Asset Hierarchy

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Chapter

1

Overview

Topics:

Overview of Assets

The **Assets** page in GE Digital APM contains the Asset Hierarchy and Asset Group that provide a dynamic way to interact with and view your assets.

Simply, the Asset Hierarchy displays records in the database and how they relate to one another. It provides a dynamic view of functional locations, equipment, and their associated analyses by navigating through the system based on the assets themselves.

Asset Groups are collections of assets, grouped together for analysis. An Asset Group can be created ad hoc in the Asset Group section or during the associated workflow. An Asset Group can be saved and reused for different types of analyses. For example, if you wanted to perform an ACA and an RBI on the same 20 pieces of equipment, you can create an Asset Group with those 20 equipment, and use the same group for each analysis.

About the Asset Hierarchy

GE Digital APM is built on the premise, within your company, there are multiple functional locations that can be organized in a hierarchy to represent the fact that some locations belong to other locations. These relationships create the Asset Hierarchy.

Navigating the Asset Hierarchy

The Asset Hierarchy allows you to browse your assets from the top-level functional location.

- Company (MRD ~ Meridium, Inc.)
- Sites (MRD-ROA ~ Meridium Roanoke)
- Areas (MRD-ROA-REFN ~ Meridium Roanoke Chemicals)
- Units (MRD-ROA-CHEM-CM101 ~ Meridium Roanoke Chemicals Unit CM101)
- Functional Locations (MRD-ROA-CHEM-CM101-FT101A ~ REACTOR COOLANT FLOW)
- Equipment (G0022-065 ~ 000000000001034757 ~ PUMP)
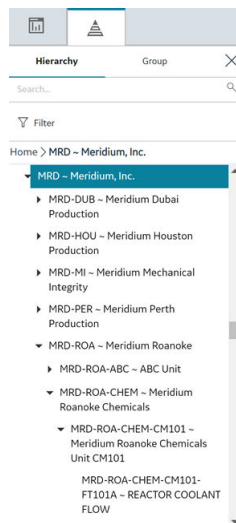
Tip:

- To navigate to a parent-level or child-level equipment or functional location of an asset that is selected in the hierarchy, select the corresponding breadcrumb link in the breadcrumb path.
- To expand or collapse the Asset Hierarchy panel, select ⊹ or ✕, respectively.
- To resize the Asset Hierarchy panel, drag the border of the panel to the required width.

Note:

- As a standard practice, we assume that your equipment is installed in locations that exist on the lowest level of your location hierarchy.
- The Asset Hierarchy displays:
  - A maximum of 500 top-level records in the hierarchy.
  - A maximum of 500 child equipment or functional locations for a parent functional location.

The <Asset Name> Workspace

As you navigate through the Asset Hierarchy, in the **<Asset Name>** workspace, you can access the information about the Health, Reliability, Strategy, and Integrity for each level of equipment or functional location. The **<Asset Name>** workspace provides an overview of all the data available in GE Digital APM related to the asset selected in the Asset Hierarchy. For each Health, Reliability, Strategy and Integrity item, a hyperlink is available, displaying the number and type of analysis performed against that asset. When selected, the hyperlinks open the analyses or inspections in a new tab while maintaining the selection in the Asset Hierarchy.

Tip: To refresh the **<Asset Name>** workspace, select 🔄.

View the Asset Criticality Analysis for an asset in the Asset Hierarchy

To view the analyses for the company, MRD ~ Meridium, Inc:

1. In the Asset Hierarchy, select MRD ~ Meridium, Inc.
   The **MRD ~ Meridium, Inc.** workspace appears.
2. Select the **Strategy** tab.
   In the **Strategy** section, you can view module-specific data for the asset, such as strategy actions, recommended actions, ACA analyses, strategies, and so on.
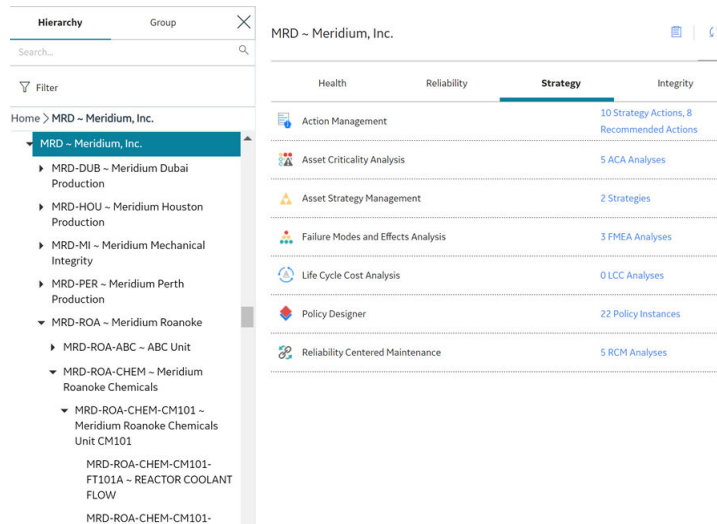
3. Select the **5 ACA Analyses** link.
   The **Asset Criticality Overview** page appears in a new tab, and you can access the existing analyses for the selected asset.
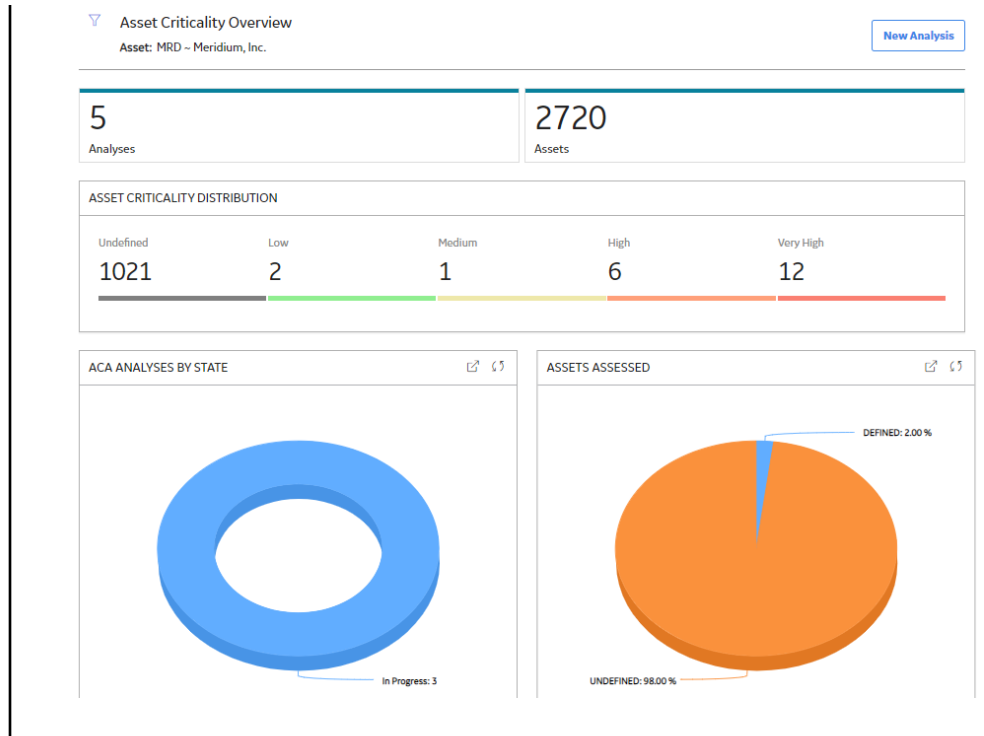
About Asset Groups Based on Queries

The ability to create an Asset Group based on a query allows a user to apply an analysis to a dynamic group of assets (that is, equipment, functional locations, and RBI components). When a user bases a new Asset Group on a query, the Asset Group is dynamic in that it is subject to change as assets change with respect to the parameters of the query.

Every time you access an Asset Group that is based on a query, the query is freshly run. For example, the day you create an Asset Group using a query, the query it is based on may populate it with 10 assets. If you were to access the same Asset Group a month later, the query would run afresh and may populate the Asset Group with more or fewer than 10, depending on the number of assets that will meet the parameters of the query the second time around.

If you want to run a static query that is populated with specific assets, you need to provide an entity key. The entity key should be provided in the first column of your query, in the ENTY_KEY column.

Additionally, when you apply an analysis to an Asset Group that is based on a query, the Asset Group is no longer dynamic. Instead, the assets returned by the base query at the time when you apply the analysis are the exact assets for which that analysis will always apply.

You cannot use an Asset Group that is based on a query as a filter in a module overview page where asset filtering is available. You must convert the dynamic Asset Group to a static group to use it as a filter.
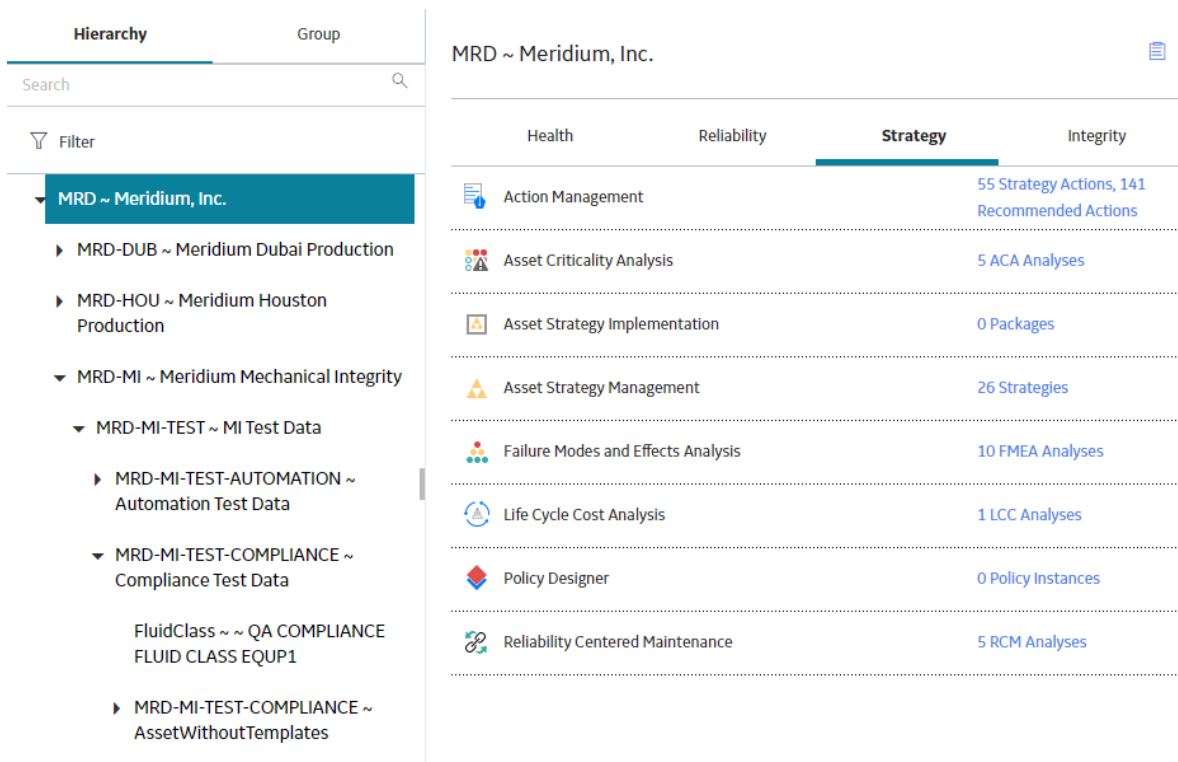
Lastly, you cannot modify Asset Groups that are based on queries. You must create a new Asset Group.

Access the Assets Page

Procedure

In the top navigation bar, select ▲.

The page displaying the Asset Hierarchy appears.

Create an Asset Group

Before You Begin

Before you can create an Asset Group based on a query, you must create a query on which you want to base your Asset Group, if it does not already exist.

Procedure

1. To create an asset group from scratch:

   a) Access the **Assets** page.

   b) In the left pane, select **Group**, and then select +.

      The **New Asset Group** workspace appears.

c) In the **Group Name** box, enter a name for the new asset group.

d) In the **Group Description** box, enter a brief description for the group.

e) To add a Parent to the Asset Group, above the **Select a Parent** box, select +.
   The **Asset Finder** window appears.

f) In the **Asset Finder** window, use the Asset Hierarchy to select + for the level of the hierarchy with which you want to associate the group, and then select **Done**.

g) Above the **Add Assets** box, select +.
   The **Asset Finder** window appears.

h) In the **Asset Finder** window, using either the Asset Hierarchy or a preexisting Asset Group, select + for the asset(s) that you want to add to the group, and then select **Done**.

i) In the workspace heading, select **Save**.
   The group is saved, and appears in the **Asset Group** section.

   Note: Relationships are determined while creating an Asset Group during an associated module workflow.

2. To create an asset group based on a query:

   a) Access the **Assets** page.

   b) In the left pane, select **Group**, and then select +.

      The **New Asset Group** workspace appears.

c) In the **Group Name** box, enter a name for the new asset group.

d) In the **Group Description** box, enter a brief description for the group.

e) To add a Parent to the Asset Group, above the **Select a Parent** box, select ╋.
The **Asset Finder** window appears.

f) Above the **Select a Query** box, select ╋.
The **Select a Query from the Catalog** window appears.

g) Navigate to the query on which you want to base the new Asset Group, and then select that query.
The **Select a Query** box is populated with the query path.

h) Select **Save**.
The group is saved, and appears in the **Asset Group** section.

Filter Assets

About This Task

Steps: Apply a Filter to the Asset Hierarchy

Procedure

1. To apply a filter to the Asset Hierarchy:

   a) Access the **Assets** page.

   b) In the left pane, in the **Hierarchy** section, select ▽.
   The **Filter** menu appears.

    c) Optionally, in the **CATEGORY** drop-down list box, select a taxonomy category.

    d) Optionally, in the **CLASS** drop-down list box, select a taxonomy class.

    e) Optionally, in the **TYPE** drop-down list box, select a taxonomy type.

    f) Select **Apply**.
      The hierarchy is filtered according to your selection.

2. To apply a filter to asset groups:

    a) Access the **Assets** page.

    b) In the left pane, in the **Group** section, select ▽ .
      The **Group Filter** window appears.

    c) Optionally, in the **Relationship** box, select a relationship by which to filter.

    d) Optionally, select **Hierarchy Filter**.
      The **Hierarchy Finder** window appears.

    e) In the Asset Hierarchy, in the row for each asset by which you want to filter groups, select ＋ .

    f) Select **OK**.
      The list of applied filters appears on the **Group Filter** window.

    g) Select **Done**.
      The groups are filtered according to your selection.

Search for an Asset

Procedure

1. Access the **Assets** page.

2. In the left pane, in either the **Asset Hierarchy** section or the **Asset Group** section, select 👓 , and then, in the text box, enter your search criteria. For more information, refer to the Search section of the documentation.
The search results appear in a list in the left pane.

   Note: You can now search for the functional location or the equipment by applying the taxonomy filter.

Copy an Asset Group Based on a Query

Before You Begin

Before you can copy an Asset Group based on a query, the system must contain an Asset Group that is based on a query.

Procedure

1. Access the **Assets** page.
2. In the left pane, select **Group**, and then select the group that you want to copy.

   The properties for the selected group appear in the **<Group Name>** workspace, where **<Group Name>** is the name of the group.
3. Select **Save As a Static Group**.

   The copy of the new group appears in the **<Group Name>** workspace, where **<Group Name>** is the name of the copied group. The asset group copy contains all of the assets that were in the previous group. The new asset group is saved automatically.

Note: The asset group you choose to copy must use a query or the **Save As a Static Group** button will not appear.

Next Steps

- Modify an Asset Group

Modify an Asset Group

Procedure

1. Access the **Assets** page.
2. In the left pane, select **Group**, and then select the group that you want to modify.

   The selected group's properties appear in the **<Group Name>** workspace, where **<Group Name>** is the name of the group.
3. Modify the properties as needed, and then, in the workspace heading, select **Save**.

   The changes are saved.

   Tip: If you want to delete an Asset Group, in the workspace for the Asset Group, select **Delete**. You cannot delete an Asset Group that is linked to an analysis. If you attempt to delete an Asset Group that is linked to one or more analyses, a message displaying the names of the linked analyses appears. If the Asset Group is linked to no analyses, a confirmation window appears. Select **Yes** to delete the Asset Group.

Chapter

2

Workflow

Topics:

Core Analysis: Asset Event Analysis Workflow

Core Analysis processes leverage GE Digital APM data to identify opportunities for business improvement. When the process identifies such an opportunity, a Performance Recommendation is raised to communicate the need and track the required work. You can use the Asset Event Analysis Workflow process to identify opportunities or needs for improvement based on unexpected or undesirable events related to specific assets.

In the following workflow diagram, the blue text in a shape indicates that a corresponding description has been provided in the sections that follow the diagram. For more information, refer to the topic Interpreting the Workflow Diagrams.
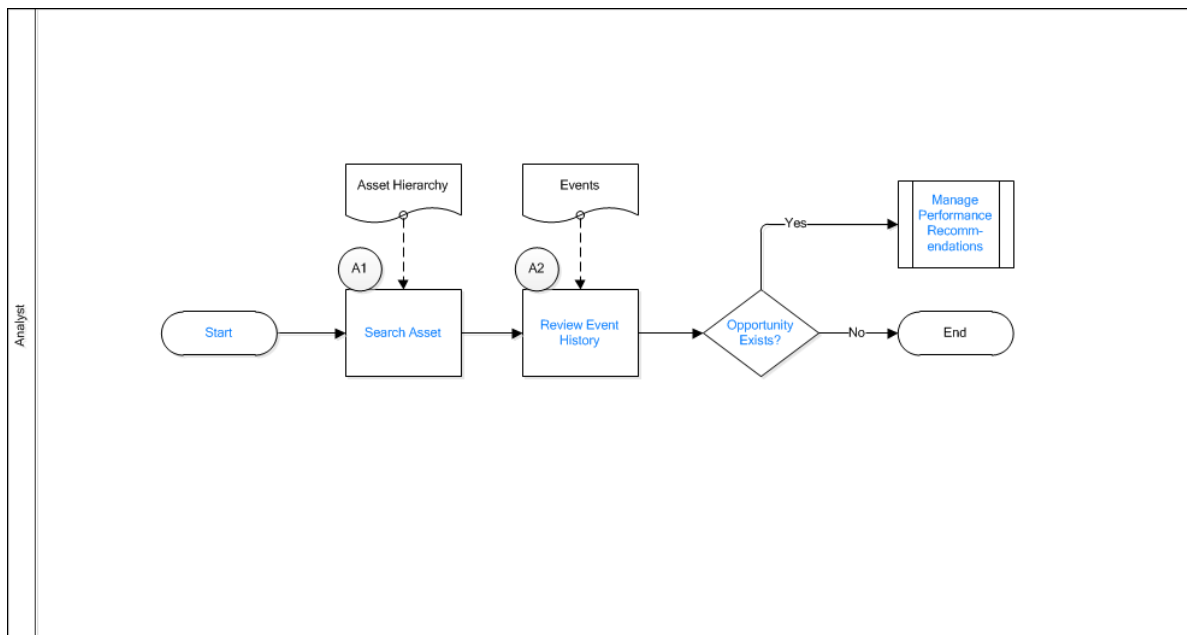
Start

Persona: Analyst

To satisfy a specific business problem, a GE Digital APM User initiates a core analysis that applies standard data analysis techniques.

Search Asset

Persona: Analyst

Search for a specific asset (Functional Location or Equipment) for which Event records are required.

Review Event History

Persona: Analyst

Review individual Event records for the selected asset. Identify unexpected or undesirable events that may require further analysis for elimination. Consult other forms of GE Digital APM data in the analysis of Event records.

Opportunity Exists?

Persona: Analyst

If a GE Digital APM User identifies an opportunity or need for improvement, then a Performance Recommendation is raised to communicate the need and track the required work. Otherwise, the workflow ends.

Manage Performance Recommendations

Persona: Analyst

If a GE Digital APM User identifies an opportunity or need for improvement, then a Performance Recommendation is raised to communicate the need and track the required work.

Chapter

3

Asset Hierarchy Configuration

Topics:

Asset Hierarchy Configuration

GE Digital APM is built on the premise that, within your company, there are multiple records that can be organized into a hierarchy. This organization relies on the parent-child relationship between records to represent the fact some records can belong to other records.

The Hierarchy can be modified to reflect a custom family. However, the baseline configuration relies on the Functional Location family and the fields in each Functional Location record to define which location each represents. Because there is only one Functional Location family, it is used to store data about all of your locations, where the values in each Functional Location record identify which type of location it is.

The baseline configuration assumes that Functional Locations have Functional Locations and that Equipment is found at the lowest levels of Functional Locations. For example, three pieces of equipment might belong to the same Functional Location, meaning the Functional Location resides on a higher level of the hierarchy than the Equipment.

More Details: Baseline Configuration

In the baseline configuration, there are two levels reflected in the Asset Hierarchy: the **Root** and a secondary level. The primary level of the Hierarchy, the **Root**, reflects the Functional Location relationships. The second level of the hierarchy reflects Equipment related to Functional Locations. The hierarchy first displays the **Root** Function Location, and drills down to child Functional Locations based on your selections. The hierarchy will continue to do so until there are no child relationships for the selected Functional Location. Then, using the criteria defined in the second level, the hierarchy will display Equipment records related to the selected Functional Location.

The baseline configuration is as follows:

- **Root**: The primary level of the hierarchy.

    ◦ **Parent Family**: Functional Location
    ◦ **Relationship**: Functional Location Has Functional Location(s)
    ◦ **Child Family**: Functional Location
    ◦ **Display Field**: Functional Location Description
    ◦ **Taxonomy Category**: Taxonomy Category
    ◦ **Taxonomy Class**: Taxonomy Class
    ◦ **Taxonomy Type**: Taxonomy Type
- **Secondary Level**: The second level of the hierarchy.

    ◦ **Parent Family**: Functional Location
    ◦ **Relationship**: Functional Location Has Equipment
    ◦ **Child Family**: Equipment
    ◦ **Display Field**: ENTY_ID
    ◦ **Taxonomy Category**: Taxonomy Category
    ◦ **Taxonomy Class**: Taxonomy Class
    ◦ **Taxonomy Type**: Taxonomy Type

Important: Equipment or functional location with multiple parent functional location is not supported in Asset Hierarchy.

To find the duplicate keys, run the below query in GE Digital APM:

```
SELECT MV_AST_HRCY_DUP.parent_enty_key
, PAR_FMLY.FMLY_CAPTION_TX "PARENT_FMLY"
, MV_AST_HRCY_DUP.enty_key "CHILD_ENTY_KEY"
```

```
, CHILD_FMLY.FMLY_CAPTION_TX "CHILD_FMLY"
, MV_AST_HRCY_DUP.enty_id "CHILD_ENTY_ID"
, MV_AST_HRCY_DUP.the_level
, MV_AST_HRCY_DUP.path
FROM MIV_MI_AST_HRCY_MV_DUP MV_AST_HRCY_DUP
  JOIN MI_FAMILIES PAR_FMLY ON PAR_FMLY.FMLY_KEY =
MV_AST_HRCY_DUP.parent_fmly_key
  JOIN MI_FAMILIES CHILD_FMLY ON CHILD_FMLY.FMLY_KEY =
MV_AST_HRCY_DUP.fmly_key
ORDER BY MV_AST_HRCY_DUP.enty_key Asc
```

Access the Asset Hierarchy Configuration Page

Procedure

Access the **Operations Manager** page, and then select **Asset Hierarchy Configuration**.
The **Asset Hierarchy Configuration** page appears, displaying the Asset Hierarchy configuration.

Modify the Asset Hierarchy Configuration

About This Task

Note: You only need to modify the Asset Hierarchy if you want to change the baseline configuration.

Procedure

1. Access the **Asset Hierarchy Configuration** page.
2. For the section you want to use as the primary level of the hierarchy, select **Root**.
3. In the **Root** section, select a value for the following as necessary:

   - **Parent Family:** The list of all entity families that exist in the database.
   - **Relationship:** The list of relationship families that exist in the database for the selected parent family.
   - **Child Family:** The list of entity families that exist in the database that are linked to the selected parent family through the selected relationship family.
   - **Display Field:** The list of fields from child families.
   - **Taxonomy Category:** A list of equipment categories (e.g., electrical is a category of equipment).
   - **Taxonomy Class:** A list of types of equipment classifications (e.g., capacitor is a class of electrical equipment).
   - **Taxonomy Type:** A list of types of equipment (e.g., series capacitor is a type of capacitor).

     Tip: In GE Digital APM, taxonomy refers to the classification systems used for identifying equipment. Equipment taxonomy is broken down into three sections: Category, Class, and Type.

4. If you want to add another level, in the upper left corner of the page, select $+$.

5. To save, but not apply, the modifications, select 🖫.

   -or-

   To apply the modifications, select 🖫, and then select **Rebuild**.

   The modifications are applied, and are reflected on the **Assets** page.

Schedule an Asset Hierarchy Rebuild

You can schedule an Asset Hierarchy rebuild to occur on a one-time or recurring basis.

Procedure

1. In the module navigation menu, select **Admin** > **Operations Manager** > **Asset Hierarchy Configuration**.
2. In the page, select , then select the **Enable Schedule** check box, and then select **Schedule**.
3. In the **Edit Schedule** window, select either **One time** or **Recurrence**.
4. In **Time Zone**, select the time zone in which you want the first scheduled rebuild to occur.
5. In **Start**, specify the date and time at which you want the first scheduled rebuild to occur.
6. If you selected **Recurrence**, in the **Every** section, specify the frequency at which you want the rebuild to occur.
7. If you selected **Recurrence**, in the **End** section, specify when the recurring rebuild should end.
8. Select **Save**.

   The **Edit Schedule** window closes.
9. In the **Asset Hierarchy Configuration** page, select **Save**.

Results

The Asset Hierarchy rebuild is scheduled.

Chapter

4

Data Loader

Topics:

About the Custom Asset Hierarchy Data Loader

The Custom Asset Hierarchy Data Loader is designed to load data into the Asset Hierarchy Entity family in GE Digital APM, and is also used to relate records in that family to other families in GE Digital APM based on the relationship definitions defined in Family Management. You can create Custom Asset Hierarchy Data Loader workbooks for the following purposes:

- Entity Family Data: Used to load data or records.
  -and-

- Relationship Family Data: Used to relate a record in an entity family to another record in different entity family.

The data loader workbooks used by the Custom Asset Hierarchy Data Loader are created using the metadata definitions configured in your GE Digital APM system. When the data is loaded, the Custom Asset Hierarchy Data Loader will trigger all of the associated field and family level rules, to ensure that the data is valid, but no further validation is done to the data. You should, however, verify that the intended data, records, or relationships are present in the GE Digital APM system after a data load has been completed.

About the Custom Asset Hierarchy Data Loader Requirements

Determine Which Families and Relationships to Populate

You can determine which families are available and how families are related in Family Management. To access Family Management:

1. Log in to GE Digital APM.
2. On the left navigation menu, select **Admin**, and the select **Family Management**.

Security Settings

The Security User performing the data load operation must be associated with either the MI Data Loader User or MI Data Loader Admin Security Role. Depending on the type of data that the Security User wants to load, the user may need to be associated with additional Security Roles to grant privileges to create the necessary records. To determine if additional Security Role association is needed to create a particular type of record, refer to the About Roles section of theGE Digital APM Administrative User Help documentation.

About the Custom Asset Hierarchy Data Loader Data Model

The following data model illustrates the records that the Custom Asset Hierarchy Data Loader supports. The Family records illustrated with a red border are customizable.

Custom Asset Hierarchy Data Loader Data Model
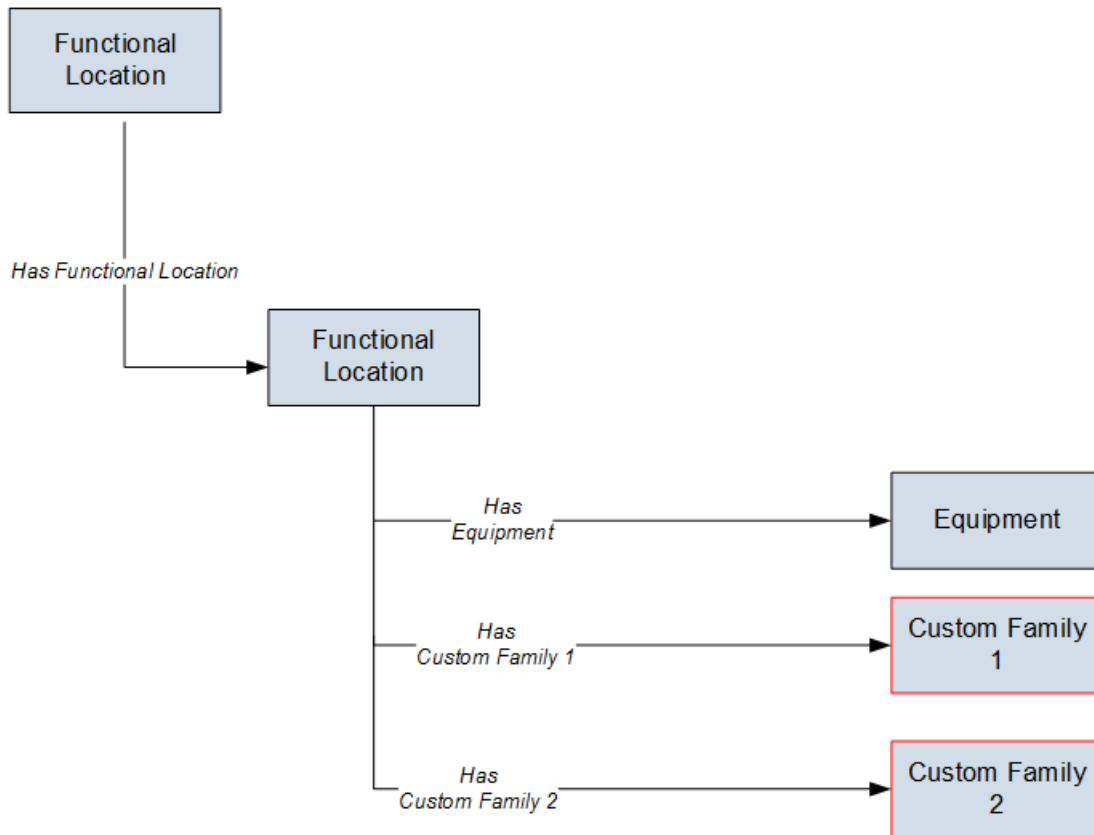
About the Custom Asset Hierarchy General Loading Strategy

This section describes any prerequisites to loading the data and the order in which the data will be loaded.

General Loading Strategy Workflow

1. Determine what families and or relationships you want to populate using the Custom Asset Hierarchy Data Loader.
2. Populate the **Configuration** worksheet.

This data loader may run on a schedule as part of the EAM data load service.

About the Custom Asset Hierarchy Data Loader Workbook Layout and Use

This section provides a high-level overview and explanation of how the data loader workbook is constructed.

In order to import data using the Custom Asset Hierarchy Data Loader, GE Digital APM provides an Excel workbook that must be used to perform the data load.

The following table lists the worksheets that are included in the **MI_AH_Entity_Dataloader.xlsx** workbook.

Worksheet	Description
Configuration	The **Configuration** worksheet is needed to describe the type of data that you will be loading and how that data should be handled during the data load.
AHEntity	Where you specify the actual Asset Hierarchy entities that you want to load.
LinkAHEntitytoEntity	Where you can connect an Asset Hierarchy entity to another Asset Hierarchy entity.
LinkAHEntitytoFL	Where you can connect an Asset Hierarchy entity to a Functional Location, Equipment, or some other asset concept defined by the Family Management settings.

Each worksheet in the Custom Asset Hierarchy Data Loader workbook contains field values that can be mapped to the appropriate GE Digital APM family/field.

Configuration Worksheet

The Configuration worksheet tells the Custom Asset Hierarchy Data Loader what types of data are being loaded and how the data is to be loaded, and is standard for all data loads regardless of the type of data that you are loading. The following table outlines the options that are valid or the values that are expected in each of the columns on the Configuration worksheet.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Load Data From Worksheet	LOAD_DATA_WORKSHEET	Boolean	• True • False	The value in this column will determine whether or not the data should be loaded from the worksheet.
Data Worksheet ID	DATA_WORKSHEET_ID	Character	• AHEntity • LinkAHEntitytoEntity • LinkAHEntitytoFL	This column contains the name of the worksheet where the actual data is located. It needs to have the same name as the worksheet in the data loader workbook.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Batch Filter Column	BATCH_FILTER_COL_ID	Character	• MI_AH_ENTITY_PRNT_ID_CHR • '<PRED_FAMILY_ID>' | MI_AH_ENTITY_ID_CHR	When the data is loaded into GE Digital APM, it is processed in a series of batches. This column contains the Data Column ID that will be used for the batching of the data. All of the records will be grouped together by the unique values in the column specified in the worksheet. This column must also be the first column that exists in the worksheet. It must be the Column ID, which is in the second row on the worksheet and not the Field ID.
Primary Family ID	PRIMARY_FAMILY_ID	Character	• MI_AH_ENTITY • MIR_ENTYHSENTY • MIR_ENTYHSASSET	Depending on the type of data that you are working with, this will contain the Relationship Family ID or the Entity Family ID. You can also allow the data in source file to determine the Family ID by encapsulating the Field ID that contains the Family ID data in brackets (<>). For example if in the worksheet there is a column with an ID of PRIMARY_FAMILY_ID, where each row contains the corresponding Family ID, then in this column you should put the value of <PRIMARY_FAMILY_ID>. If the Family ID in the GE Digital APM metadata contains spaces, then you have to use this feature.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Primary Family Key Fields	PRIMARY_FAMILY_KEY_FIELDS	Character	• MI_AH_ENTITY_ID_CHR	This column contains the Field IDs associated with the Primary Family that are used to uniquely identify a record. If more than one field is to be used, then each Field ID needs to be separated by a | (Pipe) character. In the case where you are loading data into a relationship, if no keys fields exist or are used, use the <none> constant. If the Primary Action is ACTION_INSERTONLY, then no key fields need to be specified, so you can use the <none> constant.
Family Type	FAMILY_TYPE		• Entity • Relationship	The value is this column should be Entity or Relationship depending on the type of data that is being loaded.
Predecessor Family ID	PRED_FAMILY_ID	Character	• <PRED_FAMILY_ID>	When the Family Type is Relationship, this column will contain the value of the Entity Family ID that is the predecessor in the relationship. Otherwise, it should contain the <none> constant. You can also use the data in each of the rows to determine the Predecessor Family ID.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Predecessor Family Key Fields	PRED_FAMILY_KEY_FIELDS	Character	• MI_AH_ENTITY_ID_CHR	This column contains the Field ID or IDs associated with the Predecessor Family that are used to uniquely identify the predecessor record. If more than one field is to be used, then each Field ID needs to be separated by a | (Pipe) character. If the Predecessor Action is ACTION_INSERTONLY, then no key fields need to be specified, so you can use the <none> constant.
Successor Family ID	SUCC_FAMILY_ID	Character	• <SUCC_FAMILY_ID>	When the Family Type is Relationship, this column will contain the value of the Entity Family ID that is the successor in the relationship. Otherwise, it should contain the <none> constant. You can also use the data in each of the rows to determine the Successor Family ID.
Successor Family Key Fields	SUCC_FAMILY_KEY_FIELDS	Character	• MI_AH_ENTITY_ID_CHR • MI_FNCLOC00_FNC_LOC_C	This column contains the Field ID or IDs associated with the Successor Family that are used to uniquely identify the successor record. If more than one field is to be used, then each Field ID needs to be separated by a | (Pipe) character. If the Successor Action is ACTION_INSERTONLY, then no key fields need to be specified, so you can use the <none> constant.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Primary Action	PRIMARY_ACTION	Character	• ACTION_INSERTUP DATE	The value in this column will determine the action that will be applied to the Primary Family records. If the Family Type is Entity, then the possible values are: • ACTION_INSERTON LY • ACTION_INSERTUP DATE • ACTION_UPDATEO NLY • ACTION_DELETE • ACTION_PURGE Deleting a record and purging a record will both delete the current record, the difference being that the purge action will delete the record and all of the links or relationships tied to that record. The delete action will simple attempt to delete the record, and if it is related to another record, the delete will fail. If the Family Type is Relationship, then the possible values are: • ACTION_INSERTON LY • ACTION_INSERTUP DATE • ACTION_UPDATEO NLY • ACTION_DELETE

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Predecessor Action	PRED_ACTION	Character	• ACTION_NONE • ACTION_LOCATE	The value in this column will determine the action that will be applied to the Predecessor Family records. The possible values are: • ACTION_INSERTONLY • ACTION_INSERTUPDATE • ACTION_UPDATEONLY • ACTION_DELETE • ACTION_PURGE • ACTION_LOCATE If the Family Type is Entity then the value needs to be: • ACTION_NONE
Successor Action	SUCC_ACTION	Character	• ACTION_NONE • ACTION_LOCATE	The value in this column will determine the action that will be applied to the Successor Family records. The possible values are: • ACTION_INSERTONLY • ACTION_INSERTUPDATE • ACTION_UPDATEONLY • ACTION_DELETE • ACTION_PURGE • ACTION_LOCATE If the Family Type is Entity then the value needs to be: • ACTION_NONE

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Insert with Null Values?	OPTION_INSERT_ON_NULL	Boolean	• True • False	When setting field values on a new record, if a value coming across is NULL, the field values will be set to NULL if this option is set to True.
Update with Null Values?	OPTION_UPDATE_ON_NULL	Boolean	• True • False	When setting field values on an existing record, if a value coming across is NULL, the field values will be set to NULL if this option is set to True.
Replace an Existing Link?	OPTION_REPLACE_EXISTING_LINK	Boolean	• True • False	The Replace Existing Relationship option is used to determine how a relationship is to be maintained by its cardinality definition. For example, the relationship Location Contains Asset that is defined in the Configuration Manager. It has a cardinality defined as Zero or One to Zero or One, has a Location LP-2300, and contains the Asset P-2300. If, in the data load, you assign the Asset P-5000 to be contained in the Location LP-2300, and you have set the Replace Existing Link property to True, then the data loader will link P-5000 to LP-2300 and unlink P-2300 from LP-2300. This assumes that P-5000 is not currently linked to another location. The same is true for a relationship that is defined as Zero or One to Zero or Many, or Zero or Many to Zero or One.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Allow Change of Family?	OPTION_ALLOW_CHANGE_OF_FAMILY	Boolean	• True • False	Allows the data loader to move an entity from one family to another. For example, this would allow an entity that is currently assigned to the Centrifugal Pump family to be moved to the Reciprocating Pump family. All relationships will be maintained as long as the family to which the entity is being moved allows the same relationships. **Note:** Because of the extra processing required, by selecting this option, the interface performance will decrease.
Process Each Row as a Transaction?	OPTION_TRANSACTION_PER_ROW	Boolean	• True • False	When this value is set to True, each row in the spreadsheet is committed before the next row is processed. If this is set to False, then all of the records in the batch are processed in one transaction. In general, you will get better performance when processing data in a batch, assuming that the data being loaded is clean, meaning that the vast majority of records will not be rejected.

Asset Hierarchy Entity (AHEntity) Worksheet

The following table outlines the options that are valid or the values that are expected in each of the columns on the Asset Hierarchy worksheet.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Entity Parent ID	MI_AH_ENTY_PRINT_ID_C	Character	• MRD-PER	This is the unique identifier of the parent value that you want to link to your entity.
Entity ID	MI_AH_ENTY_ID_C	Character	• MRD-PER • MRD-PER-ABC • MRD-PER-DEF	This is the unique identifier for the entity that you are adding to the worksheet.
Entity Name	MI_AH_ENTY_NAME_C	Character	• Perth • ABC Perth • DEF Perth	The name of the asset that you are adding to the worksheet.
Site Reference	MI_SITE_NAME	Character	• Perth, Australia	The site reference associated with the entity.

Link an Asset Hierarchy Entity to Another Entity (LinkAHEntityToEntity) Worksheet

The following table outlines the options that are valid or the values that are expected in each of the columns on the Asset Hierarchy Entity to Entity worksheet.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Parent ID	<PRED_FAMILY_ID>|MI_AH_ENTY_PRINT_ID_C	Character	• MRD-PER	This is the unique identifier of the parent value that you want to link to your entity.
Predecessor Family ID	PRED_FAMILY_ID	Character	• MI_AH_ENTITY	When the Family Type is Relationship, this column will contain the value of the Entity Family ID that is the predecessor in the relationship. Otherwise, it should contain the <none> constant. You can also use the data in each of the rows to determine the Predecessor Family ID.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Entity ID	<SUCC_FAMILY_ID>| MI_AH_ENTY_ID_C	Character	• MRD-PER-ABC • MRD-PER-DEF	The unique identifier of the asset that is being loaded into the Asset Hierarchy.
Successor Family ID	SUCC_FAMILY	Character	• MI_AH_ENTITY	When the Family Type is Relationship, this column will contain the value of the Entity Family ID that is the successor in the relationship. Otherwise, it should contain the <none> constant. You can also use the data in each of the rows to determine the Successor Family ID.

Link an Asset Hierarchy Entity to a Functional Location (LinkAHEntitytoFL) Worksheet

The following table outlines the options that are valid or the values that are expected in each of the columns on the Asset Hierarchy Entity to Functional Location worksheet.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Entity_ID	<PRED_FAMILY_ID>| MI_AH_ENTY_PRINT_ID_ C	Character	• MRD-PER-ABC • MRD-PER-DEF	The unique identifier of the asset that is being loaded into the Asset Hierarchy.
Predecessor Family ID	PRED_FAMILY_ID	Character	• MI_AH_ENTITY	When the Family Type is Relationship, this column will contain the value of the Entity Family ID that is the predecessor in the relationship. Otherwise, it should contain the <none> constant. You can also use the data in each of the rows to determine the Predecessor Family ID.

Field Caption	Field ID	Data Type	Potential Value(s)	Comments
Functional Location	<SUCC_FAMILY_ID>| MI_FNCLOC00_FNC_LOC_C	Character	• MRD-ROA-ABC-XYZ-FCV1005 • MRD-ROA-ABC-XYZ-FCV1006 • MRD-ROA-ABC-XYZ-PCV1001 • MRD-ROA-ABC-XYZ-PCV1002	The location of the asset that you are loading into the Asset Hierarchy.
Successor Family ID	SUCC_FAMILY	Character	• MI_FNCLOC00	When the Family Type is Relationship, this column will contain the value of the Entity Family ID that is the successor in the relationship. Otherwise, it should contain the <none> constant. You can also use the data in each of the rows to determine the Successor Family ID.

About Populating Site Reference Data

The Custom Asset Hierarchy Data Loader can be used to populate the Site Reference on Equipment and Functional Location records in GE Digital APM. The Custom Asset Hierarchy Data Loader populates the ENTY_KEY system field and the MI_SITE_KEY system field associated with the Site Reference value to be populated. On asset records, the Site Reference is stored in the MI_SITE_KEY field, a system field in GE Digital APM. The Custom Asset Hierarchy Data Loader uses the Site Name (MI_SITE_NAME) to translate the value to the corresponding Site Key and populate the MI_SITE_KEY field; therefore, you do not need to know the key to be able to populate the site reference. This functionality is important because this value can change from one database to another.

Steps: Populate Site Reference Using the Site Name

1. On the data worksheet, add a column that contains MI_SITE_NAME in the column name.
   For example, if you are working with a relationship, where a distinction needs to be made regarding which family is associated with each column, then the column name will be prefaced with the Family ID. As shown in the following image, the column name might take the form 'MI_EQUIP000| MI_SITE_NAME', where MI_EQUIP000 is the Family ID.
2. Enter the site name to designate the site by which the asset record, once loaded into GE Digital APM, will be filtered.
3. Continue populating the source workbook, and then run the data loader.
   The site reference value will filter the equipment records as determined in the source workbook.

About the Custom Asset Hierarchy Data Loader Load Verification

After loading data, you must perform the following steps in GE Digital APM to ensure the integrity and accuracy of the data imported from the data loader workbook:

- Review the details of the import job. These details will indicate any errors that occurred during the data load. The log helps you identify any records that are not loaded.
- Run a query on the relevant family to ensure that the records have been created and populated as expected.
- Verify the imported records in Asset Hierarchy to ensure that the relationships between families have been created.
- Verify that the assets in a Functional Location of the Custom Asset Hierarchy Data Loader exist.

    To view the assets, perform the following steps:

    1. Log in to GE Digital APM.

    2. On the top navigation bar, select .

        The **Assets** page appears.
    3. Select a Functional Location of Custom Asset Hierarchy Data Loader.

Chapter
5

Troubleshooting

Topics:

- Troubleshooting Scenarios

Troubleshooting Scenarios

Troubleshooting Scenarios

The following topics can help you troubleshoot issues that you may have with the Asset Hierarchy module:

- Asset Hierarchy Does Not Launch

Asset Hierarchy Does Not Launch

Description

In GE Digital APM, when you attempt to access the Asset Hierarchy, a message with `Entities with multiple parents exist` appears and the hierarchy does not display. Assume you have the following three relationships configured in Asset Hierarchy Configuration:

- Functional Location Has Functional Location as Root
- Functional Location Has Equipment
- Equipment Has Equipment

In the following scenario:

- An Equipment EQ1 is related to Equipment EQ2 using the Equipment has Equipment relationship, where EQ2 is the predecessor and the EQ1 is the successor.
- The same Equipment EQ1 is related to a Functional Location FL1 using the Functional Location has Equipment, where FL1 is the predecessor and EQ1 is the successor.

This results in the EQ1 having two parents EQ2 and FL1 which violates the requirement that an asset can only have a single parent in the hierarchy.

Cause

An Asset in the hierarchy that you are attempting to access may have multiple parent relationships.

Solution

Perform the following steps:

1. Run the following query and analyze the results.

   ```
   SELECT enty_key,fmly_key,enty_id
   from MIV_MI_AST_HRCY_MV
   ```

2. If only one row appears with an error message `Entities with multiple parents exist,` run the following query.

   ```
   SELECT MIV_MI_AST_HRCY_MV_DUP.parent_enty_key
   , MIV_MI_AST_HRCY_MV_DUP.parent_fmly_key
   , MIV_MI_AST_HRCY_MV_DUP.enty_key
   , MIV_MI_AST_HRCY_MV_DUP.enty_id
   , mi_families.fmly_id
   FROM MIV_MI_AST_HRCY_MV_DUP
    JOIN mi_families ON MIV_MI_AST_HRCY_MV_DUP.fmly_key =
   mi_families.FMLY_KEY
   ORDER BY MIV_MI_AST_HRCY_MV_DUP.enty_key Asc
   ```

3. All the assets with multiple parents will be listed.
4. Access the parent record in the Record Manager and select > to view the parent record datasheet.
5. Select °°° and select **Unlink this record** to ensure that no multiple parent relationships exists.