocid1.fsucollection.oc1.eu-
frankfurt-1.unique_ID",
        "action": "POST",
        "parameters": null,
        "headers": null
      },
      "response": {
        "status": "200",
        "responseTime": "2023-03-13T23:09:51.088Z",
        "headers": null,
        "payload": null,
        "message": "CreateCollection succeeded"
      },
      "stateChange": {
        "previous": null,
        "current": {
          "auditCollectionTest": {
            "compartmentId": "ocid1.compartment.oc1..unique_ID",
            "displayName": "auditCollectionTest",
            "fleetDiscovery": {
              "concreteClassName":
"com.oracle.fppcs.commons.contract.api.fleetdiscovery.TargetListFleetDiscovery
Contract",
              "targets": [
                "ocid1.database.oc1.eu-frankfurt-1.unique_ID"
              ]
            },
            "fppCollectionName": "fppCollection-20230313230314",
            "id": "ocid1.fsucollection.oc1.eu-frankfurt-1.unique_ID",
            "serviceType": "EXACS",
            "sourceMajorVersion": "Db19",
            "state": "ACTIVE",
            "targetCount": 1,
            "tenant": {
              "homeRegion": "phx",
              "id": "ocid1.tenancy.oc1..unique_ID"
            },
```

```
            "timeCreated": 1678748594460,
            "timeUpdated": 1678748990848,
            "type": "Db",
            "version": 196562
          }
        }
      },
      "additionalDetails": null
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuCollection - Create End",
  "additionalDetails": [
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


### This is a reference event for FSU Collection - Delete Begin


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljranb76i2axyxihwewkaefanpmvaotwtnds7zotq7oxzi
wkqq355gq",
  "eventType": "com.oraclecloud.fsu.deletefsucollection.begin",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.deletefsucollection.begin",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "ec1e6110-a196-4504-964e-af99f055475a",
    "eventTime": "2023-03-14T00:02:35.382Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "DeleteFsuCollection",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "",
      "resourceId": "ocid1.fsucollection.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "AD2",
      "freeformTags": {},
      "definedTags": {
        "ExampleTenant-Standard": {
          "CreatedOn": "2023-03-13T23:03:14.243Z",
          "OwnerEmail": "abc.def@oracle.com"
        }
      },
      "identity": {
        "principalName": "abc.def@oracle.com",
        "principalId": "ocid1.user.oc1..unique_ID",
        "authType": "natv",
        "callerName": null,
        "callerId": null,
        "tenantId": "ocid1.tenancy.oc1..unique_ID",
```

```
        "ipAddress": "138.3.193.241",
        "credentials": "ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26",
        "userAgent": "curl/7.84.0",
        "consoleSessionId": null
      },
      "request": {
        "id": "/C169E4A61BF0AC4AC4DD7871FF186E8C/
679010F96166F1C068A576E44F4ECD2F",
        "path": "/20220528/fsuCollections/ocid1.fsucollection.oc1.unique_ID",
        "action": "DELETE",
        "parameters": {},
        "headers": {
          "Accept": [
            "*/*"
          ],
          "Authorization": [
            "Signature version=\"1\",keyId=\"ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/
c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26\",algorithm=\"rsa-
sha256\",headers=\"(request-target) date host\",signature=\"*****\""
          ],
          "Date": [
            "Tue, 14 Mar 2023 00:02:33 GMT"
          ],
          "User-Agent": [
            "curl/7.84.0"
          ]
        }
      },
      "response": {
        "status": "202",
        "responseTime": "2023-03-14T00:02:35.382Z",
        "headers": {
          "Content-Length": [
            "0"
          ],
          "Content-Type": [
            "application/octet-stream"
          ],
          "Date": [
            "Tue, 14 Mar 2023 00:02:35 GMT"
          ],
          "Transfer-Encoding": [
            "chunked"
          ],
          "X-Content-Type-Options": [
            "nosniff"
          ],
          "opc-request-id": [
            "/C169E4A61BF0AC4AC4DD7871FF186E8C/
679010F96166F1C068A576E44F4ECD2F"
          ],
          "opc-work-request-id": [
            "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID"
          ]
```

```
        },
        "payload": {},
        "message": "DeleteFsuCollection succeeded"
      },
      "stateChange": {
        "previous": {
          "activeFsuCycle": {},
          "compartmentId": "ocid1.compartment.oc1..unique_ID",
          "displayName": "updatedCollectionAuditTest",
          "fleetDiscovery": {
            "strategy": "TARGET_LIST",
            "targets": [
              "ocid1.database.oc1.eu-frankfurt-1.unique_ID"
            ]
          },
          "id": "ocid1.fsucollection.oc1.eu-frankfurt-1.unique_ID",
          "lifecycleState": "ACTIVE",
          "serviceType": "EXACS",
          "sourceMajorVersion": "DB_19",
          "targetCount": 1,
          "timeCreated": "2023-03-13T23:03:14.460Z",
          "timeUpdated": "2023-03-13T23:56:36.823Z",
          "type": "DB"
        },
        "current": {}
      },
      "additionalDetails": {
        "X-Real-Port": 54646
      }
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuCollection - Delete Begin",
  "additionalDetails": [
    {
      "name": "X-Real-Port",
      "type": [
        "null",
        "Integer"
      ]
    }
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Collection - Delete End**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljr3xbcqy57cvbjov537lphq6yhcqmhn7dwlxufs5ajdod
2bk2cz4rq",
  "eventType": "com.oraclecloud.fsu.deletecollection.end",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.deletecollection.end",
```

```
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "df8853c4-0756-4154-a0f2-154ab31c3842",
    "eventTime": "2023-03-14T00:02:52.399Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "DeleteCollection",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "updatedCollectionAuditTest",
      "resourceId": "ocid1.fsucollection.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "ad3",
      "freeformTags": null,
      "definedTags": null,
      "identity": {
        "principalName": null,
        "principalId": null,
        "authType": null,
        "callerName": null,
        "callerId": null,
        "tenantId": null,
        "ipAddress": null,
        "credentials": null,
        "userAgent": null,
        "consoleSessionId": null
      },
      "request": {
        "id": "/C169E4A61BF0AC4AC4DD7871FF186E8C/
679010F96166F1C068A576E44F4ECD2F",
        "path": "/20180828/fsuCollections/ocid1.fsucollection.oc1.eu-
frankfurt-1.unique_ID",
        "action": "DELETE",
        "parameters": null,
        "headers": null
      },
      "response": {
        "status": "200",
        "responseTime": "2023-03-14T00:02:52.399Z",
        "headers": null,
        "payload": null,
        "message": "DeleteCollection succeeded"
      },
      "stateChange": {
        "previous": {
          "updatedCollectionAuditTest": {
            "compartmentId": "ocid1.compartment.oc1..unique_ID",
            "displayName": "updatedCollectionAuditTest",
            "fleetDiscovery": {
              "concreteClassName":
"com.oracle.fppcs.commons.contract.api.fleetdiscovery.TargetListFleetDiscovery
Contract",
              "targets": [
                "ocid1.database.oc1.eu-frankfurt-1.unique_ID"
              ]
```

```
            },
            "fppCollectionName": "fppCollection-20230313230314",
            "id": "ocid1.fsucollection.oc1.eu-frankfurt-1.unique_ID",
            "serviceType": "EXACS",
            "sourceMajorVersion": "Db19",
            "tenant": {
              "homeRegion": "phx",
              "id": "ocid1.tenancy.oc1..unique_ID"
            },
            "timeCreated": 0,
            "timeUpdated": 0,
            "type": "Db"
          }
        },
        "current": {
          "updatedCollectionAuditTest": {
            "compartmentId": "ocid1.compartment.oc1..unique_ID",
            "displayName": "updatedCollectionAuditTest",
            "fleetDiscovery": {
              "concreteClassName":
"com.oracle.fppcs.commons.contract.api.fleetdiscovery.TargetListFleetDiscovery
Contract",
              "targets": [
                "ocid1.database.oc1.eu-frankfurt-1.unique_ID"
              ]
            },
            "fppCollectionName": "fppCollection-20230313230314",
            "id": "ocid1.fsucollection.oc1.eu-frankfurt-1.unique_ID",
            "serviceType": "EXACS",
            "sourceMajorVersion": "Db19",
            "tenant": {
              "homeRegion": "phx",
              "id": "ocid1.tenancy.oc1..unique_ID"
            },
            "timeCreated": 0,
            "timeUpdated": 0,
            "type": "Db"
          }
        }
      },
      "additionalDetails": null
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuCollection - Delete End",
  "additionalDetails": [
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Cycle - Create Begin**


```
{
  "id":
```

```
"ocid1.eventschema.oc1.phx.abyhqljrbyxvec7jgk2zmhw5jme4k35cxgfpwywj2m3o3jjma5a
fcpj27v6a",
  "eventType": "com.oraclecloud.fsu.createfsucycle.begin",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.createfsucycle.begin",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "982ba4d4-df81-49db-9bbe-965defc8de19",
    "eventTime": "2023-03-14T18:26:43.771Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "CreateFsuCycle",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "",
      "resourceId": null,
      "availabilityDomain": "AD2",
      "freeformTags": {},
      "definedTags": {
        "ExampleTenant-Standard": {
          "CreatedOn": "2023-03-14T18:26:43.025Z",
          "OwnerEmail": "abc.def@oracle.com"
        }
      },
      "identity": {
        "principalName": "abc.def@oracle.com",
        "principalId": "ocid1.user.oc1..unique_ID",
        "authType": "natv",
        "callerName": null,
        "callerId": null,
        "tenantId": "ocid1.tenancy.oc1..unique_ID",
        "ipAddress": "138.3.193.241",
        "credentials": "ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26",
        "userAgent": "curl/7.84.0",
        "consoleSessionId": null
      },
      "request": {
        "id": "/6139BAE8E61D05A2E7F029D3DC29D667/
A836A0CBA078FD7EB5B59DDCEFBACF82",
        "path": "/20220528/fsuCycles",
        "action": "POST",
        "parameters": {},
        "headers": {
          "Accept": [
            "*/*"
          ],
          "Authorization": [
            "Signature version=\"1\",keyId=\"ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/
c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26\",algorithm=\"rsa-
sha256\",headers=\"(request-target) date host x-content-sha256 content-type
content-length\",signature=\"*****\""
          ],
```

```
            "Content-Length": [
              "482"
            ],
            "Content-Type": [
              "application/json"
            ],
            "Date": [
              "Tue, 14 Mar 2023 18:26:41 GMT"
            ],
            "User-Agent": [
              "curl/7.84.0"
            ],
            "x-content-sha256": [
              "lSChXX0qgYb1Bg4fPQfh1aD1VDYibk1otj1GHujBuuw="
            ]
          }
        },
        "response": {
          "status": "201",
          "responseTime": "2023-03-14T18:26:43.771Z",
          "headers": {
            "Content-Length": [
              "1214"
            ],
            "Content-Type": [
              "application/octet-stream"
            ],
            "Date": [
              "Tue, 14 Mar 2023 18:26:43 GMT"
            ],
            "Transfer-Encoding": [
              "chunked"
            ],
            "X-Content-Type-Options": [
              "nosniff"
            ],
            "opc-request-id": [
              "/6139BAE8E61D05A2E7F029D3DC29D667/
A836A0CBA078FD7EB5B59DDCEFBACF82"
            ],
            "opc-work-request-id": [
              "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID"
            ]
          },
          "payload": {},
          "message": "CreateFsuCycle succeeded"
        },
        "stateChange": {
          "previous": {},
          "current": {}
        },
        "additionalDetails": {
          "X-Real-Port": 58564
        }
      }
    },
```

```
  "serviceName": "FSU",
  "displayName": "FsuCycle - Create Begin",
  "additionalDetails": [
    {
      "name": "X-Real-Port",
      "type": [
        "null",
        "Integer"
      ]
    }
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Cycle - Create End**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrrbbe3w4ksxcwk6uhllyq42xhew5ex42kjdtx5vyh4zi
wfuz7gwvq",
  "eventType": "com.oraclecloud.fsu.createcycle.end",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.createcycle.end",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "94000a15-caa8-4f43-9032-e66b44afc0f9",
    "eventTime": "2023-03-14T18:27:05.299Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "CreateCycle",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "auditCycleTest",
      "resourceId": "ocid1.fsucycle.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "ad3",
      "freeformTags": null,
      "definedTags": null,
      "identity": {
        "principalName": null,
        "principalId": null,
        "authType": null,
        "callerName": null,
        "callerId": null,
        "tenantId": null,
        "ipAddress": null,
        "credentials": null,
        "userAgent": null,
        "consoleSessionId": null
      },
      "request": {
        "id": "/6139BAE8E61D05A2E7F029D3DC29D667/
A836A0CBA078FD7EB5B59DDCEFBACF82",
```

```
        "path": "/20180828/fsuCycles",
        "action": "POST",
        "parameters": null,
        "headers": null
      },
      "response": {
        "status": "200",
        "responseTime": "2023-03-14T18:27:05.299Z",
        "headers": null,
        "payload": null,
        "message": "CreateCycle succeeded"
      },
      "stateChange": {
        "previous": null,
        "current": {
          "auditCycleTest": {
            "batchingStrategy": {
              "isForceRolling": true,
              "type": "Sequential"
            },
            "collectionId": "ocid1.fsucollection.oc1.eu-
frankfurt-1.unique_ID",
            "collectionType": "Db",
            "compartmentId": "ocid1.compartment.oc1..unique_ID",
            "details": {
              "concreteClassName":
"com.oracle.fppcs.commons.contract.api.cycles.operations.PatchOperationDetails
Contract"
            },
            "displayName": "auditCycleTest",
            "id": "ocid1.fsucycle.oc1.eu-frankfurt-1.unique_ID",
            "nextActionToExecute": "STAGE",
            "state": "ACTIVE",
            "tagSlug":
"AQECAR+LCAAAAAAAAACFkk2PmzAQhqX+FEucShAYFrac+rWV0kO3UqIeejP2GLwxdjIeyMdq/
3shaZQeqt05ziO/fsbjd8/sF2Aw3rE6i9ky/Bis/YYA2mO/Fm1gNeEAV/IVtHGgLkALGyai/
u09Mx7xPMrSMlo6ejgIJUisQfSLFQmnBKoJTji6v4uyx70DfOiFsV4alSUk2nOYockn8TJLEvG3fDu
Y3bg/ueMQRGOlRCQlndaHUh6fqG+pMZsG87F7GpumsrqRO1azYrqsiPJ0vnOeQ3ZoAvltB5j44NEZ/
9GjkBYS6fuUxVf94jX9D2f7LwiCQD26N+U3sFdEEoOGAQ/
lfqyGndFQjT1VoE+dNFVH23GDFoouxxyaw02eF1d5nvJ8keaLrFhn9zUv6yJPUn73O2UvMVvZof2Jf
gtIBs6LmBfyPXi3MidYus9HmtuMxzye5zTh00Cdxwmq+eyMbvnlJf59OtWcftn+6hgI/
vMrpqcCdMLeyMsfaJmy61gCAAA=",
            "target": {
              "type": "Version",
              "version": "19.17.0.0.0"
            },
            "tenant": {
              "homeRegion": "phx",
              "id": "ocid1.tenancy.oc1..unique_ID"
            },
            "timeCreated": 1678818403325,
            "timeUpdated": 1678818424991,
            "type": "Patch",
            "version": 202733
          }
        }
```

```
      },
      "additionalDetails": null
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuCycle - Create End",
  "additionalDetails": [
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


### This is a reference event for FSU Cycle - Delete Begin


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljr5tvhjnrnogj4hfjljmmeycf46ukxkejdhamswvrdpk3
5ju553muq",
  "eventType": "com.oraclecloud.fsu.deletefsucycle.begin",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.deletefsucycle.begin",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "6d70db92-f499-433d-9cb7-5d2cdfe0206b",
    "eventTime": "2023-03-14T19:15:31.180Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "DeleteFsuCycle",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "",
      "resourceId": "ocid1.fsucycle.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "AD2",
      "freeformTags": {},
      "definedTags": {
        "ExampleTenant-Standard": {
          "CreatedOn": "2023-03-14T18:26:43.025Z",
          "OwnerEmail": "abc.def@oracle.com"
        }
      },
      "identity": {
        "principalName": "abc.def@oracle.com",
        "principalId": "ocid1.user.oc1..unique_ID",
        "authType": "natv",
        "callerName": null,
        "callerId": null,
        "tenantId": "ocid1.tenancy.oc1..unique_ID",
        "ipAddress": "138.3.193.241",
        "credentials": "ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26",
        "userAgent": "curl/7.84.0",
        "consoleSessionId": null
      },
```

```
      "request": {
        "id": "/
A6801F32AB8E1591A26857D1624DFCA5/5A93DD1FCBB8E55955EBFA6E754144BB",
        "path": "/20220528/fsuCycles/ocid1.fsucycle.oc1.eu-
frankfurt-1.unique_ID",
        "action": "DELETE",
        "parameters": {},
        "headers": {
          "Accept": [
            "*/*"
          ],
          "Authorization": [
            "Signature version=\"1\",keyId=\"ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/
c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26\",algorithm=\"rsa-
sha256\",headers=\"(request-target) date host\",signature=\"*****\""
          ],
          "Date": [
            "Tue, 14 Mar 2023 19:15:28 GMT"
          ],
          "User-Agent": [
            "curl/7.84.0"
          ]
        }
      },
      "response": {
        "status": "202",
        "responseTime": "2023-03-14T19:15:31.181Z",
        "headers": {
          "Content-Length": [
            "0"
          ],
          "Content-Type": [
            "application/octet-stream"
          ],
          "Date": [
            "Tue, 14 Mar 2023 19:15:30 GMT"
          ],
          "Transfer-Encoding": [
            "chunked"
          ],
          "X-Content-Type-Options": [
            "nosniff"
          ],
          "opc-request-id": [
            "/
A6801F32AB8E1591A26857D1624DFCA5/5A93DD1FCBB8E55955EBFA6E754144BB"
          ],
          "opc-work-request-id": [
            "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID"
          ]
        },
        "payload": {},
        "message": "DeleteFsuCycle succeeded"
      },
      "stateChange": {
```

```
        "previous": {
          "batchingStrategy": {
            "isForceRolling": true,
            "type": "SEQUENTIAL"
          },
          "collectionType": "DB",
          "compartmentId": "ocid1.compartment.oc1..unique_ID",
          "displayName": "updatedAuditCycleTest",
          "fsuCollectionId": "ocid1.fsucollection.oc1.eu-
frankfurt-1.unique_ID",
          "goalVersionDetails": {
            "type": "VERSION",
            "version": "19.17.0.0.0"
          },
          "id": "ocid1.fsucycle.oc1.eu-frankfurt-1.unique_ID",
          "lifecycleState": "ACTIVE",
          "maxDrainTimeoutInSeconds": 600,
          "nextActionToExecute": "STAGE",
          "timeCreated": "2023-03-14T18:26:43.325Z",
          "timeUpdated": "2023-03-14T18:37:25.220Z",
          "type": "PATCH"
        },
        "current": {}
      },
      "additionalDetails": {
        "X-Real-Port": 59730
      }
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuCycle - Delete Begin",
  "additionalDetails": [
    {
      "name": "X-Real-Port",
      "type": [
        "null",
        "Integer"
      ]
    }
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Cycle - Delete End**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrwaagfdh4i2h7x7emcyuijmkuxqwqxcuoljotxw3tdab
q37hiusma",
  "eventType": "com.oraclecloud.fsu.deletecycle.end",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.deletecycle.end",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
```

```
    "source": "FSU",
    "eventID": "344385b8-1833-45a6-bd1f-0024b82d84fe",
    "eventTime": "2023-03-14T19:15:47.989Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "DeleteCycle",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "updatedAuditCycleTest",
      "resourceId": "ocid1.fsucycle.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "ad2",
      "freeformTags": null,
      "definedTags": null,
      "identity": {
        "principalName": null,
        "principalId": null,
        "authType": null,
        "callerName": null,
        "callerId": null,
        "tenantId": null,
        "ipAddress": null,
        "credentials": null,
        "userAgent": null,
        "consoleSessionId": null
      },
      "request": {
        "id": "/
A6801F32AB8E1591A26857D1624DFCA5/5A93DD1FCBB8E55955EBFA6E754144BB",
        "path": "/20180828/fsuCycles",
        "action": "DELETE",
        "parameters": null,
        "headers": null
      },
      "response": {
        "status": "200",
        "responseTime": "2023-03-14T19:15:47.989Z",
        "headers": null,
        "payload": null,
        "message": "DeleteCycle succeeded"
      },
      "stateChange": {
        "previous": null,
        "current": null
      },
      "additionalDetails": null
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuCycle - Delete End",
  "additionalDetails": [
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```

**This is a reference event for FSU Discovery - Create Begin**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljr2k6tws5dnh5q7mlzb4vx3cclmu5cmrtz5lssvy2ygjo
mdrihggqq",
  "eventType": "com.oraclecloud.fsu.createfsudiscovery.begin",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.createfsudiscovery.begin",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "32b6267d-8b5c-4575-b0f8-7a602de7c7cb",
    "eventTime": "2023-03-10T22:56:48.749Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "CreateFsuDiscovery",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "",
      "resourceId": null,
      "availabilityDomain": "AD1",
      "freeformTags": {},
      "definedTags": {
        "ExampleTenant-Standard": {
          "CreatedOn": "2023-03-10T22:56:48.494Z",
          "OwnerEmail": "abc.def@oracle.com"
        }
      },
      "identity": {
        "principalName": "abc.def@oracle.com",
        "principalId": "ocid1.user.oc1..unique_ID",
        "authType": "natv",
        "callerName": null,
        "callerId": null,
        "tenantId": "ocid1.tenancy.oc1..unique_ID",
        "ipAddress": "138.3.193.241",
        "credentials": "ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26",
        "userAgent": "curl/7.84.0",
        "consoleSessionId": null
      },
      "request": {
        "id": "/
FDE687669617381932C919EA2F036203/747D9F452A14C3B8522E8F43E60E247A",
        "path": "/20220528/fsuDiscoveries",
        "action": "POST",
        "parameters": {},
        "headers": {
          "Accept": [
            "*/*"
          ],
          "Authorization": [
            "Signature version=\"1\",keyId=\"ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/
```

```
c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26\",algorithm=\"rsa-
sha256\",headers=\"(request-target) date host x-content-sha256 content-type
content-length\",signature=\"*****\""
          ],
          "Content-Length": [
            "1454"
          ],
          "Content-Type": [
            "application/json"
          ],
          "Date": [
            "Fri, 10 Mar 2023 22:56:47 GMT"
          ],
          "User-Agent": [
            "curl/7.84.0"
          ],
          "x-content-sha256": [
            "0uzhitPwsdkfZQiZ+xmysTLVRQhc5muOwiXg4CAxPbs="
          ]
        }
      },
      "response": {
        "status": "201",
        "responseTime": "2023-03-10T22:56:48.749Z",
        "headers": {
          "Content-Length": [
            "1437"
          ],
          "Content-Type": [
            "application/octet-stream"
          ],
          "Date": [
            "Fri, 10 Mar 2023 22:56:48 GMT"
          ],
          "Transfer-Encoding": [
            "chunked"
          ],
          "X-Content-Type-Options": [
            "nosniff"
          ],
          "opc-request-id": [
            "/
FDE687669617381932C919EA2F036203/747D9F452A14C3B8522E8F43E60E247A"
          ],
          "opc-work-request-id": [
            "ocid1.fsuworkrequest.oc1.unique_ID"
          ]
        },
        "payload": {},
        "message": "CreateFsuDiscovery succeeded"
      },
      "stateChange": {
        "previous": {},
        "current": {}
      },
      "additionalDetails": {
```

```
        "X-Real-Port": 53429
      }
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuDiscovery - Create Begin",
  "additionalDetails": [
    {
      "name": "X-Real-Port",
      "type": [
        "null",
        "Integer"
      ]
    }
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


### This is a reference event for FSU Discovery - Create End


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrgxdildejogswyt533cdfmp3ukhbxyu6ch65h5ixogwl
2hewygbpa",
  "eventType": "com.oraclecloud.fsu.creatediscovery.end",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.creatediscovery.end",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "a4f3ff66-1d24-4d9c-9109-d15cb5b7bcc0",
    "eventTime": "2023-03-10T22:57:46.139Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "CreateDiscovery",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "discoveryAuditTest1",
      "resourceId": "ocid1.fsudiscovery.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "ad2",
      "freeformTags": null,
      "definedTags": null,
      "identity": {
        "principalName": null,
        "principalId": null,
        "authType": null,
        "callerName": null,
        "callerId": null,
        "tenantId": null,
        "ipAddress": null,
        "credentials": null,
        "userAgent": null,
        "consoleSessionId": null
```

```
      },
      "request": {
        "id": "/
FDE687669617381932C919EA2F036203/747D9F452A14C3B8522E8F43E60E247A",
        "path": "/20180828/fsuDiscovery",
        "action": "POST",
        "parameters": null,
        "headers": null
      },
      "response": {
        "status": "200",
        "responseTime": "2023-03-10T22:57:46.139Z",
        "headers": null,
        "payload": null,
        "message": "CreateDiscovery succeeded"
      },
      "stateChange": {
        "previous": null,
        "current": {
          "discoveryAuditTest1": {
            "compartmentId": "ocid1.compartment.oc1..unique_ID",
            "discoveredTargets": [
              "ocid1.database.oc1.eu-frankfurt-1.unique_ID"
            ],
            "displayName": "discoveryAuditTest1",
            "fleetDiscovery": {
              "concreteClassName":
"com.oracle.fppcs.commons.contract.api.fleetdiscovery.FilterFleetDiscoveryCont
ract",
              "filters": [
                {
                  "compartments": [
                    "ocid1.compartment.oc1..unique_ID"
                  ],
                  "concreteClassName":
"com.oracle.fppcs.commons.contract.api.fleetdiscovery.CompartmentFilterContrac
t",
                  "operator": "Or",
                  "type": "Compartment"
                },
                {
                  "concreteClassName":
"com.oracle.fppcs.commons.contract.api.fleetdiscovery.VersionFilterContract",
                  "operator": "Or",
                  "type": "Version",
                  "versions": [
                    "19.16.0.0"
                  ]
                },
                {
                  "concreteClassName":
"com.oracle.fppcs.commons.contract.api.fleetdiscovery.ResourceIdFilterContract
",
                  "operator": "Or",
                  "resourceType": "Cloudexadatainfrastructure",
                  "resources": [
```

```
                    "ocid1.cloudexadatainfrastructure.oc1.eu-
frankfurt-1.unique_ID"
                  ],
                  "type": "ResourceId"
                },
                {
                  "concreteClassName":
"com.oracle.fppcs.commons.contract.api.fleetdiscovery.ResourceIdFilterContract
",
                  "operator": "Or",
                  "resourceType": "Cloudvmcluster",
                  "resources": [
                    "ocid1.cloudvmcluster.oc1.eu-frankfurt-1.unique_ID"
                  ],
                  "type": "ResourceId"
                }
              ]
            },
            "id": "ocid1.fsudiscovery.oc1.eu-frankfurt-1.unique_ID",
            "serviceType": "EXACS",
            "sourceMajorVersion": "Db19",
            "state": "SUCCEEDED",
            "tenant": {
              "homeRegion": "phx",
              "id": "ocid1.tenancy.oc1..unique_ID"
            },
            "timeCreated": 1678489008632,
            "timeUpdated": 1678489066008,
            "type": "Db",
            "version": 173386
          }
        }
      },
      "additionalDetails": null
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuDiscovery - Create End",
  "additionalDetails": [
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Discovery - Delete Begin**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrqfm64rtbtyq4gd45vfdcdjm3fdbpjzqyt46omohszn4
jsl2qk5xa",
  "eventType": "com.oraclecloud.fsu.deletefsudiscovery.begin",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.deletefsudiscovery.begin",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
```

```
    "source": "FSU",
    "eventID": "bf03b9ca-c277-401e-b7d5-afdaf1cde3f0",
    "eventTime": "2023-03-15T18:12:30.393Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "DeleteFsuDiscovery",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "",
      "resourceId": "ocid1.fsudiscovery.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "AD2",
      "freeformTags": {},
      "definedTags": {
        "ExampleTenant-Standard": {
          "CreatedOn": "2023-03-15T18:10:26.287Z",
          "OwnerEmail": "abc.def@oracle.com"
        }
      },
      "identity": {
        "principalName": "abc.def@oracle.com",
        "principalId": "ocid1.user.oc1..unique_ID",
        "authType": "natv",
        "callerName": null,
        "callerId": null,
        "tenantId": "ocid1.tenancy.oc1..unique_ID",
        "ipAddress": "138.3.193.241",
        "credentials": "ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26",
        "userAgent": "curl/7.84.0",
        "consoleSessionId": null
      },
      "request": {
        "id": "/
14EC36589F56B35921A299CBC0FDDCD2/8381CDFAFBA19CF400C3B1D77C7864E7",
        "path": "/20220528/fsuDiscoveries/ocid1.fsudiscovery.unique_ID",
        "action": "DELETE",
        "parameters": {},
        "headers": {
          "Accept": [
            "*/*"
          ],
          "Authorization": [
            "Signature version=\"1\",keyId=\"ocid1.tenancy.oc1..unique_ID/
ocid1.user.oc1..unique_ID/
c0:69:a4:37:a7:20:2a:e2:cf:eb:a4:7a:39:03:85:26\",algorithm=\"rsa-
sha256\",headers=\"(request-target) date host\",signature=\"*****\""
          ],
          "Date": [
            "Wed, 15 Mar 2023 18:12:29 GMT"
          ],
          "User-Agent": [
            "curl/7.84.0"
          ]
        }
      },
```

```
      "response": {
        "status": "202",
        "responseTime": "2023-03-15T18:12:30.394Z",
        "headers": {
          "Content-Length": [
            "0"
          ],
          "Content-Type": [
            "application/octet-stream"
          ],
          "Date": [
            "Wed, 15 Mar 2023 18:12:30 GMT"
          ],
          "Transfer-Encoding": [
            "chunked"
          ],
          "X-Content-Type-Options": [
            "nosniff"
          ],
          "opc-request-id": [
            "/
14EC36589F56B35921A299CBC0FDDCD2/8381CDFAFBA19CF400C3B1D77C7864E7"
          ],
          "opc-work-request-id": [
            "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID"
          ]
        },
        "payload": {},
        "message": "DeleteFsuDiscovery succeeded"
      },
      "stateChange": {
        "previous": {
          "compartmentId": "ocid1.compartment.oc1..unique_ID",
          "details": {
            "criteria": {
              "strategy": "TARGET_LIST",
              "targets": [
                "ocid1.database.oc1.eu-frankfurt-1.unique_ID"
              ]
            },
            "serviceType": "EXACS",
            "sourceMajorVersion": "DB_19",
            "type": "DB"
          },
          "displayName": "discoveryAuditTest",
          "id": "ocid1.fsudiscovery.oc1.eu-frankfurt-1.unique_ID",
          "lifecycleState": "SUCCEEDED",
          "timeCreated": "2023-03-15T18:10:26.419Z",
          "timeUpdated": "2023-03-15T18:11:26.139Z"
        },
        "current": {}
      },
      "additionalDetails": {
        "X-Real-Port": 51985
      }
    }
```

```
  },
  "serviceName": "FSU",
  "displayName": "FsuDiscovery - Delete Begin",
  "additionalDetails": [
    {
      "name": "X-Real-Port",
      "type": [
        "null",
        "Integer"
      ]
    }
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Discovery - Delete End**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrfoda22537fx55ar2rd6rzo7wm6d2u64ffwycilj3wma
c3qvlbx2a",
  "eventType": "com.oraclecloud.fsu.deletediscovery.end",
  "exampleEvent": {
    "eventType": "com.oraclecloud.fsu.deletediscovery.end",
    "cloudEventsVersion": "0.1",
    "eventTypeVersion": "2.0",
    "source": "FSU",
    "eventID": "a35d71f1-603e-47d9-8da6-24c99053d11e",
    "eventTime": "2023-03-15T18:12:51.964Z",
    "contentType": "application/json",
    "data": {
      "eventGroupingId": "ocid1.fsuworkrequest.oc1.eu-frankfurt-1.unique_ID",
      "eventName": "DeleteDiscovery",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "resourceName": "discoveryAuditTest",
      "resourceId": "ocid1.fsudiscovery.oc1.eu-frankfurt-1.unique_ID",
      "availabilityDomain": "ad2",
      "freeformTags": null,
      "definedTags": null,
      "identity": {
        "principalName": null,
        "principalId": null,
        "authType": null,
        "callerName": null,
        "callerId": null,
        "tenantId": null,
        "ipAddress": null,
        "credentials": null,
        "userAgent": null,
        "consoleSessionId": null
      },
      "request": {
        "id": "/
```

```
14EC36589F56B35921A299CBC0FDDCD2/8381CDFAFBA19CF400C3B1D77C7864E7",
        "path": "/20180828/fsuDiscovery",
        "action": "DELETE",
        "parameters": null,
        "headers": null
      },
      "response": {
        "status": "200",
        "responseTime": "2023-03-15T18:12:51.964Z",
        "headers": null,
        "payload": null,
        "message": "DeleteDiscovery succeeded"
      },
      "stateChange": {
        "previous": null,
        "current": null
      },
      "additionalDetails": null
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuDiscovery - Delete End",
  "additionalDetails": [
  ],
  "timeCreated": "2023-06-27T22:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Action - Critical**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrmaxm34w2p2kjv656pk5evqc7sqcefl77ygexjoh2jwt
4bv6aucmq",
  "eventType": "com.oraclecloud.fsu.fsuaction.critical",
  "exampleEvent": {
    "eventID": "344668b6-829e-48ae-a549-9f6bb0ef39fb",
    "eventType": "com.oraclecloud.fsu.fsuaction.critical",
    "eventTypeVersion": "2.0",
    "eventTime": "2023-07-06T13:26:23.352Z",
    "cloudEventsVersion": "0.1",
    "contentType": "application/json",
    "source": "fsuaction-20230706125615",
    "data": {
      "additionalDetails": {
        "description": "FSU Action needs attention.",
        "fsuActionOutput": "PRCZ-4057 : HTTP POST request https://
254.87.0.1:7085/fpphelper failed.\nConnection refused (Connection refused)",
        "fsuActionType": "PRECHECK",
        "fsuCollectionId": "ocid1.fsucollection.oc1.phx.unique_ID",
        "fsuCollectionServiceType": "EXACS",
        "fsuCollectionType": "DB",
        "fsuCycleId": "ocid1.fsucycle.oc1.phx.unique_ID"
      },
      "availabilityDomain": "ad1",
```

```
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "definedTags": null,
      "eventGroupingId": null,
      "eventName": "fsuaction.critical",
      "freeformTags": null,
      "identity": {
        "authType": null,
        "callerId": null,
        "callerName": null,
        "consoleSessionId": null,
        "credentials": null,
        "ipAddress": null,
        "principalId": null,
        "principalName": null,
        "tenantId": null,
        "userAgent": null
      },
      "message": "fsuaction.critical",
      "request": {
        "action": null,
        "headers": null,
        "id": null,
        "parameters": null,
        "path": null
      },
      "resourceId": "ocid1.fsuaction.oc1.phx.unique_ID",
      "response": {
        "headers": null,
        "message": null,
        "payload": null,
        "responseTime": null,
        "status": null
      },
      "stateChange": {
        "current": null,
        "previous": null
      }
    }
  },
  "serviceName": "FSU",
  "displayName": "FsuAction - Critical",
  "additionalDetails": [
    {
      "name": "description",
      "type": [
        "null",
        "string"
      ]
    },
    {
      "name": "fsuActionOutput",
      "type": [
        "null",
        "string"
      ]
```

```
    },
    {
      "name": "fsuActionType",
      "type": [
        "null",
        "string"
      ]
    },
    {
      "name": "fsuCollectionId",
      "type": [
        "null",
        "string"
      ]
    },
    {
      "name": "fsuCollectionServiceType",
      "type": [
        "null",
        "string"
      ]
    },
    {
      "name": "fsuCollectionType",
      "type": [
        "null",
        "string"
      ]
    },
    {
      "name": "fsuCycleId",
      "type": [
        "null",
        "string"
      ]
    }
  ],
  "timeCreated": "2023-07-06T14:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


**This is a reference event for FSU Job - Critical**


```
{
  "id":
"ocid1.eventschema.oc1.phx.abyhqljrmyozhhrtirpmgs4forvxpzre37mxgk7jdv2ivhu7xqz
65diasopadm",
  "eventType": "com.oraclecloud.fsu.fsujob.critical",
  "exampleEvent": {
    "eventID": "c0ea9ba7-637c-496b-9982-25daa766a90f",
    "eventType": "com.oraclecloud.fsu.fsujob.critical",
    "eventTypeVersion": "2.0",
    "eventTime": "2023-07-06T13:25:45.591Z",
    "cloudEventsVersion": "0.1",
    "contentType": "application/json",
```

```
    "source": "fsujob-20230706125954",
    "data": {
      "additionalDetails": {
        "description": "FSU Job needs attention.",
        "fsuActionId":
"ocid1.fsuaction.dev.dev.aaaaaaaadykrjfycg6kyr6k7jr5565kixn5dg3hrvmfrxcp6pfxu2
j5rwqsa",
        "fsuActionType": "PRECHECK",
        "fsuCollectionId": "ocid1.fsucollection.oc1.phx.unique_ID",
        "fsuCollectionServiceType": "EXACS",
        "fsuCollectionType": "DB",
        "fsuCycleId": "ocid1.fsucycle.oc1.phx.unique_ID",
        "fsuJobOutput": "PRCZ-4057 : HTTP POST request https://
254.87.0.1:7085/fpphelper failed.\nConnection refused (Connection refused)",
         "targetId": "ocid1.database.oc1.phx.unique_ID"
      },
      "availabilityDomain": "ad1",
      "compartmentId": "ocid1.compartment.oc1..unique_ID",
      "compartmentName": "example_compartment",
      "definedTags": null,
      "eventGroupingId": null,
      "eventName": "fsujob.critical",
      "freeformTags": null,
      "identity": {
        "authType": null,
        "callerId": null,
        "callerName": null,
        "consoleSessionId": null,
        "credentials": null,
        "ipAddress": null,
        "principalId": null,
        "principalName": null,
        "tenantId": null,
        "userAgent": null
      },
      "message": "fsujob.critical",
      "request": {
        "action": null,
        "headers": null,
        "id": null,
        "parameters": null,
        "path": null
      },
      "resourceId": "ocid1.fsujob.oc1.phx.unique_ID",
      "response": {
        "headers": null,
        "message": null,
        "payload": null,
        "responseTime": null,
        "status": null
      },
      "stateChange": {
        "current": null,
        "previous": null
      }
    }
```

```
},
"serviceName": "FSU",
"displayName": "FsuJob - Critical",
"additionalDetails": [
  {
    "name": "description",
    "type": [
      "null",
      "string"
    ]
  },
  {
    "name": "fsuActionId",
    "type": [
      "null",
      "string"
    ]
  },
  {
    "name": "fsuActionType",
    "type": [
      "null",
      "string"
    ]
  },
  {
    "name": "fsuCollectionId",
    "type": [
      "null",
      "string"
    ]
  },
  {
    "name": "fsuCollectionServiceType",
    "type": [
      "null",
      "string"
    ]
  },
  {
    "name": "fsuCollectionType",
    "type": [
      "null",
      "string"
    ]
  },
  {
    "name": "fsuCycleId",
    "type": [
      "null",
      "string"
    ]
  },
  {
    "name": "fsuJobOutput",
    "type": [
```

```
        "null",
        "string"
      ]
    },
    {
      "name": "targetId",
      "type": [
        "null",
        "string"
      ]
    }
  ],
  "timeCreated": "2023-07-06T14:00:00.000Z",
  "activationTime": "2023-07-27T00:00:00.000Z"
}
```


# Exadata Fleet Update Limits

Review the list of Exadata Fleet Update service limits.

| Resource | Resource Group | Limit Scope | Enterprise Limit | Pay As You Go or Trial |
|---|---|---|---|---|
| DiscoveryCount | fppcs | Region | 60,000. File a regular Customer Account Management (CAM) ticket to increase the limit. | 60,000. File a regular Customer Account Management (CAM) ticket to increase the limit. |
| CollectionCount | fppcs | Region | 100. File a regular Customer Account Management (CAM) ticket to increase the limit. | 100. File a regular Customer Account Management (CAM) ticket to increase the limit. |
| MaintenanceCycle Count | fppcs | Region | 1,200. File a regular Customer Account Management (CAM) ticket to increase the limit. | 1,200. File a regular Customer Account Management (CAM) ticket to increase the limit. |
| ActionCount | fppcs | Region | 3,600. File a regular Customer Account Management (CAM) ticket to increase the limit. | 3,600. File a regular Customer Account Management (CAM) ticket to increase the limit. |
| JobCount | fppcs | Region | 3,600,000. File a regular Customer Account Management (CAM) ticket to increase the limit. | 3,600,000. File a regular Customer Account Management (CAM) ticket to increase the limit. |

For more information, see Service Limits.

# 6
# Known Issues and Workarounds

### ORA-12154: TNS:could not resolve the connect identifier

**Description:** `ORA-12154: TNS:could not resolve the connect identifier` for a specific database after successful completion of patching cycle of Exadata Fleet Update collection of databases on Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D).

```
<Database home>/bin/sqlplus <db_user>/<db_pass>@<tns service name>
SQL*Plus: Release x.x.x.x.x
Version x.x.x.x.x
Copyright (c) 1982, 2022, Oracle.  All rights reserved.
ERROR:
ORA-12154: TNS:could not resolve the connect identifier specified
Enter user-name:
```

**Action:** Copy the files from old Oracle home of the specific database to the current Oracle home.

```
cp <old_oracle_home>/network/admin/<dbname>/* <current_oracle_home>/network/
admin/<dbname>/
```

### Applying DB Patch Fails

**Description:** Applying a database patch fails when the parameter `WALLET_LOCATION` or `ENCRYPTION_WALLET_LOCATION` and its value in the `sqlnet.ora` file is split or broken as follows:

```
WALLET_LOCATION=
(SOURCE= (METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/var/opt/oracle/dbaas_acfs/grid/tcps_wallets)))
ENCRYPTION_WALLET_LOCATION=
(SOURCE= (METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/var/opt/oracle/dbaas_acfs/ST1001DB/wallet_root/tde)))
```

**Action:** Modify the affected `sqlnet.ora` file as follows to ensure that the parameters `WALLET_LOCATION` and `ENCRYPTION_WALLET_LOCATION` and their values remain on the same line.

```
WALLET_LOCATION= (SOURCE= (METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/var/opt/oracle/dbaas_acfs/grid/tcps_wallets)))
ENCRYPTION_WALLET_LOCATION= (SOURCE= (METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/var/opt/oracle/dbaas_acfs/ST1001DB/wallet_root/tde)))
```

### Create Collection Fails for Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D)

**Description:** The source CIDR for ingress is too broad for destination port 7085. Update the source CIDR for the relevant security rule specifying the CIDR block for the public subnet `ocid`.

**Action:** Update security rules as follows:

- **Stateless:** No (all rules must be stateful)
- **Source Type:** CIDR
- **Source CIDR:** Client subnet's CIDR
- **IP Protocol:** TCP
- **Source Port Range:** All
- **Destination Port Range:** 7085
- **Description:** Optionally, add a meaningful description of the rule. For example, Allow access to Exadata Fleet Update private endpoint within the subnet.

### Database Rollback from 23.7 to 23.5 via Exadata Fleet Update Fails on Exadata Cloud Service

**Action:**

To prevent rollback failures when reverting from 23.7 to 23.5, apply the following workaround:

1. Apply Patch 37547027 as a one-off to the 23.5 DB Home using OPatch apply.
2. Proceed with the rollback operation from 23.7 to 23.5 after applying the fix.

This ensures a successful rollback process without encountering failures.

**(OR)**

If you encounter the following error in the `datapatch` output while rolling back from 23.7 to 23.5, follow the steps below to resolve it.

```
Error: prereq checks failed!
patch 36741532: Value of ru_version is undefined in dba_registry_sqlpatch_ru_info in PDB
PDB$SEED
```

1. Set the environment variables

   ```
   export ORACLE_HOME="<targetHomePath>"
   export ORACLE_SID="<DBSID>"
   ```

2. Connect to SQL*Plus as SYSDBA

   ```
   $ORACLE_HOME/bin/sqlplus / as sysdba
   ```

3. Open `PDB$SEED` in Read-Write mode

   ```
   alter session set "_oracle_script"=true;
   alter pluggable database pdb$seed close instances=all;
   alter pluggable database pdb$seed open read write instances=all;
   ```

4. Switch to `PDB$SEED` and check for errors

```
alter session set container=pdb$seed;
select * from dba_errors;
```

You may encounter errors such as:

```
PLS-00907: cannot load library unit SYS.SYS_STUB_FOR_PURITY_ANALYSIS (referenced by
SYS.GETLONG)
```

5. Compile required packages

```
alter package SYS.SYS_STUB_FOR_PURITY_ANALYSIS compile;
show errors;  -- Should return "No errors."


alter package dbms_lob compile body;
show errors;  -- Should return "No errors."
```

Run the following query to verify that no errors remain:

```
select * from dba_errors;
```

6. Close and reopen `PDB$SEED` in Read-Only mode

```
alter pluggable database pdb$seed close instances=all;
alter pluggable database pdb$seed open read only instances=all;
```

7. Exit SQL*Plus

```
exit;
```

8. Run `datapatch` to apply SQL patches

```
$ORACLE_HOME/OPatch/datapatch -verbose
```

If you have multiple PDBs and want to distribute the patching workload across nodes, you can use the `-pdbs` option.

9. Restart the database

```
# Stop the database
srvctl stop database -d <DB_NAME>


# Start the database
srvctl start database -d <DB_NAME>
```

10. Verify PDB state
After restarting, all PDBs should come out of RESTRICTED mode, and the rollback to 23.5 should be successful.