ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile

Configuration Guide

Release 24B

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ORACLE

ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile Configuration Guide

Contents

Preface

Welcome to the ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile Configuration Guide for release 24B.

The preface includes the following:

Audience

This document is intended for anyone implementing the integration of the following products with ESRI ArcGIS Field Maps:

- Oracle Field Service
- Oracle Utilities Work and Asset Cloud Service

Documentation and Resources

For more information regarding this integration, foundation technology and the edge applications, refer to the following documents:

Product Documentation

Topic	Location
ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile documentation	https://docs.oracle.com/en/industries/energy-water/integrations-index.html
Oracle Utilities Work and Asset Cloud Service Integration to Oracle Field Service documentation	https://docs.oracle.com/en/industries/energy-water/integrations-index.html
Oracle Utilities Work and Asset Cloud Service documentation	https://docs.oracle.com/en/industries/energy-water/work-asset-cloud-service/index.html
Oracle Field Service documentation	https://docs.oracle.com/en/cloud/saas/field-service/index.html

Additional Documentation

Resource	Location
Oracle Support	Visit My Oracle Support at https://support.oracle.com regularly to stay informed about updates and patches.
Oracle Technology Network (OTN) for latest versions of documents	http://www.oracle.com/technetwork/index.html
Oracle University for training opportunities	http://education.oracle.com/

Updates to Documentation

The complete ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile documentation set is available from Oracle Help Center at https://docs.oracle.com/en/industries/energy-water/index.html.

Visit My Oracle Support for additional and updated information about the product.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website.

Access to Oracle Support

Oracle customers have access to electronic support for the hearing impaired. Visit My Oracle Support or Oracle Accessibility Learning and Support for more information.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Acronyms

The following terms are used in this document:

Term	Expanded Form
OFS	Oracle Field Service
ESRI	ESRI ArcGIS Field Maps
OIC	Oracle Integration Cloud
ICS	Integration Cloud Service
DVM	Domain Value Map (Lookup)
WACS	Oracle Utilities Work and Asset Cloud Service
WAM	Oracle Utilities Work and Asset Management

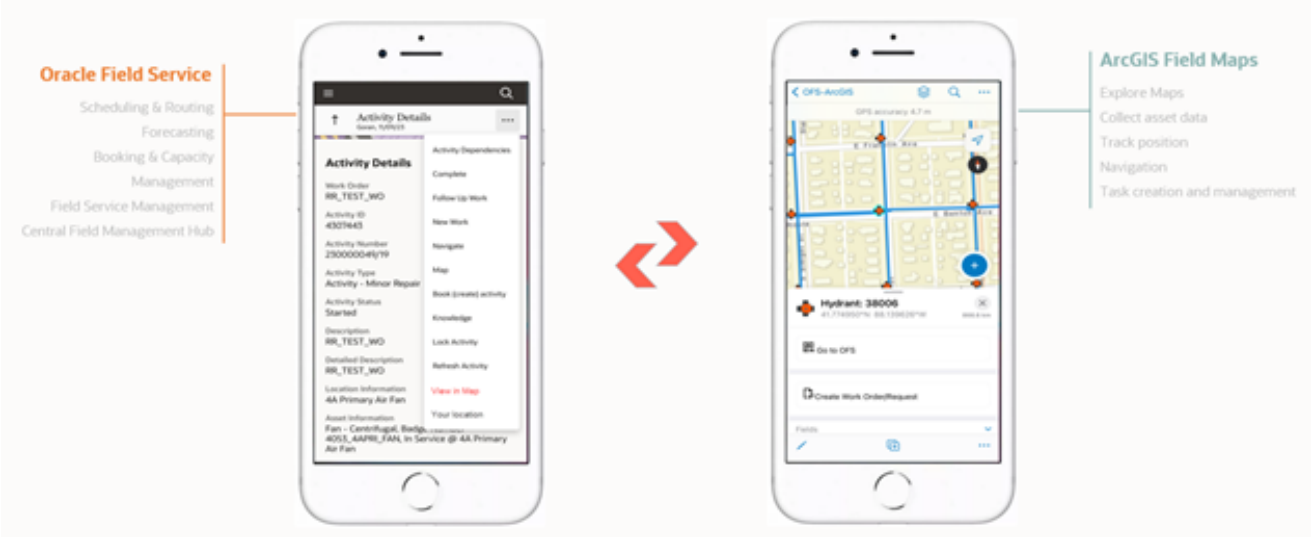
Chapter 1

Introduction

This chapter provides an overview about ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile using Oracle Integration Cloud. It focuses on the software requirements, Oracle Integration Cloud, and business standpoint of the integration. It includes the following:

Overview of the Integration

The ESRI ArcGIS Field Maps to Oracle Field Service pre-built integration extends the capabilities of the Oracle Field Service mobile solution by bridging key GIS functionality from ESRI ArcGIS Field Maps. The solution enables seamless navigation between the two applications using parameterized deeplink calls for key use cases, as well as utility-specific workflows accessible from both the ESRI ArcGIS Field Maps and Oracle Field Service applications. Out of the box, the solution will also provide support for offline scenarios, adding efficiency and significant value to the field operations.



The integration unlocks key use cases for field crews, utilizing mapping functionality and geospatial data to improve efficiency and optimize workflows. Crews will now be able to:

- Locate and analyze assets in ESRI ArcGIS Field Maps.
  - Ability to search for assets (Poles, Transformers, Hydrants, etc.) based on pre-defined searchable fields via a text search.
  - Ability to visually identify assets within a particular region on the map.
  - Ability to view and update Asset attributes directly from Field Maps.
- Create work orders/requests directly from ESRI ArcGIS Field Maps.
  - Field technicians can now create both work orders and work requests within Field Maps. The forms are in synchronization with the forms within Oracle Field Service for a streamlined experience.
- Locate assets in ESRI ArcGIS Field Maps and complete work order/request workflows in Oracle Field Service.
  - Alternatively, assets can be selected from the map and the required work request/order can be created within Oracle Field Service. This provides a second option for initiating mission critical work.
- View Work Activities n ESRI ArcGIS Field Maps.
  - Ability to view nearby activities, status, and related assets for additional insights available to field technicians.

- Limitations/Considerations:
  - The **View Work Activities** feature is supported by multiple flows and includes a mechanism for configuring historical lookback windows to determine which activities will be synchronized on the map, along with a process to purge older activities (Suspended, Cancelled, Completed passed a defined period threshold - configurable per activity status).
    - Only **Scheduled** activities will be considered within this flow).
    - Activities must contain coordinates (latitude/longitude) to be included in the synchronization to ESRI.
  - Related Asset searches (within Activity view) rely on a strict mapping between Oracle Utilities Work and Asset Management/Oracle Utilities Work and Asset Cloud Service asset type and a corresponding ESRI asset type and in turn a specific Feature layer for proper operation.

The integration will be facilitated via Oracle Integration Cloud and will include flows for creating work orders/requests, both from ESRI ArcGIS Field Maps and Oracle Field Service. An Admin Synchronization flow will maintain parity between the structure of the work order and work request forms in Oracle Field Service and the forms used in ESRI ArcGIS Field Maps.

The integration will be available for both iOS and Android platforms respectively.

Prerequisites

This integration requires Oracle Utilities Work and Asset Cloud Service Integration to Oracle Field Service to be in place for all Oracle Utilities Work and Asset Cloud Service to Oracle Field Service and Oracle Field Service to Oracle Utilities Work and Asset Cloud Service related workflows.

About Oracle Utilities Work and Asset Cloud Service (WACS)

Oracle Utilities Work and Asset Cloud Service efficiently manages asset lifecycles, streamlines maintenance operations, maximizes supply chain performance, enhances safety, and improves regulatory compliance.

About ESRI ArcGIS Field Maps (ArcGIS)

ESRI ArcGIS Field Maps is an all-in-one application that uses data-driven maps and mobile forms to help workers perform data capture and editing, find assets and information, and report their real-time locations. ESRI ArcGIS Field Maps is the go-to field application that streamlines the critical workflows mobile personnel use every day.

About Oracle Field Service (OFS)

Oracle Field Service is built on time-based, self-learning, and predictive technology, empowering to solve business problems while evolving the field service organization. It has various modules to choose, such as forecasting, routing, capacity, mobility, collaboration, core manage, smart location, customer communication, and more. It leverages the performance pattern profiles to create optimal daily routes and schedules and continues to learn as employee work patterns change over time.

About Oracle Integration Cloud (OIC)

Oracle Integration Cloud is a unified platform to integrate the applications, automate processes, and create applications.

Using Process Builder the business processes can be rapidly designed, automated, and managed in the cloud. Using integrations connect the applications into a continuous business flow. The integrations can be quickly developed and activated between both the applications that live in the cloud; and the applications still live on premises. The lookups help to match application specific codes between the two applications.

Integration Insights and Stream Analytics helps to simplify and extract business metrics and create custom dashboards.

Supported Applications

The following applications are required/supported in the integration:

- Oracle Utilities Work and Asset Management

  Note that the on-premises versions (Oracle Utilities Work and Asset Management) may have limited functionality as they trail cloud-based versions (Oracle Utilities Work and Asset Cloud Service) due to the release frequency.
- Oracle Utilities Work and Asset Cloud Service
- Oracle Integration Cloud
- Oracle Field Service
- ESRI ArcGIS Field Maps

For specific application versions, refer to the *ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile Release Notes* included in this release. The documentation is available on Oracle Help Center at: https://docs.oracle.com/en/industries/utilities/integrations-index.html

Chapter 2

Solution Architecture

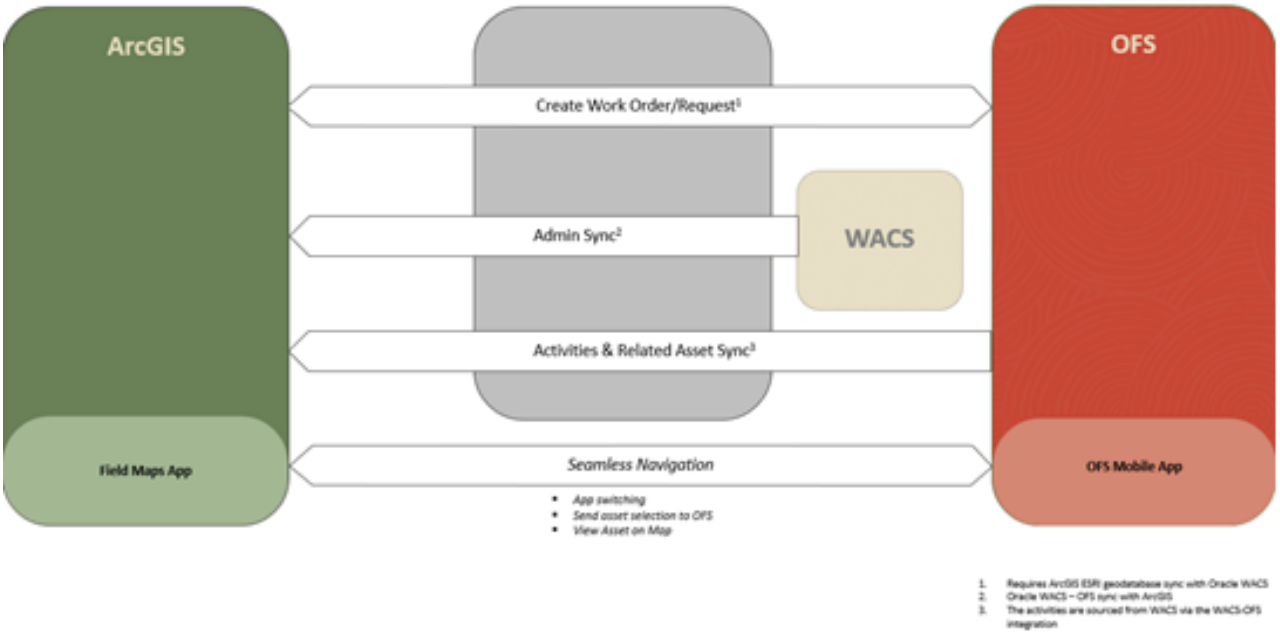
This chapter provides an overview of the application architecture used by the integration, including:

- Solution Diagram
- Business Flows

Solution Diagram

The technical aspects involved in ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile are:

- An integration between ESRI ArcGIS Field Maps and Oracle Field Service.
- The integration layer is made up of integration processes deployed on Oracle Integration Cloud.
- It uses web services and REST APIs to facilitate communication between the two applications.
- Oracle Field Service uses REST APIs to receive the messages.
- In the Oracle Field Service initiated processes, events are triggered and Oracle Utilities Work and Asset Cloud Service uses inbound web services (IWS) to receive the messages.



Business Flows

The integration scope supports the following business processes:

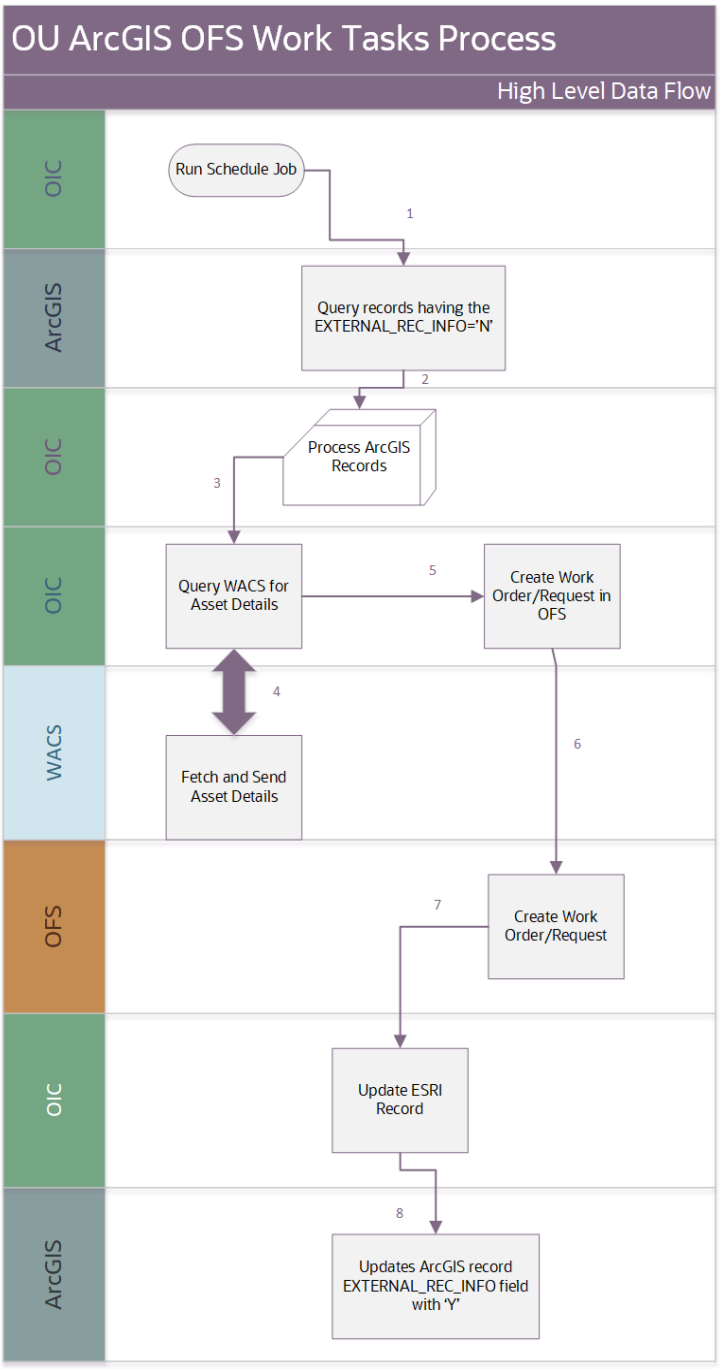
- Process Work Tasks (Oracle Integration Cloud Scheduled Job)
- Create Admin Files (Oracle Integration Cloud Scheduled Job)
- Delete Activities (Oracle Integration Cloud Scheduled Job)
- Activities Sync (Oracle Integration Cloud Scheduled Job)

Process Work Tasks (Oracle Integration Cloud Scheduled Job)

This integration flow is used to synchronize the work request or work order created in ESRI ArcGIS Field Maps connected to ArcGIS Online or ArcGIS Enterprise to Oracle Field Service. Work request can be created with or without an asset and work order is always created with asset in ESRI ArcGIS Field Maps.

The integration synchronizes the same to Oracle Field Service and also updates the ESRI ArcGIS Field Maps records with Oracle Field Service work order/work request ID.

The following diagram shows a graphical representation of the Process Work Tasks integration process.



Business Processing

This scheduled integration process includes the following activities:

1. The Oracle Utilities Work Tasks Process flow is a scheduled integration. It operates asynchronously, allowing both manual execution and scheduling to retrieve the work order/work requests from ESRI ArcGIS Field Maps and create it in Oracle Field Service.
2. The process queries the ESRI ArcGIS Field Maps Tasks feature layer for unprocessed work order or work requests.
3. The process checks if the records contain GIS ID or not.
4. If the ESRI ArcGIS Field Maps record contains the GIS ID, then assetQuery and assetDetails in Oracle Utilities Work and Asset Cloud Service are invoked to get all the asset details.
5. The process checks if the records are work order or work request, transforms the message into the Oracle Field Service format, and invokes the bulk update API to create a work order and service request API to create a work request in Oracle Field Service.
6. If the work order and work request creation is successful in Oracle Field Service, the integration process does the following:
    a. Transforms the Oracle Field Service response and adds the activity ID to the successful work order records.
    b. Transforms the Oracle Field Service response and adds the request ID to the successful work request records.
7. If the work order/work request creation is unsuccessful in Oracle Field Service, the integration process does the following:
    a. Transforms the fault response and adds the fault message to the unsuccessful records list.
8. The process flow updates the successful records in the ESRI ArcGIS Field Maps Task layer to make sure the successful records will not be retrieved in the next run.
9. The process flow sends an email notification with an attachment containing the failure records information and error details.
10. Any unrecoverable errors thrown are handled by the global fault handler.
11. An optional email notification with error details is sent to the users configured in the `OUTL-BRT-ArcGIS_OFS_Email_ID` lookup.
12. Email notification is optional. Configure the property email.flag in the `OUTL-BRT-ArcGIS_OFS_ConfigProps` lookup to 'true' to receive email notifications when errors are encountered.

Technical Details

The following table describes the integration processes and the respective ESRI ArcGIS Field Maps and Oracle Field Service artifacts used in this integration process.

Artifacts	Value
OFSC BO/Operation	Activity/Bulk Update Activity

Artifacts	Value
OFSC API	• /rest/ofscCore/v1/activities/custom-actions/bulkUpdate • /rest/ofscCore/v1/serviceRequests
WACS BO	• W1-AssetQuery • W1-GetAstDtl
Integration Process Name	OU ArcGIS OFS Work Tasks Process
Integration Project Name	OU ESRIArcGIS OFS
Source Connection (Oracle Utilities Adapter)	OU SOAP WACS for ArcGIS-OFS
Target Connection (Rest Adapter)	• OU REST ArcGIS for ArcGIS-OFS • OU REST OFS API for ArcGIS-OFS • OU REST OFS for ArcGIS-OFS
OIC Lookups	• OUTL-BRT-ArcGIS_OFS_ConfigProps • OUTL-BRT-ArcGIS_OFS_Email_ID • OUTL-BRT-ArcGIS_OFS_ActivityType

Lookups Referenced

The following table describes customized properties referenced in the integration. For more information about the lookup properties, refer to Configuring Lookups, Error Handling, and Email Notifications.

DVM	Property
OUTL-BRT-ArcGIS_OFS_ConfigProps	• notifcation.email.error.flag • asset.inventory.type • ofs.default.bucket
OUTL-BRT-ArcGIS_OFS_Email_ID	• from • to
OUTL-BRT-ArcGIS_OFS_ActivityType	

Integration Properties

Property Name	Comments
addLocInfo	Property used to append the geo location X and Y values from ARCGIS record to WO/WR description in OFS if it is set to 'Y'. Valid values are 'N' or 'Y'.

Property Name	Comments
queryParameter	Property used to query the unprocessed ArcGIS records. The value will be used as query parameter as part of the query feature layer request. (EXTERNAL_REC_INFO='N')
workTasksLayerRelativeURI	Relative URI of the Work task feature layer after /rest/service in the feature layer rest service URL. The URI begins with "/". Example: /WorkTasks/FeatureServer/0

Create Admin Files (Oracle Integration Cloud Scheduled Job)

This integration process synchronizes the fields and values found in the work order and work request form the drop down in ESRI ArcGIS Field Maps with values from Oracle Utilities Work and Asset Cloud Service. Operating as a one-way, asynchronous process, it updates the latest values and relationships from Oracle Utilities Work and Asset Cloud Service, generating CSV files that are then uploaded to a designated Object Storage Bucket. In ESRI ArcGIS Field Maps, these fields and values are referred to as Domain Values (DV) and their related field values as Contingent Values (CV). The integration process produces specific files which can then be manually uploaded to the Tasks feature layer through ArcGIS Pro.

For more information on this update process, refer to the *ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile Setup Guide* included in this release. The integration documentation is available on Oracle Help Center at: https://docs.oracle.com/en/industries/energy-water/integrations-index.html

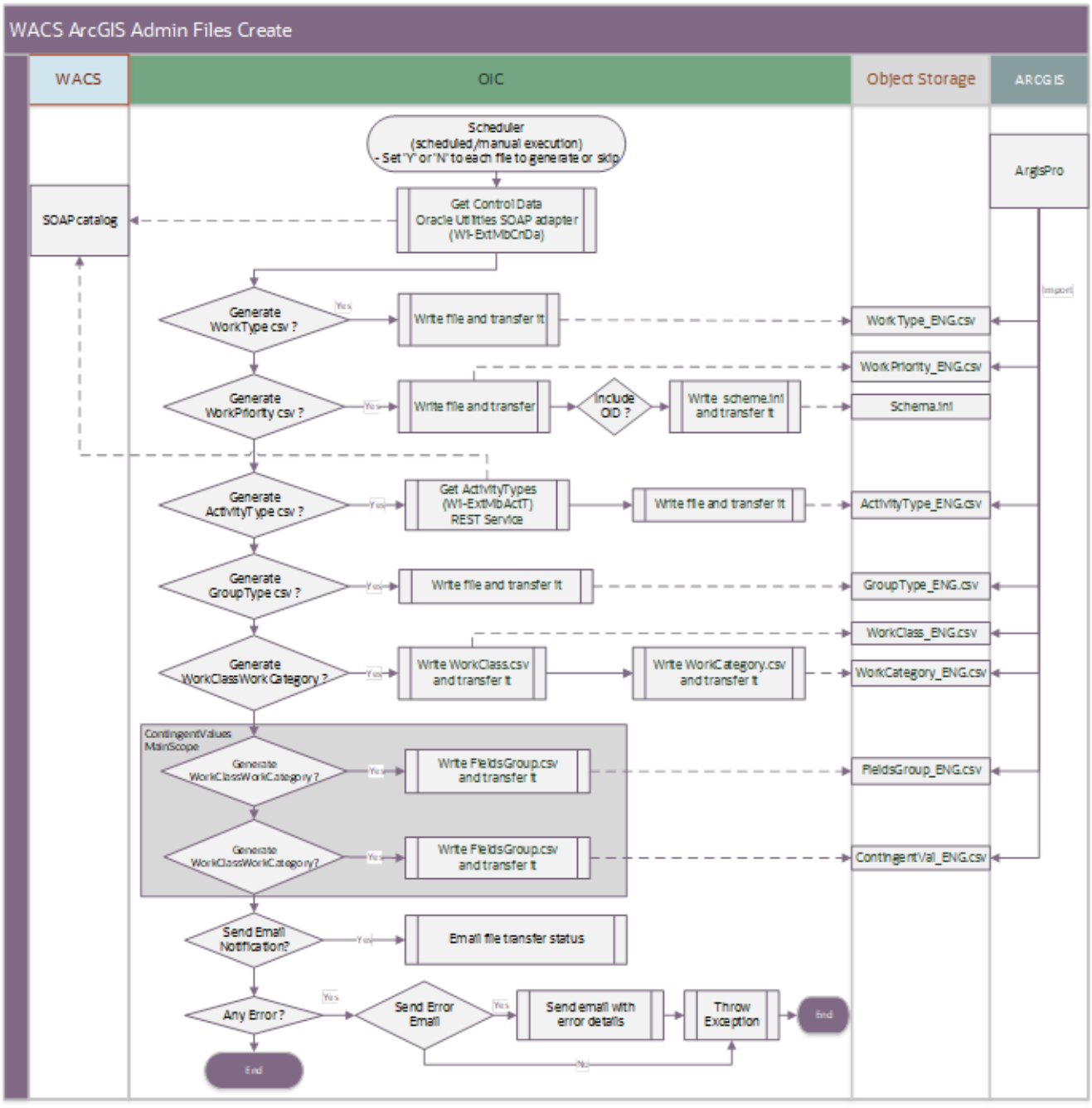
The domain value files are:

- WorkType
- WorkPriority (A schema.ini file will also be generated)
- ActivityTypes
- GroupTypes
- WorkClass
- WorkCategory

The contingent value files are:

- ContingentVal
- FieldGroup

The following diagram shows a graphical representation of the Create Admin Files integration process:



Business Processing

The integration process includes the following activities:

1. Initialization Phase
    - This is a scheduled integration. It operates asynchronously, allowing both manual execution and scheduling.

- It uses the following integration properties that take effect during runtime:
  - **groupType**: Defaults to "WACS" identifies the source of the domain value and contingent value files.
  - **arcgisOSNamespace**: Specifies the cloud object storage namespace for file uploads.
  - **arcgisOSBucket**: Determines the cloud object storage bucket name for file storage.
  - **includeOIDWorkPriority**: Defaulted to "Y", this setting allows ArcGIS Pro to import priority values as numbers rather than strings, ensuring correct data interpretation.
  - **sourceExternalSystem**: By default, set to "OFSC", this identifies the target system for field values retrieved from Oracle Utilities Work and Asset Cloud Service.
- Parameters set during each run dictate the generation of specific files with the descriptions in the language specfied:
  - **Language**: Defaults to "ENG" to extract specific translation values for domain values and contingent values.

    Note : The files generated are prefixed with language value of this parameter.
  - **Work_Category-Work_Class**: Defaults to "Y" to generate WorkClass.csv and WorkCategory.csv files; "N" skips generation. This action also produces ContingentVal.csv and FieldGroup.csv.
  - **ActivityType**: Defaults to "Y" to generate ActivityTypes.csv file; "N" skips generation.
  - **Group_Type**: Defaults to "Y" to generate the GroupType.csv file; "N" skips generation.
  - **Work_Type**: Defaults to "Y" to generate WorkType.csv file, "N" skips file generation.
  - **Work_Priority**: Defaults to "Y" to generate WorkPriority.csv file; "N" skips CSV file generation. This action may also create a schema.ini file.

2. Retrieve Oracle Utilities Work and Asset Cloud Service Admin Data.
   - Utilizing the Oracle Utilities Adapter, field values are fetched from the Oracle Utilities Work and Asset Cloud Service SOAP catalog through the External Mobile Control Data service (/W1-ExtMbCnDa).
   - Language codes (default ENG) affect translation values and file naming, excluding schema.ini.
3. Processing Files
   - CSV files are created according to the parameters defined in the initialization phase and are temporarily stored in Oracle Integration Cloud. Subsequently, these files are uploaded to the designated object storage bucket, and a language suffix is added to each filename.
   - In the processing of particular files, additional actions may be executed based on the type of file and specific integration configurations:

- When the WorkPriority file is in the process of being generated and the integration property includeOIDWorkPriority is enabled ("Y"), a schema.ini file will also be produced. This facilitates ArcGIS Pro to accurately import Priority values as numerical rather than string types, ensuring the data is interpreted correctly.
- When generating Work_Category-Work_Class files in addition to the standard domain value files, contingent value files, namely FieldGroup.csv and ContingentVal.csv, will be generated. These files capture the relationship between the two entities. If there are instances where WorkCategory values are not related to WorkClass as returned by WACS, CV_VALUE2 is set to '1'. This configuration indicates that ArcGIS will permit the association of any WorkClass value to that particular WorkCategory value, without issuing warnings.

4. Business Notification Email
   - A completion email is triggered based on the notification.email.process.complete.flag setting. If this flag is set to indicate an email should be sent, an email will be dispatched, enumerating the files generated and uploaded to the object storage bucket, thus giving a brief summary of the integration's results.
5. Error Handling
   - When there is service unavailability or data retrieval failures from External Mobile Control Data, External Mobile Activity Types, or Object Storage, the following occurs:
     - The integration process stops immediately if the failure originates in the External Mobile Control Data service at the onset. A technical error email is sent (if notification.email.error.flag is 'true'), an exception is thrown, and the Oracle Integration Cloud instance is marked as Failed.
     - For failures during data retrieval from External Mobile Activity Types or if Object Storage is not working:
       - The files already in Object Storage remain.
       - The flow records the error details, but continues to subsequent files.
       - At the end, a summary notification email and, if applicable, a Technical Error Detail email is/are sent.
       - The Oracle Integration Cloud instance is marked as 'Failed'.
     - For other errors, the integration process gathers error details and proceeds to the next file. Upon completion, it sends out notification emails, depending on the configuration set in the lookups for Business Notification email and Technical Error email. Finally, the status of the Oracle Integration Cloud instance is marked as 'Failed'.

Technical Details

The following table describes the integration processes and the respective ESRI ArcGIS Field Maps and Oracle Field Service artifacts used in this integration process.

Artifacts	Value
Integration Process Name	OU WACS ArcGIS Admin Files Create
Integration Process Identifier	OUTL-BA-ARCGIS_OFS_ADM_CRT
Integration Project Name	OU ESRIArcGIS OFS
Source Connection (Oracle Utilities Adapter)	OU SOAP WACS for ArcGIS-OFS
Target Connection (Rest Adapter)	OU REST ArcGIS OS for ArcGIS-OFS
OIC Lookups	• OUTL-BRT-ArcGIS_OFS_ConfigProps • OUTL-BRT-ArcGIS_OFS_Email_ID

Lookups Referenced

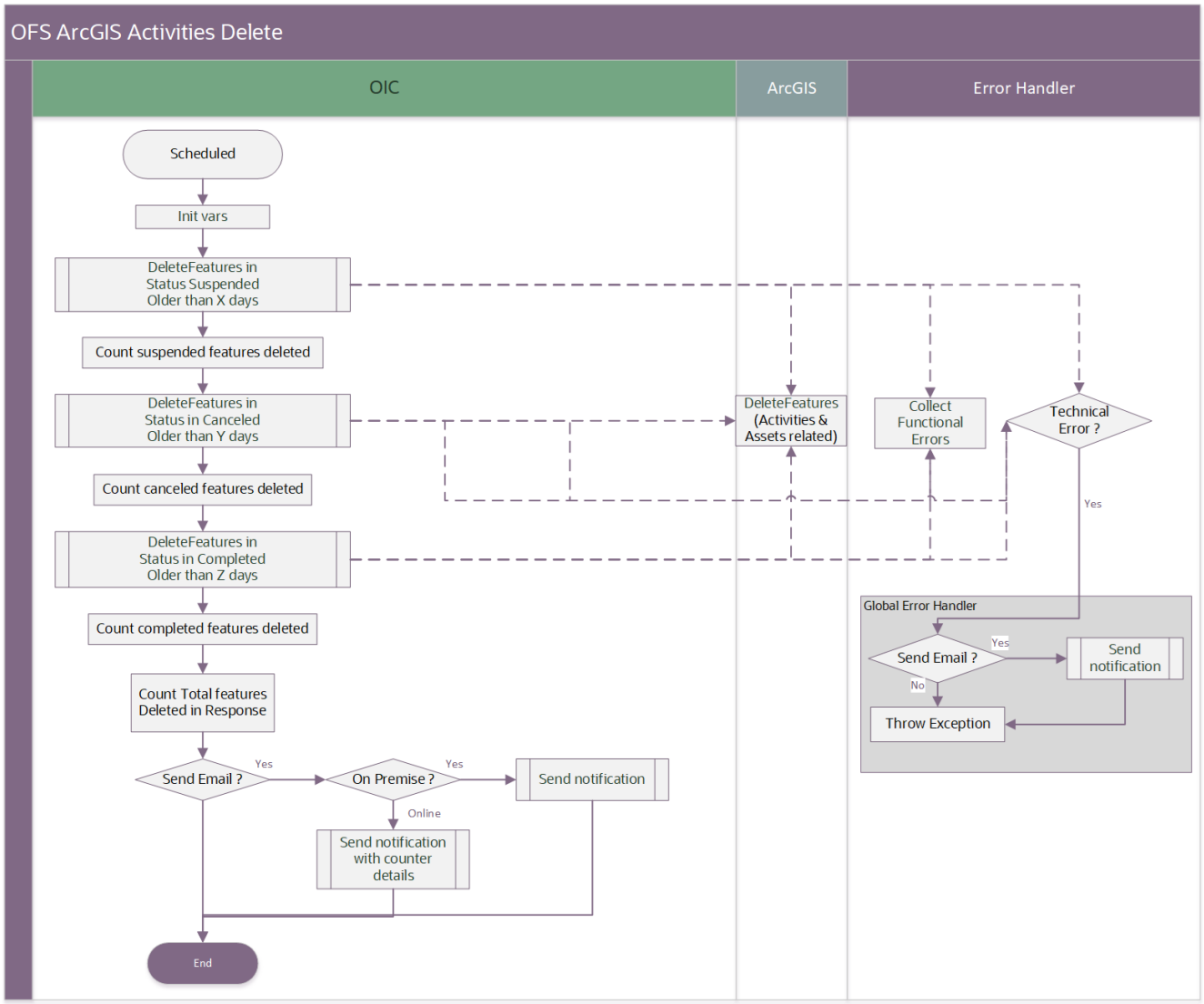
The following table describes customized properties referenced in the integration. For more information about the lookup properties, refer to Configuring Lookups, Error Handling, and Email Notifications.

DVM	Property
OUTL-BRT-ArcGIS_OFS_ConfigProps	• notifcation.email.error.flag • notification.email.process.complete.flag
OUTL-BRT-ArcGIS_OFS_Email_ID	• from • to • to.process.notification

Delete Activities (Oracle Integration Cloud Scheduled Job)

This scheduled process fetches activities from the ArcGIS Activities feature class with statuses (Suspended, Cancelled, and Completed) that are older than a specified number of days. Each status has a separate parameter for data retrieval. The process invokes ArcGIS deleteFeatures API to delete the corresponding Activities and Assets by status separately. This process makes sure that Field Crews access only relevant, recent activities information in Field Maps, such as ongoing pending activities.

The following diagram shows a graphical representation of the Delete Activities integration process:



Business Processing

The integration process includes the following activities:

1. Initialization phase
    - This is a scheduled integration. It operates asynchronously, allowing both manual execution and scheduling.
    - It uses the following integration properties that take effect during runtime:
        - **activitiesLayerRelativeURI**: Specifies the relative URI of the Activities feature layer rest service. This is relative URI after /rest/services/ of the Activities feature layer endpoint within ESRI ArcGIS Field Maps.

- Parameters set during run determine the criteria for deleting activities based on their age and status:
  - **Canceled_days**: Specifies the number of days prior to today on which canceled activities will be deleted. Acceptable values are zero and positive integers.

    Example: '0' is all days prior to today, '1' is all days prior to yesterday.
  - **Suspended_days**: Specifies the number of days prior to today on which suspended activities will be deleted. Acceptable values are zero and positive integers.

    Example: '0' is all days prior to today, '1' is all days prior to yesterday.
  - **Completed_days**: Specifies the number of days prior to today on which completed activities will be deleted. Acceptable values are zero and positive integers.

    Example: '0' is all days prior to today, '1' is all days prior to yesterday.

2. Delete the related activities and assets in ESRI ArcGIS Field Maps.
   - Utilizing the Oracle Rest Adapter invoke the deleteFeatures operation to remove activities based on the parameters specified during the initialization phase.
   - When a parent record in Activities feature class is deleted, the child records in ActivityAssets feature are automatically deleted.
   - When the Activities feature layer is deployed on ArcGIS Online, the deleteFeatures API returns has the number of records deleted. The integration process will count and record the number of deletions per each status. When Activities feature layer is deployed on ArcGIS Enterprise, the API does not return the number of records deleted.
3. Business notification email
   - An email is dispatched upon completion based on the notification.email.deleteactivities.flag setting, which is initially set to 'false'.
     - **Activities feature layer on ArcGIS Online**: When flag is 'true' and the integration process is connected to a Activities feature layer on ArcGIS Online, the email details the number of activities deleted by each status.
     - **Activities feature layer on ArcGIS Enterprise**: When connected to an ArcGIS Enterprise and the flag is 'true', the email will merely confirm the successful execution of the integration flow, without detailing the deleted activities.
4. Error handling
   - **Functional errors**: If ArcGIS reports functional errors during the deletion of activities, or if there are invalid parameter values used during the initialization phase, the integration flow will capture these errors.
     - An email will be sent at the end of the process if notification.email.deleteactivities.flag from the `OUTL-BRT-ArcGIS_OFS_ConfigProps` lookup is set to 'true'.
     - Target recipients are defined in the `OUTL-BRT-ArcGIS_OFS_Email_ID` lookup under "to.process.notification".

- The Oracle Integration Cloud instance will finish successfully regardless of the functional errors.

- **Technical errors**: Given that ESRI ArcGIS Field Maps is the only system targeted in this integration process and involves only one endpoint, any technical error (such as ESRI ArcGIS Field Maps being unavailable) will cause the process to halt immediately.
  - An email detailing the error will be sent if the notification.email.error.flag in the `OUTL-BRT-ArcGIS_OFS_ConfigProps` lookup is set to 'true'.
  - Target audience for the email is specified in the `OUTL-BRT-ArcGIS_OFS_Email_ID` lookup under "to".
  - An exception will be thrown, and the Oracle Integration Cloud instance will be marked as 'failed'.
  - After fixing the error, the flow can either be manually trigger or wait for the next scheduled iteration.

Technical Details

The following table describes the integration processes and the respective ESRI ArcGIS Field Maps and Oracle Field Service artifacts used in this integration process.

Artifacts	Value
Integration Process Name	OU OFS ArcGIS Activities Delete
Integration Process Identifier	OUTL-BA-OFS_ARCGIS_ACT_DEL
Integration Project Name	OU ESRIArcGIS OFS
Target Connection (Rest Adapter)	OU REST ArcGIS for ArcGIS-OFS
OIC Lookups	• OUTL-BRT-ArcGIS_OFS_ConfigProps • OUTL-BRT-ArcGIS_OFS_Email_ID

Lookups Referenced

The following table describes customized properties referenced in the integration. For more information about the lookup properties, refer to Configuring Lookups, Error Handling, and Email Notifications.

DVM	Property
OUTL-BRT-ArcGIS_OFS_ConfigProps	• notifcation.email.error.flag • notification.email.deleteactivities.flag
OUTL-BRT-ArcGIS_OFS_Email_ID	• from • to • to.process.notification

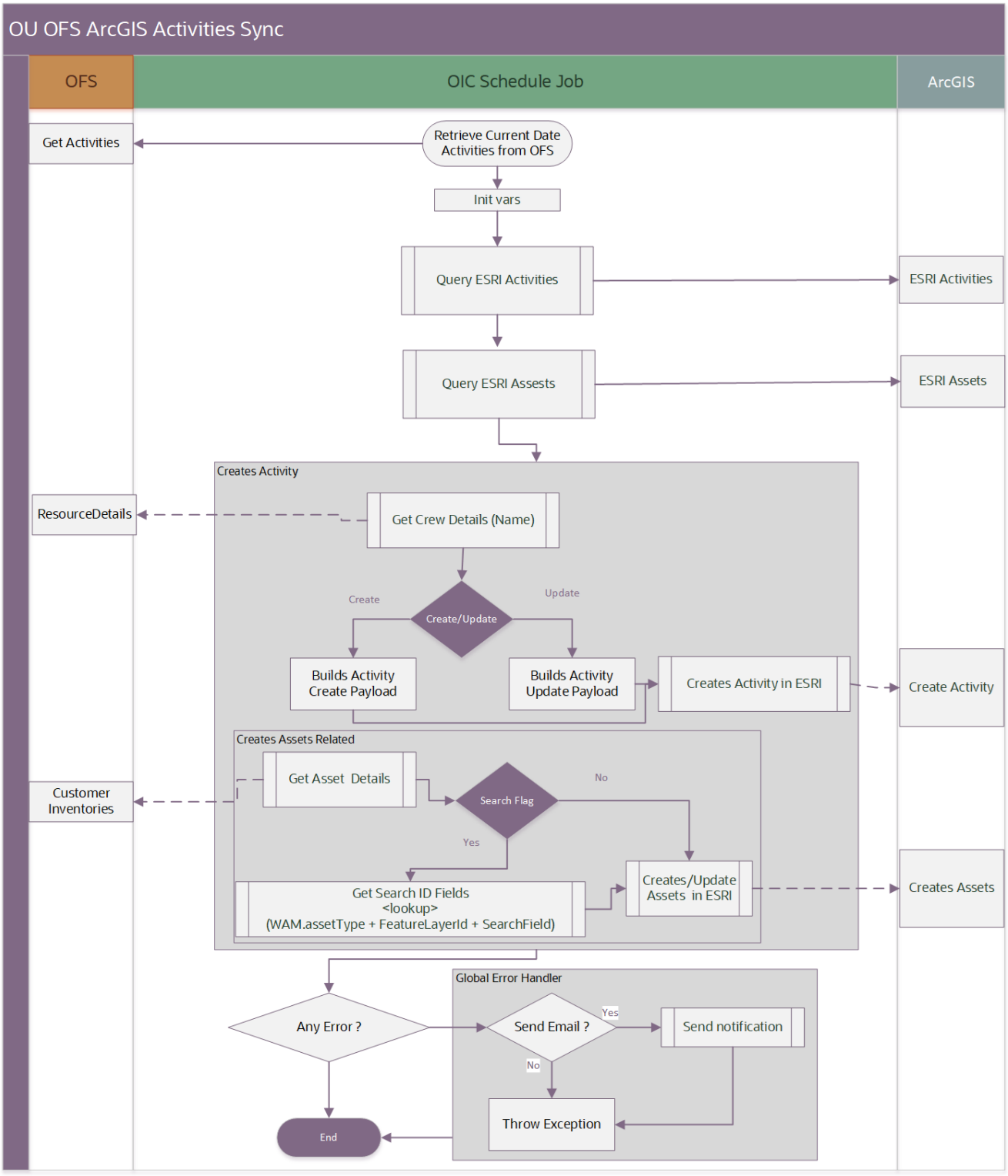
Activities Sync (Oracle Integration Cloud Scheduled Job)

This scheduled process fetches and synchronizes the activities from Oracle Field Service on specified start and end date and inserts or updates the activities to the ArcGIS Activities feature class. Also, this flow inserts/updates the activities in ArcGIS with status specified in the configuration property.

If startDate and endDate is specified as NA, the current date will be taken as start and end dates as parameters.

This flow also searches the assets of specific activity from the OFS and insert/update the ActivityAssets table in ESRI ArcGIS Field Maps.

The following diagram shows a graphical representation of the Activities Sync integration process:



Business Processing

The integration process includes the following activities:

1. Initialization phase.
    - This is a scheduled integration. It operates asynchronously, allowing both manual execution and scheduling.
    - It uses the following integration properties that take effect during runtime:
        - **activitiesLayerRelativeURI**: Specifies the relative URI endpoint of the Activities feature layer. This is relative URI after /rest/services/ of the Activities feature layer endpoint within ESRI ArcGIS Field Maps.
        - **activitiesAssetsLayerRelativeURI** : Specifies the relative URI endpoint of the ActivityAssets table. This is relative URI after /rest/services/ of the ActivityAssets feature layer endpoint within ESRI ArcGIS Field Maps.
2. Query activities and assets from Oracle Field Service.
    - Utilizing the Oracle Rest Adapter invoke the getActivities API from Oracle Field Service to get the activities from Oracle Field Service for specific start and end date.
    - Utilizing the Oracle Field Service Adapter invoke the getCustomerInventories API to get the assets related to an activity from Oracle Field Service.
    - Utilizing the Oracle Field Service Adapter invoke the get ResourceDetails API to get the resource name and time zone from Oracle Field Service.
3. Query activities and assets from ESRI ArcGIS Field Maps.
    - Utilizing the Oracle Rest Adapter invoke the Activities feature layer API to get the activities from ArcGIS for specific start and end date of an activity stored in the ACTIVITY_DATE field.
    - Utilizing the Oracle Rest Adapter invoke the ActivityAssets feature layer API to get the assets from ESRI ArcGIS Field Maps on specific start and end date of an activity stored in the ACTIVITY_DATE field.
4. Processing each activity and assets, and preparing the create/update payload for activity and asset records.
    - For each Oracle Field Service activity (matching start date and end date), if the Oracle Field Service activity ID matches the activity ID stored in Activities feature class:
        a. Prepare the activity update payload.
        b. Else, prepare the activity create payload.
    - For each Oracle Field Service activity:
        a. Get the assets from Oracle Field Service by invoking the getCustomerInventories API from Oracle Field Service.
        b. For each retrieved assets from the ActivityAssets table:
            a. If the activity ID and asset ID match with the ESRI ArcGIS Field Maps activity asset record, prepare the asset update payload.
            b. Else, prepare the asset create payload.

- Finding the asset search value:

  You can configure a popup for the Activities feature layer in Webmaps to show the activities and related assets information from the ActivityAssets table. These assets can be linked to a Field Maps search URL using Arcade expression. A SEARCH_VALUE field in the ActivityAssets table stores the search value that can be used to search this asset on the map.

  A SEARCH_VALUE field is populated based on the configurations in the `OUTL-BRT-ArcGIS_OFS_AssetSearchField OIC` lookup table. This lookup has three columns:

  - **Asset Type**: Oracle Utilities Work and Asset Cloud Service asset type for a given asset.

    Example: WD-PoleWood

  - **FeatureLayerID**: ID of the corresponding Asset in ESRI ArcGIS Field Maps.
  - **SearchField_1**: A configured search field for this layer in ESRI ArcGIS Field Maps Webmap/Field Map.
  - **SearchField_2**: A configured search field for this layer in ESRI ArcGIS Field Maps Webmap/Field Map. This field will be looked at if the SearchField_1 attribute returns empty or null.

  Currently, we can configure only two search fields in the `ArcGIS_OFS_AssetSearchField OIC` lookup. If one search field element value is empty, map the second search field element value.

  To assign the search field value:

  a. Gets the feature layer ID from the `OUTL-BRT-ArcGIS_OFS_AssetSearchField` lookup based on the asset type.

  b. Get the asset details using gisID by invoking the ArcGIS Query API.

  c. Assign the **SearchField_1** and **SearchField_2** values from the `OUTL-BRT-ArcGIS_OFS_AssetSearchField` lookup.

  d. Extracts the attribute data from the asset response payload.

  e. If the **SearchField_1** value is not empty, get the attribute value by using the ArcGISOFS_GetSearchValFromResponse library and assign it to the asset payload SEARCH_VALUE element.

  f. If the **SearchField_1** value is empty and **SearchField_2** value is not empty, get the attribute value by using the ArcGISOFS_GetSearchValFromResponse library and assign it to the asset payload SEARCH_VALUE element.

5. Add/update the related activities and assets in ESRI.

   - Utilizing the Oracle Rest Adapter, invoke the applyEdits operation to add or update activities and assets in the Activities feature class and ActivityAssets table.

6. Business Notification Email

   - If any invalid activities are identified, an email will be sent to the respective email IDs configured in the `ArcGIS_OFS_Email_ID` lookup.

7. Error Handling
    - **Functional errors**: If ESRI ArcGIS Field Maps or Oracle Field Service reports functional errors during query or add/update of activities or assets due to invalid parameters or invalid data, the error notification will be sent to the respective email IDs configured in the `ArcGIS_OFS_Email_ID` lookup.
    - **Remote errors**: Any technical errors, such as ESRI ArcGIS Field Maps or Oracle Field Service being unavailable will cause the process to stop.

      In this case:

      a. An email detailing the error will be sent if the notification.email.error.flag in the `OUTL-BRT-ArcGIS_OFS_ConfigProps` lookup is set to 'true'.

      b. Target audience for the email is specified in the `OUTL-BRT-ArcGIS_OFS_Email_ID` lookup under "to".

      c. An exception will be thrown, and the Oracle Integration Cloud instance will be marked as 'failed'.

      d. After fixing the error, the flow can either be manually triggered or can wait for the next scheduled iteration.

Technical Details

The following table describes the integration processes and the respective ESRI ArcGIS Field Maps and Oracle Field Service artifacts used in this integration process.

Artifacts	Value
Integration Process Name	OU OFS ArcGIS Activities Sync
Integration Process Identifier	OUTL-BA-OFS_ARCGIS_ACTIVTY_SYNC
Integration Project Name	OU ESRIArcGIS OFS
Target Connection (Rest Adapter)	OU REST ArcGIS for ArcGIS-OFS
OIC Lookups	• OUTL-BRT-ArcGIS_OFS_ConfigProps • OUTL-BRT-ArcGIS_OFS_Email_ID • OUTL-BRT-ArcGIS_OFS_AssetSearchField
OIC Libraries	• ArcGISOFS_getSearchValFromResponse function

Schedule Parameters

The following table describes the schedule parameters of the integration are used to Query the activities by given start date and end date.

Parameter Name	Description	Default Value
StartDate	This parameter is used to configure the start date to query activities from OFS and ESRI.	NA

Parameter Name	Description	Default Value
EndDate	This parameter is used to configure the end date to query activities from OFS and ESRI.	NA

Note: The startDate and EndDate parameters will take current date as value if the default value is set to 'NA'. Also, make sure to provide the date in the 'YYYY-MM-DD' format.

Lookups Referenced

The following table describes customized properties referenced in the integration. For more information about the lookup properties, refer to Configuring Lookups, Error Handling, and Email Notifications.

DVM	Property
OUTL-BRT-ArcGIS_OFS_AssetSearchField	Configured values
OUTL-BRT-ArcGIS_OFS_ConfigProps	• notifcation.email.error.flag • wacs.projectedcoordinatesystem.wkid • arcgis.asset.search • ofs.activities.buckets • activity.status.include • notification.email.invalidactivities.flag
OUTL-BRT-ArcGIS_OFS_Email_ID	• from • to

Chapter 3

Configuring Oracle Utilities Work and Asset Cloud Service

This chapter explains about setting up the web services catalog necessary for the integration used by Oracle Utilities Work and Asset Cloud Service. It includes:

- Adding Oracle Integration Cloud Certificates
- Managing Catalog Services

Important! Note that Oracle Utilities Work and Asset Cloud Service Integration to Oracle Field Service is a prerequisite for this integration process. For information about configurations related to the Oracle Utilities Work and Asset Cloud Service Integration to Oracle Field Service, refer to the *Oracle Utilities Work and Asset Cloud Service Integration to Oracle Field Service Configuration Guide* at: https://docs.oracle.com/en/industries/energy-water/integrations-index.html

Adding Oracle Integration Cloud Certificates

Add the Oracle Integration Cloud certificate to the ESRI ArcGIS Field Maps stores wherever applicable to send transactions to the Oracle Integration for Cloud layer.

Managing Catalog Services

The catalog service is used by Oracle Integration Cloud to communicate with the respective application. It is configured in the **Catalog URL** field in the Oracle Integration Cloud connection page of Adapters.

To configure the Catalog Service for this integration process:

1. Login to Oracle Utilities Work and Asset Cloud Service.
2. Navigate to the **Web Service Catalog** page either from the **Admin** menu or the **Search** menu.

   The inbound web services mentioned in the table in step 3 are added to the catalog.
3. To get the catalog URL, append "webservices/builtin/ServiceCatalog?wsdl" to the on-premises application.

   Example: http(s)://<WAM_HOST>:<WAM_PORT>/<ContextRoot>/webservices/builtin/ServiceCatalog?wsdl

   If you are using Oracle Utilities Work and Asset Cloud Service, the format should be: https://{host}:{port}/{tenant}/{domain}/{appName}/soap/api/iws/ServiceCatalog?WSDL

Following is the list of artifacts to be included in web service catalog:

Service Type	Service Name	Device Verification
Inbound Web Service	W1-ExtMobileControlData	External Mobile Control Data
Inbound Web Service	W1-AssetQuery	Asset Query
Inbound Web Service	W1-GetAssetLocationDetails	Get Asset/Location Details
Inbound Web Service	W1-ExtMobileActivityTypes	External Mobile Activity Types

> **Note**: Oracle Utilities Work and Asset Cloud Service Integration to Oracle Field Service is a prerequisite for this integration. For information about configurations, refer to the *Oracle Utilities Work and Asset Cloud Service Integration to Oracle Field Service Configuration Guide* at: https://docs.oracle.com/en/industries/energy-water/integrations-index.html

For more information about Oracle Utilities Work and Asset Cloud Service configurations, refer to the Oracle Utilities Work and Asset Cloud Service documentation available on Oracle Help Center at: https://docs.oracle.com/en/industries/energy-water/work-asset-cloud-service/index.html

Chapter 4

Configuring Oracle Field Service

For Oracle Field Service configuration information refer to the *ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile Setup Guide* included in this release. The documentation is available on Oracle Help Center at: https://docs.oracle.com/en/industries/energy-water/integrations-index.html

Chapter 5

Importing, Configuring, and Testing Integration Connections

This chapter explains in detail the process for importing the connections, packages, and files needed for the integration and the configuration of these connections imported through the packages. After a successful import and configuration, the chapter lists out steps to help test the connections. It includes the following sections:

Importing the Oracle Integration Cloud Project Based Accelerator Package from Oracle Cloud Marketplace

All integration artifacts are shipped into single package (.car) file.

To import a pre-built integration from Oracle Cloud Marketplace:

1. Launch the Oracle Cloud Marketplace portal.
2. Click **Applications**.
3. Search for "ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile".
4. Browse through the list of applications and select the pre-built integration package to import.
5. Click **GetApp**.
6. Review and accept "Oracle Standard Terms and Restrictions".
7. Click **Next**. My Oracle Support portal opens.
8. From the integration artifacts table, download the Integration OIC Accelerator Project (.car) file.
   - OUTL-BA-ARCGIS_OFS-01.24.2000.car
9. Perform the following steps before importing the new project based accelerator package (.car) into your Oracle Integration Cloud instance:
   a. Take a backup of the existing customized integrations and lookups.
   b. Perform cleanup by deactivating and deleting the existing flows, connections, lookups, libraries used in the integration and the .par package file.

   If your previous pre-built integration was package based (.par file):
   - It is visible on the **Design-Packages** page in your Oracle Integration Cloud instance.
   - On the **Design-Integrations** page, the individual integrations of the imported package file are designated with an Accelerator and BUILT BY ORACLE message is displayed.
10. In the **Navigation** pane, click **Projects**.
11. Click **Add**.
12. Select **Import Project** and drag-and-drop the .car file downloaded from Oracle Cloud Marketplace.

    Note: Make sure to select the Anyone can edit, view, and monitor checkbox.
13. The new project will show up in the list but with the "Configured" status due to the connections not being completed yet.
14. Click **Project Edit** and follow the verification and configuration steps mentioned in the sections.
15. If all configuration is complete, click **Activate** in the Design UI. You can also activate the latest deployment plan using the **Deploy** screen.

Verifying the Project Import

To verify the project import was successful:

1. Verify whether the following integrations are imported successfully as seen in the **Integrations** section of the project:
   - OU ArcGIS OFS Work Tasks Process(1.24.2000)
   - OU ArcGIS OFS Admin Files Create(1.24.2000)
   - OU OFS ArcGIS Activities Delete(1.24.2000)
   - OU OFS ArcGIS Activities Sync(1.24.2000)
2. Verify whether the following connections are imported successfully as seen in the **Connections** section of the project:
   - OU REST ArcGIS for ArcGIS-OFS
   - OU SOAP WACS for ArcGIS-OFS
   - OU REST ArcGIS OS for ArcGIS-OFS
   - OU REST OFS API for ArcGIS-OFS
   - OU REST OFS for ArcGIS-OFS
   - OU REST Asset ArcGIS for ArcGIS-OFS
3. Make sure that the following lookups are imported successfully as seen in the **Lookups** section of the project:
   - OUTL-BRT-ArcGIS_OFS_ConfigProps
   - OUTL-BRT-ArcGIS_OFS_Email_ID
   - OUTL-BRT-ArcGIS_OFS_ActivityType
   - OUTL-BRT-ArcGIS_OFS_AssetSearchField
4. Make sure the following libraries are imported successfully as seen in the **Libraries** section of the project:
   - ArcGISOFS_GetSearchValFromResponse

Configuring Connections in Oracle Integration Cloud

After the packages are imported and verified, the respective connections must be configured.

This section describes the procedure to set up the following connections:

- Configuring Oracle Utilities SOAP WACS for ArcGIS-OFS Connection
- Configuring Oracle Utilities OFS for ArcGIS-OFS Connection
- Configuring Oracle Utilities REST OFS API for ArcGIS-OFS Connection
- Configuring Oracle Utilities REST ArcGIS for ArcGIS-OFS Connection
- Configuring Oracle Utilities REST ArcGIS Object Storage for ArcGIS-OFS Connection
- Configuring Oracle Utilities REST Asset ArcGIS for ArcGIS-OFS Connection

Configuring Oracle Utilities SOAP WACS for ArcGIS-OFS Connection

This connection is used to communicate with Oracle Utilities Work and Asset Cloud Service using the Oracle Utilities adapter.

To configure the OU SOAP WACS for ArcGIS-OFS connection:

1. Add the Oracle Utilities Work and Asset applications catalog to the **CatalogURL** field on the Oracle Integration Cloud **Connection** page.

   In the on-premises applications, make sure that the catalog is in the following format:

   http(s)://<WAM_HOST>:<WAM_PORT>/<ContextRoot>/webservices/builtin/ServiceCatalog?wsdl

   If you are using Oracle Utilities Work and Asset Cloud Service, the format should be: https://{host}:{port}/{tenant}/{domain}/{appName}/soap/api/ iws/ServiceCatalog?WSDL

2. On the **Security policy** tab, select the applicable security policy. Refer to the Oracle Utilities Adapter documentation for more information on the supported security policies at: https://docs.oracle.com/en/cloud/paas/application-integration/utilities-adapters/create-oracle-utilities-adapter-connection.html

3. In case of Oracle Utilities Work and Asset on-premises, configure the agent in the connection.

   a. In the **Agent Group** section, click **Configure Agents**.

   b. Select the agent group from the list created in Creating an Agent Group.

4. On the **Connection** page, enter the username and password. Click **Test** at the upper-right corner to test the connection.

5. After the connection is tested successfully, click **Save**.

Configuring Oracle Utilities OFS for ArcGIS-OFS Connection

This connection is used to communicate with Oracle Field Service using the Oracle Field Service adapter.

Configure the Oracle Utilities OFS for ArcGIS-OFS connection with the required details:

1. Enter the API URL in the **Field Service Cloud API URL** field.

   Example: https://<ofsc instance id>.fs.ocs.oraclecloud.com

2. Enter the **Instance ID**.

3. From the **Security Policy** drop-down list, select **Basic Authentication**.

4. On the **Connection** page, enter the user name and password.

   Note: As part of user name and password, provide the **ClientID** and **Client Secret** (you can retrieve them from the Oracle Field Service environment).

   For more information, refer to the Oracle Field Service documentation.

5. Click **Test** at the upper-right corner to test the connection.

6. After the connection is tested successfully, click **Save**.

Configuring Oracle Utilities REST OFS API for ArcGIS-OFS Connection

This connection is used to communicate with the OFSC API using the REST adapter.

Configure the Oracle Utilities REST OFS for ArcGIS-OFS connection with required details:

1. On the **Connection** page, from the **Connection Type** drop-down list, select **REST API Base URL**.
2. Do not configure the **TLS version**.
3. Enter "https://<ofs instance id>.fs.ocs.oraclecloud.com" in the **Connection URL** field.
4. From the **Security Policy** drop-down list, select the appropriate security policy. For more information on the supported security policies, refer to the REST Adapter documentation at: https://docs.oracle.com/en/cloud/paas/application-integration/rest-adapter/create-rest-adapter-connection.html
5. Enter the user name and password. Click **Test** to test the connection.
6. After the connection is tested successfully, click **Save**.

Configuring Oracle Utilities REST ArcGIS for ArcGIS-OFS Connection

This connection is a generic connection to connect to Tasks, Activities, and ActivityAssets feature layer published either on ArcGIS Online or Enterprise Server using the REST adapter.

If the Tasks, Activities, and ActivityAssets feature layer are published as rest services on standalone ArcGIS Enterprise Server configure the connection with the following details:

1. On the **Connection** page, from the **Connection Type** drop-down list, select **REST API Base URL**.
2. Do not configure the **TLS version**.
3. Enter https://<hostName>:<port>/arcgis/ in the **Connection URL** field.
4. From the **Security Policy** drop-down list, select **OAuth Custom Two Legged Flow**.
   a. On the **Access Token Request** field, enter the following curl command:

      -X POST https://<hostname : port> /arcgis/admin/generateToken -H "Content-Type: application/x-www-form-urlencoded" -d "f=json&username=username&password=password&client=requestip&expiration=120"

      Note:

      - The username in the above token request URL should be a user with ADMINISTER or PUBLISH privileges. For more information, refer to the documentation at: https://developers.arcgis.com/rest/services-reference/enterprise/generate-admin-token.htm
      - Since this API does not return a refresh token, there is no automatic refresh of token when the token expires. To overcome that, set the expirations to a long period. Token expiration period can be set to maximum of one year. This number is represented in minutes.

- To regenerate the token again, "Test and Save" the connection and reactivate the integration.

b. In the **Optional Security** policy add following data:

a. Enter "token" in the **$access_token** field.

b. Enter "expires" in the **$expiry** field.

5. Configure the **Connectivity** agent and click **Test**.
6. After the connection is tested successfully, click **Save**.
7. When running any of the OU ArcGIS OFS Work Tasks Process, OU OFS ArcGIS Activities Delete, or OU OFS ArcGIS Activities Sync flows, make sure the integration property is set with the correct relative URI. This relative URI is the part of the feature layer URL after /rest/services/.

   Example: A feature layer URL for Tasks layer may look as follows:

   https://exampleOrghost:6443/arcgis/rest/services/ArcGIS_OFS/WorkTasks/FeatureServer/0

   The Relative URI will be: /ArcGIS_OFS/WorkTasks/FeatureServer/0
8. The Integration properties pertaining to relative URIs is configured in the OU ArcGIS OFS Work Tasks Process, OU OFS ArcGIS Activities Delete, or OU OFS ArcGIS Activities Sync flows.

   Example:

   - For the Work Tasks Process flow, set workTasksLayerRelativeURI = "/WorkTasks/FeatureServer/0".
   - For the Activities Delete flow, set activitiesLayerRelativeURI = "/Activities/FeatureServer/0".

If the Tasks, Activities, and ActivityAssets feature layers are published as hosted layers in ArcGIS Online:

1. From the **Connection Type** drop-down list, select **REST API Base URL**.
2. Do not configure the TLS version.
3. Enter "https://<org server root>/arcgis" in the **Connection URL** field.
4. From the **Security Policy** drop-down list, select **OAuth Client Credentials**.
5. On the **Access Token Request URL** field, enter the URL.

   URL: https://www.arcgis.com/sharing/rest/oauth2/token/
6. Configure the **Client ID** and **Client Secret**.
7. In the **Optional Security Client Authentication** field, select "send client credentials in body".
8. Click **Test** to test the connection.
9. After the connection is tested successfully, click **Save**.
10. When running any of the OU ArcGIS OFS Work Tasks Process, OU OFS ArcGIS Activities Delete, and OU OFS ArcGIS Activities Sync flows, make sure the integration property is set with the correct relative URI. This relative URI is part of the feature layer URL after /rest/services/.

Example: A feature layer URL for Activities layer looks as follows:

https://services10.arcgis.com/xyz/arcgis/rest/services/Activities/FeatureServer/0

Relative URI will be: /Activities/FeatureServer/0

11. Integration properties pertaining to relative URIs is configured in the OU ArcGIS OFS Work Tasks Process, OU OFS ArcGIS Activities Delete, or OU OFS ArcGIS Activities Sync flows.

    Example:

    - For the Work Tasks Process flow, set workTasksLayerRelativeURI = "/WorkTasks/FeatureServer/0".
    - For the Activities Delete flow, set activitiesLayerRelativeURI = "/Activities/FeatureServer/0".

Configuring Oracle Utilities REST ArcGIS Object Storage for ArcGIS-OFS Connection

This connection is used to communicate with Oracle Infrastructure Cloud Object Storage Services using the REST adapter.

Configure the OU REST ArcGIS OS for ArcGIS-OFS connection with required details:

1. On the **Connection Properties** section, enter the object storage API endpoint in the **Connection URL** field.

   The Connection URL follows this format: https://objectstorage.{region}.oraclecloud.com

   Refer to the Oracle Cloud Infrastructure documentation/API Reference and Endpoints to see the Object Storage Service API and endpoints at: https://docs.oracle.com/en-us/iaas/api/

2. In the **Security** section:

   a. Select the **OCI Signature Version 1** security policy.

   b. Provide the following Object Storage information:

      - Tenancy OCID
      - User OCID
      - Upload the private key
      - Fingerprint (obtained from object storage after register the public key for the appropriate user)

      For more information, refer to the *Object Storage Setup Guide 20C* at: https://docs.oracle.com/cd/F35460_01/index.htm

3. After the connection is tested successfully, click **Save**.

Configuring Oracle Utilities REST Asset ArcGIS for ArcGIS-OFS Connection

This connection is used to connect ESRI ArcGIS Field Maps to get the asset information to retrieve the assets based on gisID. This connection corresponds to ArcGIS Enterprise Server connection where the Utility dataset is published from a Enterprise geodatabase.

Example: Water, Electric dataset

1. On the **Connection** page, from the **Connection Type** drop-down list, select **REST API Base URL**.
2. Do not configure the **TLS version**.
3. Enter https://<hostName>:<port>/arcgis/rest/services/<folder-name>/FeatureServer in the **Connection URL** field.
4. From the **Security Policy** drop-down list, select **OAuth Custom Two Legged Flow**.
    a. On the **Access Token Request** field, enter the following curl command:

    -X POST https://<hostname : port> /arcgis/admin/generateToken -H "Content-Type: application/x-www-form-urlencoded" -d "f=json&username=username&password=password&client=requestip&expiration=120"

    Note:

    - The username in the above token request URL should be a user with ADMINISTER or PUBLISH privileges. For more information, refer to the documentation at: https://developers.arcgis.com/rest/services-reference/enterprise/generate-admin-token.htm
    - Since this API does not return a refresh token, there is no automatic refresh of token when the token expires. To overcome that, set the expirations to a long period. Token expiration period can be set to maximum of one year. This number is represented in minutes.
    - To regenerate the token again, "Test and Save" the connection and reactivate the integration.

    b. In the **Optional Security** policy add following data:

    a. Enter "token" in the **$access_token** field.

    b. Enter "expires" in the **$expiry** field.
5. Configure the **Connectivity** agent and click **Test**.
6. After the connection is tested successfully, click **Save**.

Configuring Agent (if applicable)

Create an agent group in Oracle Integration Cloud and install agent on the on-premises server before creating/activating an integration in which messages are exchanged between the on-premises applications and Oracle Integration Cloud. The agent related configurations are needed only if the server points to an on-premises application.

This section includes:

- Possible Combinations
- Creating an Agent Group
- Downloading Agent Installer
- Installing On-Premises Agent

Possible Combinations

The possible combination of an agent group is:

- Oracle Utilities Work and Asset Cloud Service on-premises and Oracle Field Service

Creating an Agent Group

Create an agent group in Oracle Integration Cloud before running the agent installer. When the on-premises agent is installed in the environment, the on-premises agent is associated with the agent group identifier. Only one on-premises agent can be associated with an agent group.

For a single Oracle Integration Cloud instance, you can create up to five agent groups. Creating the agent group also creates the necessary queues required for message exchange.

To create an agent group:

1. Login to Oracle Integration Cloud.
2. On the **Home** page, navigate to **Integration** > **Agents**.
3. Click **Create Agent Group**.
4. Enter the following information:
   - Agent Group Name
   - Identifier

     Note: The agent group name and identifier must be same.
   - Description
5. Click **Create**.

Downloading Agent Installer

Download the agent installer from Oracle Integration Cloud and run the installer to install the on-premises agent in your local environment. During the installation, associate the agent with the Agent Group Identifier generated when creating an agent group in Oracle Integration Cloud.

For more information on agent installer, refer to the **Download and Run the Connectivity Agent Installer** section in the Oracle Integration Cloud documentation.

Installing On-Premises Agent

To install an on-premises agent:

1. Login to Oracle Integration Cloud.
2. On the **Home** page, navigate to **Integration** > **Agents**.
3. Click **Download**.
4. Select **Connectivity Agent**.

5. Select **Save File** when prompted to save the file to a directory location on your on-on-premises host.
6. Navigate to that directory and unzip **oic_connectivity_agent.zip**.
7. Change the file permissions to be executable.
8. Download the Oracle Utilities Work and Asset Cloud Service certificate and upload it to agent. Run the following command from the agent Home directory.

   ```
   keytool -import -file directoryPath/sample.crt -alias
   SampleCert - keystore <Agent_Home>/agenthome/agent/cert/
   keystore.jks
   ```

9. Modify **InstallerProfile.cfg** to include the following information.
   a. Provide the oic_URL value with the OIC SSL host name.

      Example: https://OIC_host:OIC_port

   b. Provide the agent_GROUP_IDENTIFIER. It should be the Agent Group Identifier generated when creating an agent group created in Oracle Integration Cloud.

   c. Set the proxy parameters if the connectivity agent is used with a proxy in the on-premises environment.

   d. Set the JAVA_HOME property to the directory/folder where JDK is installed.

      Note: Before running the connectivity agent installer, perform the steps in the Oracle Utilities Adapter with Oracle Integration documentation.

   e. Run the connectivity agent installer from the command prompt.

      ```
      java -jar connectivityagent.jar
      ```

   f. Provide the Oracle Integration Cloud credentials when prompted.

   g. Wait for a successful installation message to appear.

After the installation is complete, an agent instance is created to interact with Oracle Integration Cloud.

To verify if the agent instance was created:

1. Navigate to **Integration** > **Agents** in Oracle Integration Cloud.
2. Check if the agent count for your **Agent Group** is increased by one.
3. Click the number to view the agent details.

For more details, refer to Oracle Integration Cloud documentation.

Setting up Certificates for Security

Important! Skip this section if there are valid CA certificates for the integration.

If there no valid certificates for this integration, download the Oracle Utilities Work and Asset Cloud Service certificates and upload them to Oracle Integration Cloud to handshake with Oracle Utilities Work and Asset Cloud Service.

To download the Oracle Utilities Work and Asset Cloud Service certificate:

1. Login to Oracle Utilities Work and Asset Cloud Service.
2. Click the URL on the top-left corner.
3. On the **Security** tab, click **View Certificate**.
4. On the **Details** tab, click **Export**.
5. Save the certificate.

To upload the certificate to Oracle Integration Cloud:

1. Login to Oracle Integration Cloud with Admin credentials.
2. Navigate to **Settings** > **Certificates**.
3. On the **Certificate** window, click **Upload**.
4. Select **Certificate Type** as **Trust Certificate**.
5. Provide the **Certificate Alias Name**.
6. Select the certificate to upload.
7. Click **Upload**.

Chapter 6

Configuring Lookups, Error Handling, and Email Notifications

This chapter focuses on the lookups configuration, handling business and technical errors, sending email notifications, and customizations in this integration. It includes the following sections:

Configuring Lookups

The following table lists the lookups that are part of this integration.

Lookup Name	Integration Name	Purpose
OUTL-BRT-ArcGIS_OFS_ConfigProps	• OU ArcGIS OFS Work Task Process • OU ArcGIS OFS Admin Files Create • OU OFS ArcGIS Activities Delete • OU OFS ArcGIS Activities Sync flow	Used for configurable properties.
OUTL-BRT-ArcGIS_OFS_Email_ID	• OU ArcGIS OFS Work Task Process • OU ArcGIS OFS Admin Files Create	Used to configure email IDs of the respective users. Under the Email_Id column where the value of Recipient is "to", add comma separated email IDs to send an email to multiple users. Do not change or add any values under the Recipient column.
OUTL-BRT-ArcGIS_OFS_ActivityType	OU ArcGIS OFS Work Task Process	Used for configurable properties.
OUTL-BRT-ArcGIS_OFS_AssetSearchField	OU OFS ArcGIS Activities Sync Flow	Used to get search value that can be configured as part of Field maps URL link in a Arcade expression to search for an asset: • **Asset Type**: WACS asset type for a given asset. Example: WD-PoleWood **Note**: Each WACS asset type must correspond to a unique feature layer ID, so that the asset can be linked and searched in that particular feature layer. • **FeatureLayerID**: ID of the corresponding asset in ArcGIS. • **SearchField_1**: A configured search field for this layer in ArcGIS Webmap/Field Map. • **SearchField_2**: A configured search field for this layer in ArcGIS Webmap/Field Map. This field will be looked at if the SearchField_1 attribute returns empty or null.

Editing Lookups

To edit a lookup:

1. Login to Oracle Integration for Cloud.
2. Navigate to **Projects**.
3. Select the project and then navigate to the **Lookups** section of the project.
4. Select the lookup to edit.

5. Make the necessary changes.
6. Click **Save** and **Close**.

Configuration Properties

The `OUTL-BRT-ArcGIS_OFS_ConfigProps` lookup contains the properties that can be defaulted in the integration. It also contains a flag to enable email notifications.

Property Name	Sample Value	Description	Used in Integration Process Name
source.system	WACS	Defines the WAM or WACS product code	OU ArcGIS OFS Admin Files Create
notification.email.error.flag	true	If the value is set to 'true', email notification will be sent out for errors. Valid values: true/false Default: true Also, setup the OUTL-BRT-ArcGIS_OFS_Email_ID 'to' property for the users or administrators who should receive the email.	OU ArcGIS OFS Admin Files Create
ofs.activities.buckets	OHMeter	The property is used to configure the OFS buckets where the activities are assigned.	OU OFS ArcGIS Activities Sync flow
wacs.projectedcoordinatesystem.wkid	4326	This property is used to configure the coordinates system [wkid] which will be used to retrieve the geometry coordinates in the specified system format.	OU OFS ArcGIS Activities Sync flow

Property Name	Sample Value	Description	Used in Integration Process Name
arcgis.asset.search	false	This property is used to enable or disable the asset search logic in the flow if the navigating to an asset based on search value feature is not used in the popup. Refer to the *Oracle Field Service and ESRI ArcGIS Field Maps Configurations for ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile Setup Guide* included in this release for more information on configuring links in the popup based on search value. The asset search property is used in the flow to get the value of search field element of the asset configured in the lookup.	OU OFS ArcGIS Activities Sync flow
notification.email.invalidactivities.flag	False	If the value is set to 'true', email notification with invalid activities that have not been synchronized to ArcGIS will be sent out. As an example, the activities which has invalid longitude and latitude will not be synchronized and that activity information will be sent through the email if this flag is configured to true.	OU OFS ArcGIS Activities Sync flow
activity.status.include	cancelled,started,completed,pending,suspended,enroute,notdone	The property is used to determine the status of the OFS activities that needs to be considered for add/update in Activites feature class. This list can be modified to remove the status so that activities belonging to that status will not be synchronized.	OU OFS ArcGIS Activities Sync flow

Property Name	Sample Value	Description	Used in Integration Process Name
notification.email.process.complete.flag	true	Configures the optional email notification. If the value is set to 'true', email notification will be sent to the configured users. Also, setup the OUTL-BRT-ArcGIS_OFS_Email_ID 'to.process.notification' property for the users or administrators who should receive the email.	OU ArcGIS OFS Admin Files Create
asset.inventory.type	Asset		OU ArcGIS OFS Work Task Process
ofs.default.bucket	OHMeter	Configure the default bucket to assign the activities.	OU ArcGIS OFS Work Task Process
notification.email.deleteactivities.flag	False	Sends a notification email when the delete process finishes. By default, flag is set to false.	OU OFS ArcGIS Activities Delete

The `OUTL-BRT-ArcGIS_OFS_Email_ID` lookup contains the properties that can be defaulted in the integration. It also contains a flag to enable email notifications.

Property Name	Sample Value	Description	Used in Integration Process Name
from	arcgis-ofs@email.com	Defines the WAM or WACS product code	OU ArcGIS OFS Admin Files Create
to	errorDist@myCy.com	The email address(es) who should receive any error notification. Multiple emails can be configured by putting comma to separate the email IDs. These are likely the administrators or users who maintain the applications.	• OU OFS ArcGIS Activities Delete • OU OFS ArcGIS Activities Sync
to.process.notification	busUserDist@myCy.com	The email address(es) who should receive notification when the processing has completed. Multiple emails can be configured by putting comma to separate the email IDs. These are likely the business or application users.	• OU ArcGIS OFS Admin Files Create • OU OFS ArcGIS Activities Delete

Error Handling

This section provides information about the different ways used to handle errors in the integration and also resubmitting the instances after rectifying the errors.

Summary of Integration Error Handling

Integration Process: OU ArcGIS OFS Admin Files Create

Type of Error	Action	Notification Type	Retry
External Mobile Control Data service unavailability	• Process Stop • The OIC instance is marked as Failed	Technical Error Email	Reschedule execution in OIC
Failure in any of the file creation or any other errors	• Files already in Object Storage remain. • Collect the error details. • Process the next file. • At the end, a summary notification email and, if applicable, a Technical Error Detail email are sent. • The OIC instance is marked as Failed.	• Technical Error Email • Business Notification Email with Summary of Files	Reschedule execution in OIC

Integration Process: OU ArcGIS OFS Work Tasks Process

Type of Error	Action	Notification Type	Retry
Invalid Token	• Process Stop • The OIC instance is marked as Failed.	Technical Error Email	Reschedule execution in OIC
Remote Fault[Application down]	• Process Stop • The OIC instance is marked as Failed.	Remote Error Email	Reschedule execution in OIC

Type of Error	Action	Notification Type	Retry
Business Fault [Bad Request]	• The error is collected for each record. • The EXTERNAL_REC_INFO field is not updated and still retains the value of N. • OIC processing is successful.	Business Error Email with failed records	Fix the relevant issue and reschedule execution in OIC
Technical Fault[Xpath or DVM issue]	• The error is collected for each record. • The EXTERNAL_REC_INFO field is not updated and still retains the value of N. • OIC processing is successful.	Business Error Email with errors as attachment	Fix the relevant issue and the next run should successfully process the record. If the records cannot be fixed, update the EXTERNAL_REC_INFO field of the Task layer to Y.

Integration Process: OU OFS ArcGIS Activities Delete

Type of Error	Action	Notification Type	Retry
Invalid Token	• Process Stop • The OIC instance is marked as Failed.	Technical Error Email	Reschedule execution in OIC
Remote Fault[Application down]	• Process Stop • The OIC instance is marked as Failed.	Technical Error Email	Reschedule execution in OIC
Business Fault [Bad Request]	• The error is collected for each record. • OIC processing is successful.	Business Error Email with error details per status when connected to Online ESRI services.	Fix the relevant issue and reschedule execution in OIC
Technical Fault[Xpath or DVM issue]	• Process Stop • The OIC instance is marked as Failed. • The OIC instance is marked as Failed.	Technical Error Email	Reschedule execution in OIC.

Integration Process: OU OFS ArcGIS Activities Sync

Type of Error	Action	Notification Type	Retry
Invalid Token eError while querying or updating/creating ESRIActivities and ActivityAssets on ArcGIS Enterprise server.	• Process Stop	Business Error	Reschedule execution in OIC
Invalid Token error while getting asset attributes for a given gis ID from the asset feature layer published on ArcGIS Enterprise server.	• Process continues • The error message is collected, and email will be sent. • OIC processing is successful.	Business Error	Reschedule execution in OIC
Business Fault while create/update record in ArcGIS. Example: Foreign key constraints, Bad Request	• Error is thrown and process stops. • The flow will not continue further if the error occurred during the activity create/update invocation. It will not insert the asset records if the activity create/update fails. • The error is handled in the fault handler. • OIC processing is successful.	Business Error Email with error details will be sent.	Fix the relevant issue and reschedule execution in OIC.
Technical Fault [Xpath or DVM issue]	• Process Stop • The OIC instance is marked as Failed. • The OIC instance is marked as Failed.	Technical Error Email	Reschedule execution in OIC

Type of Error	Action	Notification Type	Retry
Remote Fault [ArcGIS or OFS Application down]	• Process Stop • The fault is thrown. • The fault will be handled in the fault handler section of the flow. • The OIC instance is marked as Failed.	Technical Error Email	Reschedule execution in OIC

Email Notifications

This pre-built integration includes a configurable email notification.

To receive an email notification:

1. Login to Oracle Integration Cloud.
2. Navigate to **Integrations** > **Lookups**.
3. Edit the `OUTL-BRT-ArcGIS_OFS_ConfigProps` lookup.

   Change the **email.flag** property value to 'true'.
4. Edit the `OUTL-BRT-ArcGIS_OFS_Email_ID` lookup.
   a. In the **from** field, enter the email ID to receive an email from.
   b. In the **to** field, enter the email ID to send the email to.
   c. In the **Email_Id** field, provide the comma separated email IDs.

      Note: In the `OUTL-BRT-ArcGIS_OFS_Email_ID` lookup, do not edit the values provided under the **Recipient** column.

Chapter 7

Activating and Testing the Integration Flows

This section provides an overview of how integration flows are activated and tested. It includes the following sections:

Prerequisites

Make sure the catalog in Oracle Utilities Work and Asset Cloud Service is configured completely to activate an integration process.

Activating Integration Flows

To activate the integration flows:

1. Login to Oracle Integration Cloud.
2. From **Home** page, navigate to the integration to activate.
3. Drag the slider for that integration. When prompted to enable tracing, click **Yes** to view the instances.
4. Click **Activate**.

The integration takes time to get activated. The activated integration appears at the top of the integrations list.

Chapter 8

Customizations

In Oracle Integration Generation 3, you can extend (customize) an integration in an accelerator project by adding and configuring an extension group. An extension group enables you to extend your integration by adding invoke connections; stitch, for-each, switch, map, and integration actions; and global variables to the integrations in your accelerator project.

For more details on how to perform these changes, refer to the **Manage a Project** section in **Using Integrations in Oracle Integration 3** at: https://docs.oracle.com/en/cloud/paas/application-integration/integrations-user/manage-project.html#GUID-BD7207BB-19D8-42D1-8D9E-7FC4D50E1B57

In addition, a knowledge base article is available at: https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=407954934694303&id=3017378.1&_adf.ctrl-state=611abf54g_77

Chapter 9

Monitoring and Troubleshooting

This chapter provides information about monitoring and troubleshooting the integration. It includes the following:

Oracle Utilities Work and Asset Cloud Service

This section provides information about monitoring Oracle Utilities Work and Asset Cloud Service.

Oracle Utilities Work and Asset Cloud Error Logs

The following error logs can be monitored for Oracle Utilities Work and Asset Management:

- Errors related to the online integration invocation from Oracle Utilities Work and Asset Management are stored in the WACS_ENVIRONMENT_NAME/logs/ or WAM_ENVIRONMENT_NAME/logs/system folder.

  Example: V24001_WAM_ORA_WLS/logs/system\

For more information about errors and notifications, and accessing cloud logs, refer to the Oracle Utilities Work and Asset Cloud Service documentation at: https://docs.oracle.com/en/industries/energy-water/work-asset-cloud-service/index.html

Oracle Integration Cloud

This section focuses on the monitoring Oracle Integration Cloud and troubleshooting any issues that occur during the integration activation.

Monitoring Integration Flows

Integration flows are monitored using the following:

- Project (for project based instances)
- Observability (for non project based instances)

To monitor the integration flows within a project:

1. Login to Oracle Integration Cloud.
2. Click **Projects**. On the navigation pane, click the relevant project.
3. Navigate to the **Observe** menu.
4. You can check:
   a. **Integrations** to view the counts of various status of instances created per integration flows.
   b. **Instances** to see instances of integrations of the project.
   c. **Future runs** to see all the runs scheduled or started for scheduled integrations.
   d. **Audit** to view and download design-time audit logs.

For more information, refer to: https://docs.oracle.com/en/cloud/paas/application-integration/integrations-user/monitor-integrations-project.html#GUID-8EAFC33E-1DDE-47FE-98F7-75418F5661CD

To monitor the integration flows outside the project through Oracle Integration Cloud Observability menu option:

1. Login to Oracle Integration Cloud.
2. Click Observability on the menu.
3. Select any of the following as required:
    - **Dashboards**: To monitor the complete dashboard of integration.
    - **Integrations**: To monitor each integration.
    - **Instances**: To monitor instance and flow trace/activity stream of the integration.
    - **Error**: To monitor the integrations in 'error' state. Re-submit the asynchronous integration flows.

Troubleshooting

To troubleshoot the errors in the workflow through the generated instances, you can set tracing level to DEBUG to generate detailed logs.

To enable DEBUG:

1. Select **Configure Activation** and then select the **Tracing Level** to be 'DEBUG'.
2. Run the integration and check the activity stream which now will include the runtime log details of the flow.
3. If an activation fails, the **Integrations** page displays an error message.

Some of the sample cases are as follows:

- For any connectivity errors while activating the integration, make sure the trigger connection is successful. Test the connection and refresh the metadata, and then activate the integration.
- If the integration (Oracle Utilities Work and Asset Cloud Service initiated flows) is activated for the first time, ensure the Oracle Utilities Work and Asset Cloud Service catalog is configured accurately.

Appendix A

Limitations and Workarounds

For information about the limitations and workarounds in this integration and in the respective applications, and the known issues, refer to the ESRI ArcGIS Field Maps Integration to Oracle Field Service Mobile Release Notes included in this release.

The documentation is available on Oracle Help Center at: https://docs.oracle.com/en/industries/energy-water/integrations-index.html