

OFS Analytical Applications Infrastructure

DMT Metadata Migration Guide

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OFSAA DMT Metadata Migration Guide

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Document Control

Version Number	Revision Date	Change Log
1.0	Created Dec 2019	Created the document to walk you through the details of the DMT Metadata migration process.

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1 Introduction

From OFSAA 8.0.6.0.0 version onwards, all DMT metadata types such as Table based Data Sources, Data Mapping, Data File Mapping, Post Load Changes (DT) and DMT properties XMLs (ETLLoader.properties and Cluster.XML) will be persisted in tables, instead of XML files.

A migration utility is available with OFSAA to migrate the pre-806 DMT metadata to the new tables. This document helps you to identify when to migrate, what/how to migrate, and how to handle migration issues.

This document walks you through the details of the migration process.

1.1 When to Use This Utility

In case of a fresh OFSAA 807 installation, there will be no impact on the end users. All the applications will be seeding their metadata in the tables. Hence, you do not require the migration utility if yours is a fresh 807 setup.

However, an OFSAA upgrade from 805 and earlier versions requires users to use this migration utility. The platform installer will handle an in-place migration of all Table based and Web Log Based Sources, and other ETL configurations like `Clusters.xml` and `ETLLoader.properties`. The OOB metadata created by respective applications will be saved into the new tables as part of Application Installation. Any customer who has created any customized definitions, needs to manually run the migration utility to migrate the customized metadata from XML to database tables.

Additionally, when only a few of the applications are upgraded to 806 and above, and some applications are still not upgraded to 806 and above versions, you need to run the utility to migrate the DMT metadata of applications which are not upgraded to 806 and higher versions.

1.2 Prerequisites

Before you run the utility, ensure the following:

1. All the pre-806 metadata XML files like TFM xml, ETL Repository xml, Definition xml, Properties xml, and Mapping xml must be present in the standard paths (relative to the `/ftpshare` folder).
2. Table `AAI_ETL_SOURCE` must be present in the Configuration Schema, with all appropriate information of the sources.
3. Table `DATE_TASK_MASTER` and `DATE_TASK_PRECEDENCE` must be present in the Configuration Schema with all appropriate information.
4. In the SQL block given in `TFM.xml`, entry for procedure name in `DATE_TASK_MASTER` and the actual function in Atomic schema should be in sync.
5. The `Clusters.XML` (*applicable for Web Log Customers only*) file must be present in the `$FIC_HOME/conf` directory.
6. The `ETLLoader.properties` file must be present in the `$FIC_HOME/ficdb/conf` directory.
7. Users need to ensure that there is no mismatch in Application ID and Name attribute in `ETLRepository.xml` file before invoking the DMT migration utility.
8. Application ID/Name tags cannot be duplicated for a given application.

2 How to Use This Utility

OFSA platform upgrade to 807 and Application installation automatically takes care of the following two things:

1. 807 platform upgrade migrates all existing Table based sources (both RDBMS and HDFS) and WebLog based sources into the new metadata tables. In addition, data from `ETLLoader.properties` and `Clusters.xml` is also migrated into the new metadata tables.
2. Application Installation brings all OOB definitions (PLC, Data Mapping) into the new metadata tables.

If users have created their own metadata (not part of apps OOB definitions), or had modified the apps OOB definition in pre-806 setup, you need to run the migration utility.

2.1 When Users Have Created Metadata Outside Application OOB Definitions

Post the Application installation, you need to manually run the DMT Migration utility, in **Add Mode**, if any of the below conditions are satisfied:

1. Customer has Data File Mapping Definitions and File Based Sources
2. Customer has additional customized metadata (apart from the OOB metadata)

Steps to execute the utility:

1. Navigate to `$FIC_HOME/utility/DMT/Migration/bin.`
2. Execute this command:

```
./DMTUpgradeUtility_806.sh UPGRADE ALL
```

This will migrate all the existing DMT metadata, that is, Data Mapping, Data File Mapping and PLC definitions, `ETLLoader.properties` and `Clusters.xml` into the new metadata tables in **Add Mode**.

While migrating the Data File Mapping metadata, the underlying File based Sources will also be implicitly migrated.

If any metadata is already present in the tables (created by Application installation), migration for that metadata will be skipped with an alert "Already exists". This makes sure that in the Add Mode, only the definitions created outside App OOB are migrated.

2.2 When Users Have Modified the Application OOB Definitions

If the customer has customized the OOB definitions, each one of the definitions needs to be migrated selectively using the migration in **Version Mode**. If any metadata is already present in the tables (created by Application installation), the utility will create a new version of the same metadata for the customized definition (without modifying the App OOB definition metadata). Therefore, now there will be two versions of the same definition in the tables, with the customized definition being the latest and the only active version.

Users can keep running the migration utility repeatedly; it will keep on creating new versions of metadata. However, at all times, there will be only one active version of the metadata. If you want to make an earlier version as active, you can use Make Latest feature. For more information, see

Versioning and Make Latest Feature section in the [OFS Analytical Applications Infrastructure User Guide](#).

Each customized definition needs to be migrated one by one.

Steps to execute the utility:

1. Navigate to `$FIC_HOME/utility/DMT/Migration/bin`.
2. Execute this command:


```
./DMTUpgradeUtility_806.sh ONLY_DEFINITION_AS_VERSION <METADATA_TYPE>
<INFODOM_NAME> <DEFINITION_NAME>
```

 - **<METADATA_TYPE>**: Can be **DMT_PLC**(PLC or DT) or **DMT_DM**(Data Mapping and Data File Mapping)
 - **<INFODOM_NAME>**:
 - **DMT_PLC** - Infodom in which the definition is defined.
 - **DMT_DM** - Any valid Infodom.
 - **<DEFINITION_NAME>**:
 - **DMT_PLC** - Any valid Definition Name
 - **DMT_DM** - <Application Name>~<Source Name>~<Definition Name>

Example 1: If you want to migrate a single PLC definition, say PLC1 (formerly known as DT), which is defined on infodom Infodom1, invoke the migration utility as given:

```
./DMTUpgradeUtility_806.sh ONLY_DEFINITION_AS_VERSION DMT_PLC
Infodom1 PLC1
```

Example 2: If you want to migrate a single Data Mapping Definition T2T1, which is defined on Application App1 and Source Src1 and mapped to target infodom Infodom2, then invoke the migration utility as below:

```
./DMTUpgradeUtility_806.sh ONLY_DEFINITION_AS_VERSION DMT_DM
Infodom2 App1~Src1~T2T1
```

2.3 To Support Compatibility with Applications now Upgraded to 809

As part of the 809 Application upgrade, the DMT OOB metadata for the upgraded App will be present in the DMT metadata tables. However, the user needs to manually migrate the DMT metadata of the Applications which are not upgraded to 806 and higher versions, by running the migration utility.

Steps to execute the utility:

1. Navigate to `$FIC_HOME/utility/DMT/Migration/bin`.
2. Execute this command:


```
./DMTUpgradeUtility_806.sh UPGRADE ALL
```

3 Post Upgrade Steps

1. The following properties will not be migrated from the `ETLLoader.properties` file.

- `SQOOPSERVER_NAME`
- `SQOOPSERVER_SSH_PORT`
- `SQOOPSERVER_SSH_USERID`
- `SQOOPSERVER_SSH_PASSWORD`

Instead, users must use the DMT Configurations UI to update these values for source/target clusters as needed:

- SSH Server name
- SSH Port
- SSH Auth Alias

See [OFS Analytical Applications Infrastructure User Guide](#) for the detailed steps.

2. Restart OFSAA services after migration run.

3.1 Log Files

Utility logs will be available in `$FIC_HOME/utility/DMT/Migration/log`.

- `DMTMigrationUtilityReport.log` - This log gives a status of all the metadata that has been migrated.
- `DMTMigrationUtility.log` - This is a debug log. All parsing related information will be available in this log.

Other errors during metadata SAVE will be written to `DMTMigrationService.log` at the following location:

`<ftpshare>/logs/Migration/DMT/DMTMigrationService.log`

3.2 Troubleshooting

For further debugging, in case of migration failure:

1. Make a note of failed PLCs, T2Ts if any, from the report log:
`DMTMigrationUtilityReport.log`.
2. If save fails due to seeded xml errors, detailed migration log (`DMTMigrationUtility.log`) will log the errors. Search this log with the Definition code for the exact error.
3. If the above is not sufficient to debug the issue, refer to
`<ftpshare>/logs/Migration/DMT/DMTMigrationService.log` for further details. Again, search this log with the Definition code to find the exact error.

Utility might fail for some definitions due to an invalid definition or mapping xml files. Follow the 'Action required' and re-trigger migration utility.

Problem Description	Action Required
Column 'ID' tag missing in Definition.xml NOTE: This was mostly observed for derived columns (EXPRESSIONS) where Table Name = 'Expression' and column ID was empty or null.	User needs to correct such definitions, provide valid column IDs, and re-trigger migration utility. The valid expression ID can be found in the mapping.xml against the corresponding source-target map.
INFODOMS/INFODOM tags are missing in ETLRepository.xml	User needs to insert 'INFODOMS/INFODOM' tags in ETLRepository.xml.
Definition.xml is corrupted or not present.	If there is an invalid special char in the xml, parsing would throw an exception. In case of corrupted xml, see the console for details. Based on the exception, user needs to identify the invalid characters and remove them from the XMLs.
T2F definitions working as F2T	This functionality of reusing T2F as F2T is no longer supported. Utility cannot handle this. The user needs to recreate the F2T definition.
Invalid string in Number Data Type tag. Tags affected: length, scale, precision, field order	No mandatory action is required. Utility defaults these to 0 and proceeds.
Duplicate columns in definition.xml	No mandatory action is required. Utility ignores the second occurrence and proceeds.
Duplicate mappings in mapping.xml	No mandatory action is required. Utility ignores the second occurrence and proceeds.
Unrecognized column datatypes	No mandatory action is required. Utility defaults Logical Datatype to 'Unsupported', and proceeds.
All Data Mapping definitions under a particular Application are missing	This is because of erroneous entry in the ETLRepository.XML file. Check for the below scenarios : • Application ID is empty • There is a mismatch between APPLICATION ID and APPLICATION NAME • For a given application duplicate entries for the APPLICATION ID and APPLICATION NAME are present. Correct the ETLRepository.XML file and re-trigger the utility.

Problem Description	Action Required
Few of PLC definitions are missing	This might have happened because these definitions are not present in the <code>TFM.XML</code> file. Add the definitions to the <code>TFM.XML</code> and re-trigger the utility.

3.3 Limitations

The following scenario of erroneous metadata seeding cannot be handled by the migration utility:

- Source Column value missing in Definition XML:

If a Source Expression node is missing in the Definition XML, but used and present in the Mapping XML, the utility will not be able to identify this scenario and migration will be successful. However, execution of this definition will fail, as the value of the Expression node is lost in the process and hence engine will not be able to replace it in the query.

3.3.1 How to Handle This Scenario

Correct the `definition.xml`. Ensure that the source expression present in the `mapping.xml` is also present in the `definition.xml`.

Selectively migrate this definition again in version mode. For instance, if you have corrected definition T2T1, which is defined on Application App1 and Source Src1 and mapped to target infodom Infodom2, then invoke the migration utility as given:

```
./DMTUpgradeUtility_806.sh ONLY_DEFINITION_AS_VERSION DMT_DM Infodom2  
App1~Src1~T2T1
```

4 How It Works

4.1 Introduction of Metadata Code

OFSA 806 has mandated the Metadata Code field of length 250 chars. Old XML based DMT definitions had only Name and no Code.

To allow traceability, the existing name will be used as the Code. If Name exceeds 250 chars, migration of that metadata will be skipped.

Information regarding the skipped metadata will be available in the log file. For more details, see [Log Files](#) section.

1. METADATA TYPE: DMT_PLC

For each Infodomain it looks up the `<InfodomainName>_TFM.XML`, parses it and migrates the PLC Metadata into the OCI tables.

2. METADATA TYPE: DMT_DMT (Applicable for T2T, T2F, F2T)

The utility parses the `ETLRepository.xml`, fetches the list of definitions (all T2T, F2T, T2F) and the corresponding mapping. The definition and mapping are then migrated into the 806 tables into the mapped Infodomain.

The underlying source for (File/Table/Weblogs) is also implicitly migrated.

3. METADATA TYPE: CLUSTERINFO

For each infodomain, it looks up the `Clusters.XML`, parses it and migrates the existing cluster information into the `AAI_DMT_DB_CLUSTER_PROPERTY` table.

If a cluster name already exists, the cluster with the same name does not get migrated.

4. METADATA TYPE: ETLPROPINFO

For each infodomain, it looks up to the `ETLLoader.properties` file from the `$FIC_HOME/ficdb/conf` folder, parses it and migrates the existing ETL Configuration Properties into the `AAI_DMT_CONFIG` table.

4.2 Few Important Pointers

1. To reflect the migration changes, OFSAA services should be restarted.
2. All metadata should have a Metadata Code of maximum length of 250 characters. Old XML based DMT definitions had only a name. So after migration, the existing name will be used as Code. If the name exceeds 250 characters, migration of that metadata will be skipped.
3. For PLC definition migration:
 - a. If Stored Procedure is a call function, modifying the definition will fail if the function name is more than 30 characters.
 - b. If Stored Procedure is a procedure, then the migration will be successful and the user is able to edit and save from the UI.
4. DMT_SRC is supported only for table based sources in ONLY_DEFINITION mode.
5. While migrating a Data Mapping metadata (T2T, T2F), the underlying table based source will be migrated.

6. While migrating a Data File Mapping Metadata (F2T) there are some assumptions that we need to make, as the File based Sources have undergone a design change in 806 version.
 - a. A new unique File Based Source will be created for each F2T. Name of the new source will be <Source Name>_ <Definition Name>. All references to the Source Name for this F2T in ICC and RRF tables will be updated by the migration utility. The File based Source will be migrated implicitly by the utility when the F2T definition is being migrated
 - b. The definition properties of the existing F2T definition will be set as the Properties of the File Based Source
7. The new table structure does not support a definition with the same name to be present in more than one source. For such definitions, the 2nd occurrence of the definition will be a new version.
8. There have been a few modifications to properties names that will be present in the `ETLLoader.properties` file and that will be migrated to the `AAI_DMT_CONFIG` Table.

The following are old property codes and the corresponding new ones.

- T2TMode -> T2T_MODE
- T2HMode -> T2H_MODE
- H2TMode -> H2T_MODE
- H2HMode -> H2H_MODE
- F2HMode -> F2H_MODE
- KEEP_WEBLOG_PROCESSED_FILES -> KEEP_WEBLOG_PROCESSED_FILE
- ISHIVELOCAL -> IS_HIVE_LOCAL
- SQOOPURL -> SQOOP_URL

9. The following properties have changed, and will not be migrated from the `ETLLoader.properties` file. The user must manually use the DMT Configurations UI to update these values. The values must go into the source or target clusters as required.
 - SQOOPSERVER_NAME -> SSH_HOST_NAME
 - SQOOPSERVER_SSH_PORT -> SSH_PORT
10. The following properties have become obsolete and need not be migrated.
 - HIVESERVER_NAME
 - HIVESERVER_PORT
 - HIVESERVER_FTPDRIVE
 - HIVESERVER_FTPSHARENAME
 - HIVESERVER_FTP_USERID
 - HIVESERVER_FTP_PASSWORD
 - SQOOPSERVER_SSH_USERID
 - SQOOPSERVER_SSH_PASSWORD

5 Frequently Asked Questions (FAQs)

I have an existing pre-806 setup. I have also installed another 809 setup. Can I use Object Migration to move metadata from the pre-806 setup to the 809 setup?

No. However, you can upgrade the pre-806 environment to 806 or higher versions, and then objects can be migrated using Object Migration.

As part of the 809 Upgrade installer, migration of sources has failed, due to which the execution of OOB definitions is failing. What do I do?

Run the DMT Migration utility again to migrate all Table Based and Web Log Based sources using the below command

```
./DMTUpgradeUtility_806.sh UPGRADE DMT_SRC
```

I have upgraded to OFSAA 809. I do not want to upgrade any of the Applications. I cannot see any PLC or Data Mapping definitions in the UI. What do I do?

As part of OFSAA 809, all DMT Metadata resides in tables. Run the migration utility manually to bring in all DMT Metadata- PLC, Sources, Data Mapping, Data File Mapping into the new table structures.

```
./DMTUpgradeUtility_806.sh UPGRADE DMT_DM
```

After running the utility refer the section on [Logging](#) and [Troubleshooting](#) for errors if any.

Post manually running the migration utility, I noticed that the names of all File Based Sources have changed. There are more file based sources than that were present originally. Is this an error?

Data File Mapping Metadata (F2T) has undergone a design change in the 806 version. The below will be implicitly handled as part of migration

1. A new unique File Based Source will be created for each F2T. Name of the new source will be <Source Name>_<Definition Name>. All references to the Source Name for this F2T in ICC and RRF tables will be updated by the migration utility. The File based Source will be migrated implicitly by the utility when the f2t definition is being migrated
2. The definition properties of the existing F2T definition will be set as the Properties of the File Based Source
3. The location of the data files for the F2T definitions will remain unchanged. Even after migration executions will still look for the old path for the .dat files.

I have successfully run migration to migrate the Data File Mapping Definitions, but I do not see any Data File Mapping Link in the LHS Menu.

With OFSAA 806+, there is no separate LHS Menu link for Data File Mapping. Both Data Mapping and Data File Mapping definitions will be available under Data Mapping

I have manually run the migration utility post Application upgrade. However, I see some errors in the logs. Migration of few PLC/Data Mapping/ File Mapping definitions has failed.

DMT Migration Utility might fail for particular definitions due to invalid definition or mapping xml files. See the [Troubleshooting](#) section. Correct the erroneous xml files and rerun the utility

You can run the entire migration again (like in Step 3). Already migrated definitions will be skipped and corrected ones will be migrated

```
./DMTUpgradeUtility_806.sh UPGRADE ALL
```

Alternately,

If the number of failed/corrected definitions are few, you can choose to migrate only the specific definition using the below

```
./DMTUpgradeUtility_806.sh ONLY_DEFINITION <METADATA_TYPE> <INFODOM_NAME>  
<DEFINITION_NAME>
```

Example 1: If you want to migrate a single corrected PLC definition say PLC1 (formerly known as DT) which is defined on infodom Infodom1 invoke the migration utility as below

```
./DMTUpgradeUtility_806.sh ONLY_DEFINITION DMT_PLC Infodom1 PLC1
```

Example 2: If you want to migrate a single corrected Data Mapping Definition T2T1 which is defined on Application App1 and Source Src1 and mapped to target infodom Infodom2, then invoke the migration utility as below

```
./DMTUpgradeUtility_806.sh ONLY_DEFINITION DMT_DM Infodom2 App1~Src1~T2T1
```

I have migrated a PLC definition and execution is successful. However, after editing the definition from the UI, the execution is failing. Why did this happen?

As mentioned in the pre-requisites, in the SQL Block given in TFM.xml, entry for procedure name in DATE_TASK_MASTER and the actual function in Atomic schema should be in sync.

During migration, the SQL blocks data is migrated into the PLC metadata tables. However, the actual function in the atomic schema is retained as is. (As it needs no migration)

If there was an erroneous SQL block this is propagated to the PLC metadata tables. Edit of this metadata will overwrite the corresponding function in the atomic schema and this can fail an execution.

How to fix this: Correct the SQL block from the UI and resave.

As part of 807 Upgrade installer, migration of ETLLoader.properties and Clusters.xml has failed, due to which the execution of some OOB definitions is failing. What do I do?

Run the DMT Migration utility again to migrate ETLLoader.properties and Clusters.xml using the following command:

```
./DMTUpgradeUtility_806.sh UPGRADE CLUSTERINFO  
./DMTUpgradeUtility_806.sh UPGRADE ETLPROPINFO
```

I have successfully completed migration, but all the Data Mapping definitions under a particular Application are missing. What should I do?

This is probably because of erroneous entry in ETLRepository.xml. Check for the following scenarios:

1. Application ID is empty (<APPLICATION ID="">)
2. Any mismatch between APPLICATION ID and APPLICATION NAME.
3. Duplicate entries for the APPLICATION ID and APPLICATION NAME (APPLICATION/NAME) are present for a given application

Correct the above scenarios in the ETLRepository.xml and re-trigger migration.

I have successfully completed migration but few of the Post Load Changes definitions are missing. What should I do?

This happened because the required PLC definitions are not present in the `TFM.xml` file. Add the missing PLC definition details to the `TFM.xml` and re-trigger the utility.