Oracle® Communications Network Integrity

CORBA Based DWDM Layers and Service Discovery and Assimilation Cartridge Guide

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Oracle Communications Network Integrity CORBA Based DWDM Layers and Service Discovery and Assimilation Cartridge Guide, Release 7.5

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Contents

Preface

This guide describes the functionality and design of the Oracle Communications Dense wavelength-division multiplexing (DWDM) Logical Discovery cartridge and Dense wavelength-division multiplexing (DWDM) Logical Assimilation cartridge.

Audience

This guide is intended for Network Integrity administrators who want to understand the design and evaluate the functionality of this cartridge, and for Network Integrity developers who want either to build or to extend similar cartridges.

Developers should have a good working knowledge of FTP operations, specifications, Network Integrity, UIM, and the use of Oracle Communications Design Studio for Network Integrity.

This guide assumes that you are familiar with the following documents included with this release:

- Oracle Communications Network Integrity Concepts
- Oracle Communications Network Integrity Developer's Guide
- Oracle Communications Network Integrity Abstract CORBA Cartridge Guide
- Oracle Communications Network Integrity UIM Integration Cartridge Guide

This guide assumes that you are familiar with the following concepts and technologies:

- Dense wavelength-division multiplexing (DWDM) standards and terminology
- Development and extensibility of Network Integrity cartridge

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the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

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Oracle Communications DWDM Logical Discovery Cartridge

This chapter provides information about the Oracle Communications DWDM Logical Discovery cartridge.

About the Oracle Communications DWDM Logical Discovery Cartridge

Oracle Communications DWDM Logical Discovery cartridge supports the modeling of DWDM subnetwork and association in the network.

The DWDM Logical Discovery cartridge provides functionality including:

- Read and collect data from NMS/EMS system provided using CORBA API
- Client subnetwork connection discovery and modeling
- ODU subnetwork connection discovery and modeling
- OTU subnetwork connection discovery and modeling
- OCH subnetwork connection discovery and modeling
- OMS subnetwork connection discovery and modeling
- OTS subnetwork connection discovery and modeling

This cartridge produces logical subnetwork connection hierarchies that represent a discovered DWDM layer and association.

The logical hierarchy includes a logical subnetwork connection and port termination point.

The first association is at the logical subnetwork connection level, between the parent layer subnetwork connection and the child subnetwork connection, and the second association is at the interface level between physical ports and logical subnetwork connection.

For the discovery and reconciliation of DWDM device physical hierarchies, see *Network Integrity Optical TMF814 CORBA Cartridge Guide* and *Network Integrity Optical UIM Integration Cartridge Guide*.

> **Note:**
>
> Property Locations and Network Entity Codes must be loaded into UIM before reconciling physical layer data.

Network Entities

This cartridge will discover the following network entities:

- Subnetwork Connection
- Server Trails

Sample Discovered DWDM Logical Hierarchy

The DWDM SNC linking overview is as follows:

- Client is at top layer.
  - **AB1-AB2-Client-1**
- Link to →

  AB1-AB2-ODUflex-2
- Link to →

  AB1-AB2-ODU4-3
- Link to →

  AB1-AB2-OTU4-4
- Link to →

  AB1-AB2-OCh-5
- Link to →

  AB1-AB2-OMS-51

  AB1-AB2-OTS-511

  AB1-AB2-OTS-512

  AB1-AB2-OTS-513

  AB1-AB2-OTS-514

  AB1-AB2-OTS-515

  AB1-AB2-OTS-516

  Link to →
- **AB1-AB2-OMS-52**

AB1-AB2-OTS-521

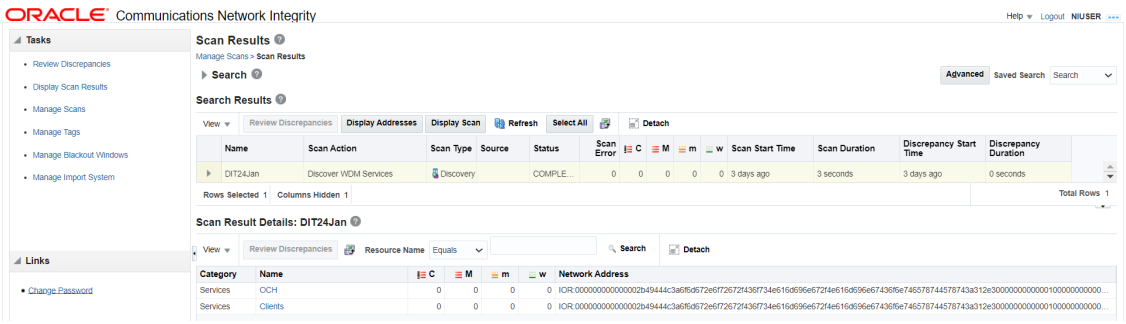
AB1-AB2-OTS-522

AB1-AB2-OTS-523

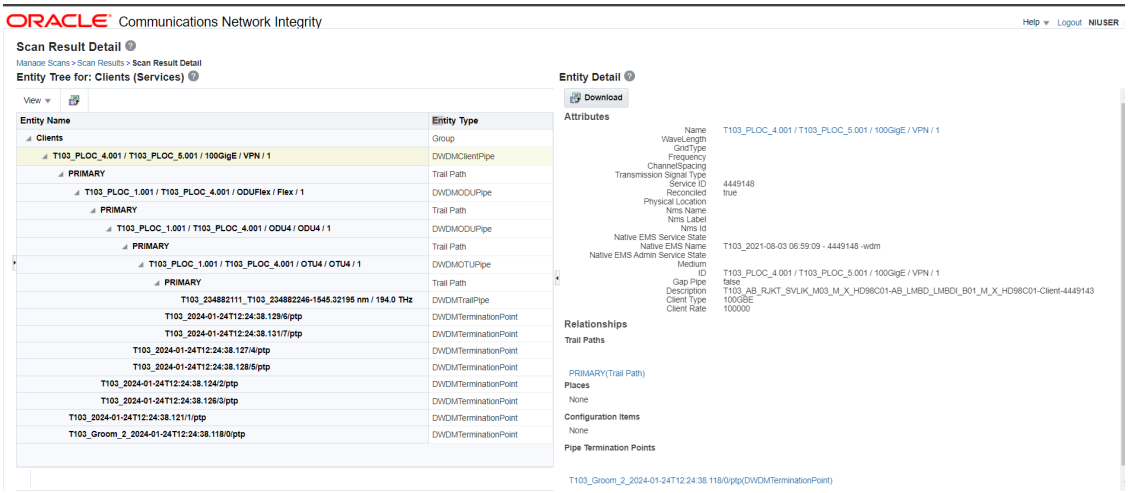
AB1-AB2-OTS-524

AB1-AB2-OTS-525

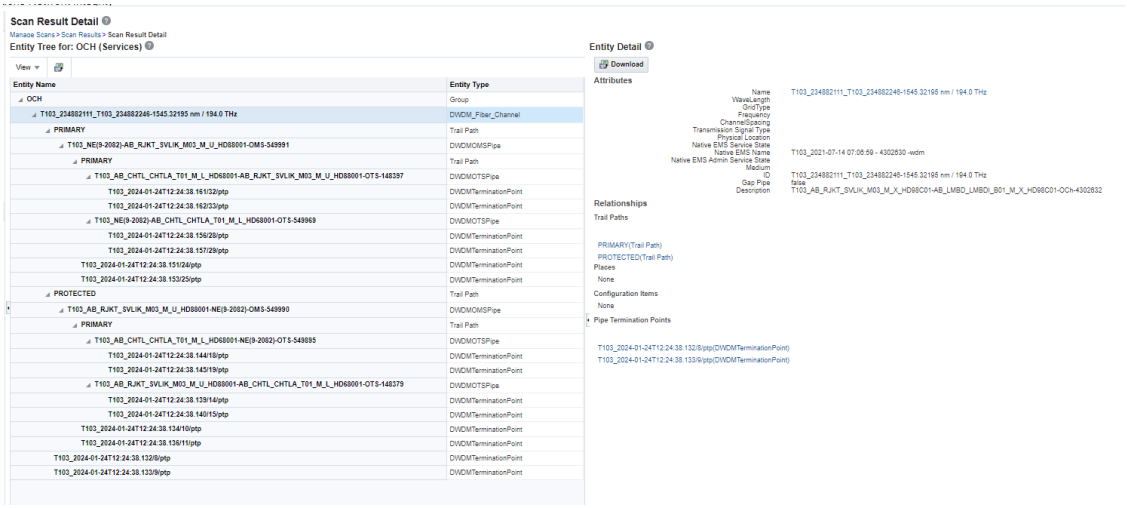
AB1-AB2-OTS-526



Client Layer



OCH Layer



This cartridge is designed to be used for a standalone display of the model hierarchy in Network Integrity. The cartridge provides no integration with other products but can be extended. This cartridge is designed to discover DWDM subnetwork connection's logical hierarchy only and attempts to discover other logical hierarchy results in a scan failure.

In addition to a discovery action, this cartridge provides discrepancy detection for integration with Unified Inventory Management. The discrepancy detection provides a mechanism to allow a filtered comparison of DWDM subnetwork connection logical hierarchy between what is discovered and what is imported from UIM.

For more information about discrepancy detection actions and processors, see Network Integrity Developer's Guide.

About Cartridge Dependencies

This section provides information on dependencies that the DWDM Logical Discovery cartridge has on other entities.

Run-Time Dependencies

This cartridge requires that the Address_Handlers cartridge be deployed to Network Integrity.

Design-Time Dependencies

The DWDM Logical Discovery cartridge has the following dependencies:

- NetworkIntegritySDK
- Abstract_CORBA_Cartridge
- ora_uim_basewdm
- ora_uim_basemeasurements
- ora_uim_basetechnologies
- ora_uim_mds
- ora_uim_model
- UIM_DWDM_Logical_Model

Opening the Cartridge Files in Design Studio

To review and extend the DWDM Logical Discovery cartridge, you must download the Oracle Communications DWDM Logical Discovery Cartridge software from the Oracle software delivery website: https://edelivery.oracle.com

The software contains the DWDM Logical Discovery cartridge ZIP file, which has the following structure:

- \UIM_Cartridge_Projects\
- \Network_Integrity_Cartridge_Projects\
- DWDM_Logical_Discovery_Cartridge.iar
- \UIM_Cartridge_Projects\UIM_DWDM_Logical_Model
- \UIM_Cartridge_Projects\ora_uim_basewdm
- \UIM_Cartridge_Projects\ora_uim_basetechnologies
- \UIM_Cartridge_Projects\ora_uim_basemeasurements
- \Network_Integrity_Cartridge_Projects\Abstract_CORBA_Cartridge
- \Network_Integrity_Cartridge_Projects\DWDM_Logical_Discovery_Cartridge

See *SCD Design Studio Modeling Network Integrity* and *Network Integrity Developer's Guide* for information about opening files in Design Studio.

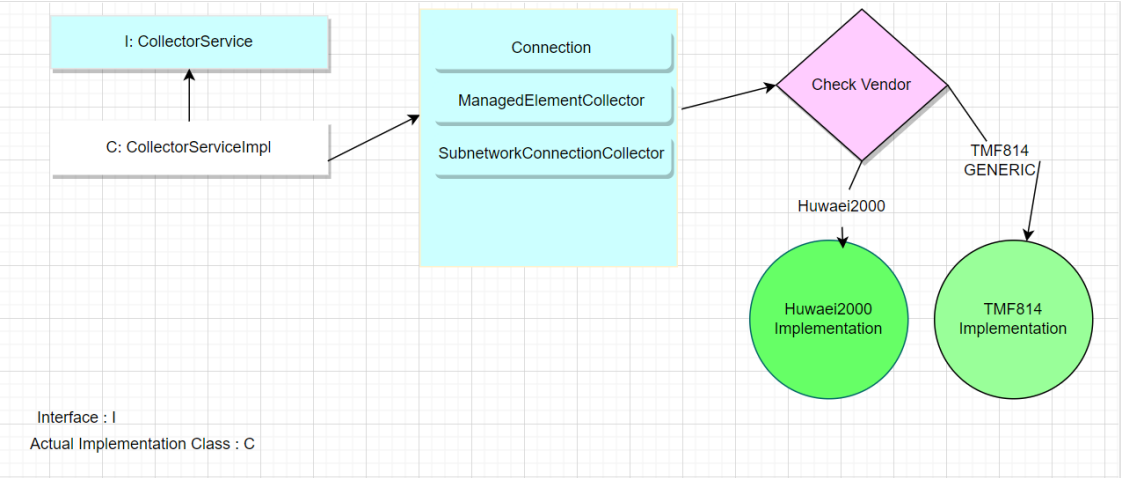
Building and Deploying the Cartridge

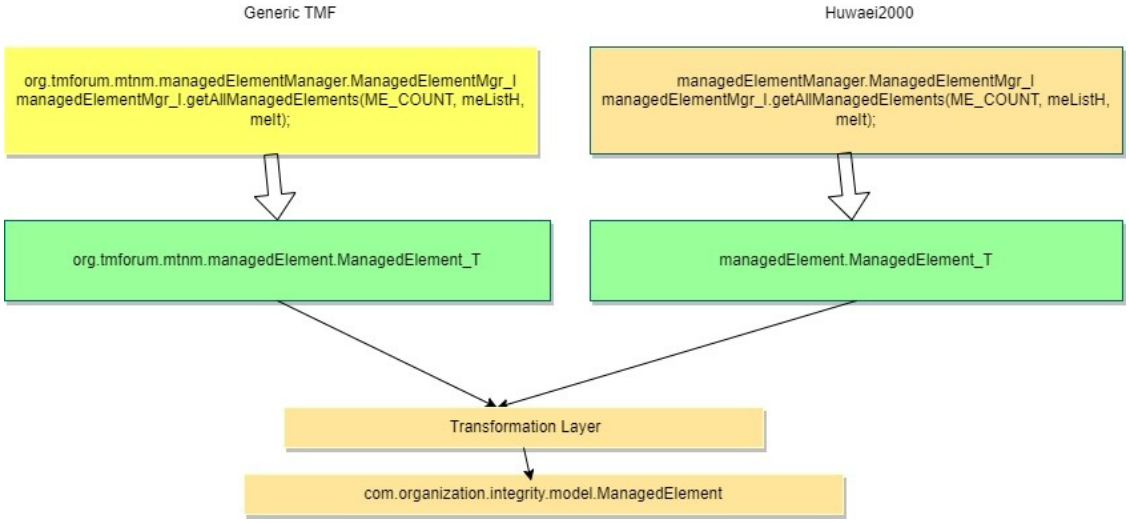
See Design Studio Help for information about building and deploying cartridges.

About the Cartridge Components

This chapter provides information about the components of the Oracle Communications Network Integrity DWDM Logical Discovery cartridge

- Common collector service to collect data from EMS/NMS of any vendor.
- Collector service based on vendor details provided in Connection Details prepares valid implementation classes specific to the vendor.
- Collector service connect to EMS/NMS and pull the data now for each vendor data return type from NMS can be different based on their specific implementation.
- Collector service provide loose coupling between vendor and CORBA information that need to be processed.
- Collect service collect the information and transform it to a COMMON OBJECT similar to TMF814 objects.
- This COMMON OBJECT will not be specific to vendor thus same code can be reused for multiple vendor.





DWDM Logical Discovery Cartridge Actions

The DWDM Logical Discovery Cartridge contains the following actions:

- Discovery Abstract WDM Services
- Discover WDM Services

Action : Discovery Abstract WDM Services

Result Categories is **NA** and **Type** is **Abstract**.

Table 1-1 Scan Parameter Group

Name	Description	Type
Parallel Process	Multithreading is enabled when this checkbox is enabled	Checkbox

Table 1-2 Model: DWDM_Logical_Discovery_Cartridge

Name	Description	Entity Type
DWDMClientPipe	This entity is used to model Client subnetwork connection.	pipe
DWDMODUPipe	This entity is used to model ODU subnetwork connection.	pipe
DWDMOTUPipe	This entity is used to model OTU subnetwork connection.	pipe
DWDM_Optical_Fiber	This entity is used to model OCH subnetwork connection.	pipe
DWDM_Fiber_Channel	This entity is used to model OCH subnetwork connection.	pipe
DWDMOMSPipe	This entity is used to model OMS subnetwork connection.	pipe
DWDMOTSPipe	This entity is used to model OTS subnetwork connection.	pipe

Table 1-2 (Cont.) Model: DWDM_Logical_Discovery_Cartridge

Name	Description	Entity Type
DWDMTrailPipe	This entity is used to model association between parent and child subnetwork connection.	pipe
DWDMTerminationPoint	This entity is used to model Pipe termination point.	pipetp

Table 1-3 Processors

Name	Description	Owner Action	Imported Action
Prepare EMS Connection Params	This processor is used to prepare connection parameter to connect over NMS/EMS system.	Abstract CORBA Discovery Service	Abstract CORBA Discovery Service
Init Collector Service	This processor is used to connect to NMS/EMS system.	Abstract CORBA Discovery Service	Abstract CORBA Discovery Service
Init DataHolder	This processor is used to initialize common objects.	Discovery Abstract WDM Services	NA
LoadImportScanResults	This processor collect latest import scan result from NI.	Discovery Abstract WDM Services	NA
CollectSNCHierarchy	This processor collect subnetwork connection hierarchy from NMS/EMS system.	Discovery Abstract WDM Services	NA
ModelSNCHierarchy	This processor model subnetwork connection hierarchy collected.	Discovery Abstract WDM Services	NA
Collect And Model SNC Hierarchy In Batch	This processor collect and model subnetwork connection hierarchy in batch.	Discovery Abstract WDM Services	NA
PersistResult	This processor persist model subnetwork connection hierarchy to NI.	Discovery Abstract WDM Services	NA

Action: Discover WDM Services

Result Categories is **Services** and **Type** is **Normal**.

Table 1-4 Scan Parameter Group: EMS Connection (Source : Abstract_CORBA_Cartridge)

Name	Description	Type
Ems Class	EMS/NSM class used for connection.	Text
Ems Instance Name	EMS/NSM ems instance name used for connection.	Text
Ems Password	EMS/NSM password used for connection.	Text
Ems Session Factory	EMS/NSM ems session factory name used for connection.	Text

Table 1-4 (Cont.) Scan Parameter Group: EMS Connection (Source : Abstract_CORBA_Cartridge)

Name	Description	Type
Ems Type	EMS/NSM ems type used for connection.	Text
Ems User Name	EMS/NSM ems user name used for connection.	Text
Ems Vendor	EMS/NSM ems vendor used for connection.	Text
Ems Version	EMS/NSM ems version used for connection.	Text

Table 1-5 Scan Parameter Group: DWDM Layers

Name	Description	Type
Client User Label	Name of client user label.	Text
Client User Label File Path	Folder location of file with client user label.	Text
Full Network Scan	Select checkbox for full Network Scan.	Text
Client Selection Range	Input ex : 1-10 or 40-50	Text
Discover unassigned OCH SNC	Select checkbox to discover unassigned OCH SNC.	Text
OCH Selection Range	Input ex : 1-10 or 40-50	Text

Table 1-6 Incremental Scan Parameter (Source : NI_SDK)

Name	Description	Type
Incremental Scan	Enable this checkbox to process dwdm nms notification.	Text
Nms Notification Circle	Nmsdetails table OSS entry should be provided here.	Text
Nms Notification Vendor	Nmsdetails table VENDOR entry should be provided here.	Text
Nms Notification Count	Count of notification to be processed.	Text

Table 1-7 Model: DWDM_Logical_Discovery_Cartridge

Name	Description	Type
DWDMClientPipe	This entity is used to model Client subnetwork connection.	pipe
DWDMODUPipe	This entity is used to model ODU subnetwork connection.	pipe
DWDMOTUPipe	This entity is used to model OTU subnetwork connection.	pipe
DWDM_Optical_Fiber	This entity is used to model OCH subnetwork connection.	pipe
DWDM_Fiber_Channel	This entity is used to model OCH subnetwork connection.	pipe

Table 1-7 (Cont.) Model: DWDM_Logical_Discovery_Cartridge

Name	Description	Type
DWDMOMSPipe	This entity is used to model OMS subnetwork connection.	pipe
DWDMOTSPipe	This entity is used to model OTS subnetwork connection.	pipe
DWDMTrailPipe	This entity is used to model association between parent and child subnetwork connection.	pipe
DWDMTerminationPoint	This entity is used to model Pipe termination point.	pipetp

Table 1-8 Processors

Name	Description	Owner Action	Imported Action
Prepare EMS Connection Params	This processor is used to prepare connection parameter to connect over NMS/EMS system.	Abstract CORBA Discovery Service	Discovery Abstract WDM Services
Init Collector Service	This processor is used to connect to NMS/EMS system.	Abstract CORBA Discovery Service	Discovery Abstract WDM Services
Init DataHolder	This processor is used to initialize common objects.	Discovery Abstract WDM Services	Discovery Abstract WDM Services
ReadScanParams	This processor is used to initialize DWDM layer scan params provided.	Discover WDM Services	NA
Collect Notification	This processor is used to collect DWDM notification if incremental scan is enabled.	Discover WDM Services	NA
Collect Input SNCs	This processor is used to collect subnetwork connection provided in scan params client label.	Discover WDM Services	NA
Collect Full Network SNCs	This processor is used to collect full network subnetwork connection if full network scan is enabled.	Discover WDM Services	NA
LoadImportScanResults	This processor collect latest import scan result from NI.	Discovery Abstract WDM Services	Discovery Abstract WDM Services
CollectSNCHierarchy	This processor collect subnetwork connection hierarchy from NMS/EMS system.	Discovery Abstract WDM Services	Discovery Abstract WDM Services
ModelSNCHierarchy	This processor model subnetwork connection hierarchy collected.	Discovery Abstract WDM Services	Discovery Abstract WDM Services
Collect And Model SNC Hierarchy In Batch	This processor collect and model subnetwork connection hierarchy in batch.	Discovery Abstract WDM Services	Discovery Abstract WDM Services

Table 1-8 (Cont.) Processors

Name	Description	Owner Action	Imported Action
PersistResult	This processor persist model subnetwork connection hierarchy to NI.	Discovery Abstract WDM Services	Discovery Abstract WDM Services
Update Notification	This processor is used to update DWDM notification status if incremental scan is enabled.	Discover WDM Services	NA

Using the Cartridge

This chapter provides instructions for using the Oracle Communications Network Integrity DWDM Logical Discovery Cartridge in Network Integrity.

Run DWDM Logical Discovery Scan

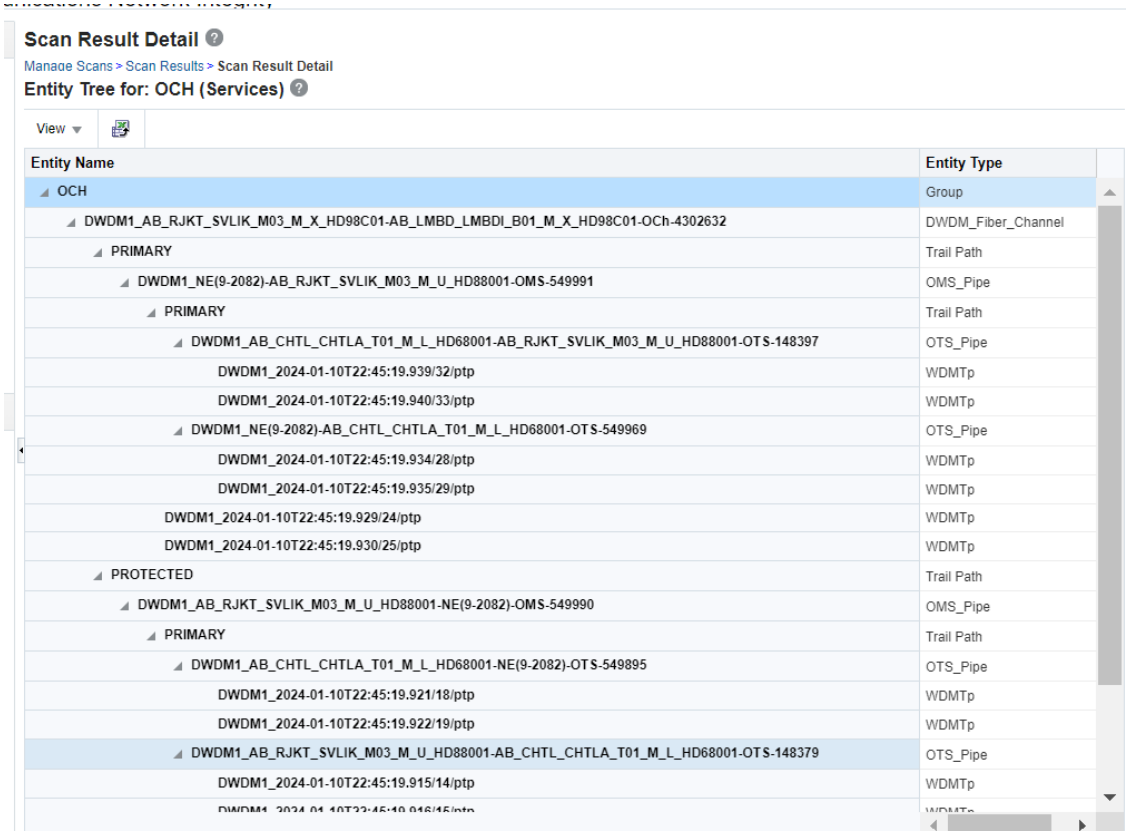
To run DWDM Logical Discovery Scan:

1. Go to **Manage Scan**.
2. Click **Create Scan**.
3. On Create Scan screen provide the following:
   - Name: Enter the name of the scan.
   - Enabled: Select to run the scan.
   - Scan Action: Enter **Discover WDM Services**.

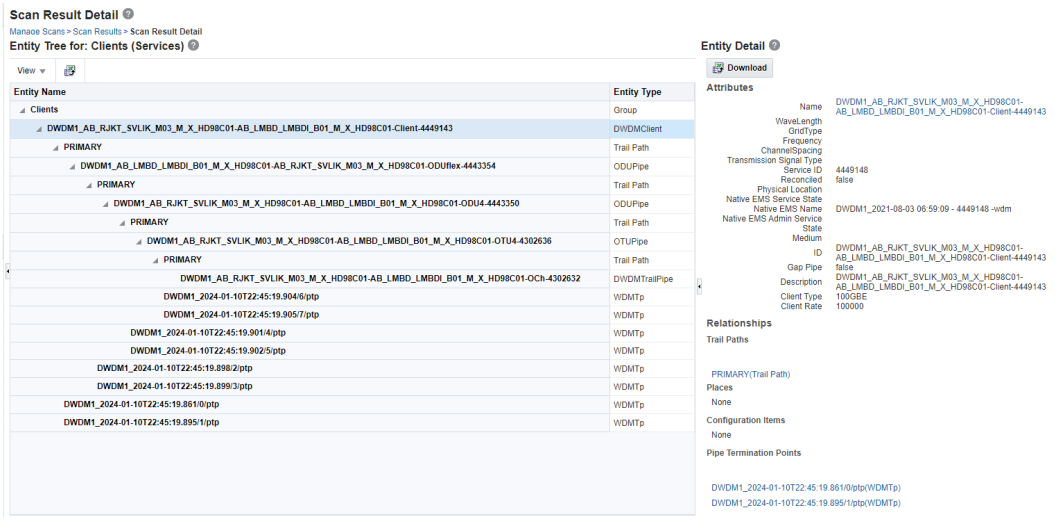
   The corresponding Scan Action Parameters appear.
4. In **Ems Connection**, provide input for the field to connect with EMS/NMS system.
5. In **DWDM Layers**, provide input for the field to discover data from EMS/NMS system.
6. In **Parallel Process Parameter**, **Parallel Process** is enabled by default, with the thread count configured at time of NI installation.
7. Click **Save and Close** to save the scan.
8. Run the DWDM Logical Discovery scan.
9. Go to **Manage Scan**.
10. Search for the created scan under **Discover WDM Services** from **Scan Action**.
11. Select the scan and click **Start Scan** to start the scan.
12. After scan is complete, click **Display Scan Result** to show the scan result.

The scan result is divided into two groups: OCH and Clients

The OCH inventory group has starting layer as **OCH** then linked to **OMS** which is linked to **OTS**.



The Client inventory group has the starting layer as **Client** then linked to **ODU**, which is linked to **OTU** and has termination on **DWDM Trail** path which is OCH Layer.



Incremental Discovery

The prerequisites for Incremental Discovery are:

- Collect the DWDM logical layer notification from CORBA based **nms/ems** system using the NMS listener.

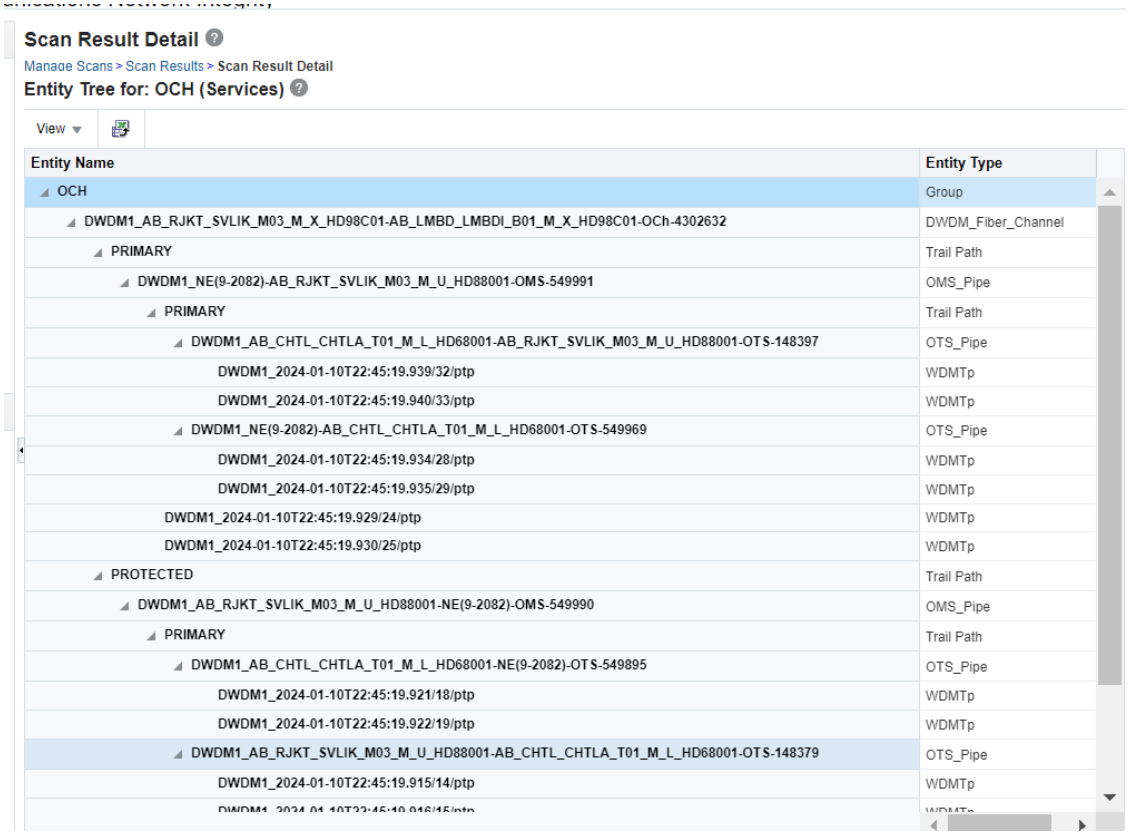
- Run an incremental import scan so that the notification status is updated from **INITIAL** TO **IMPORTED**.

Run an Incremental Discovery Scan

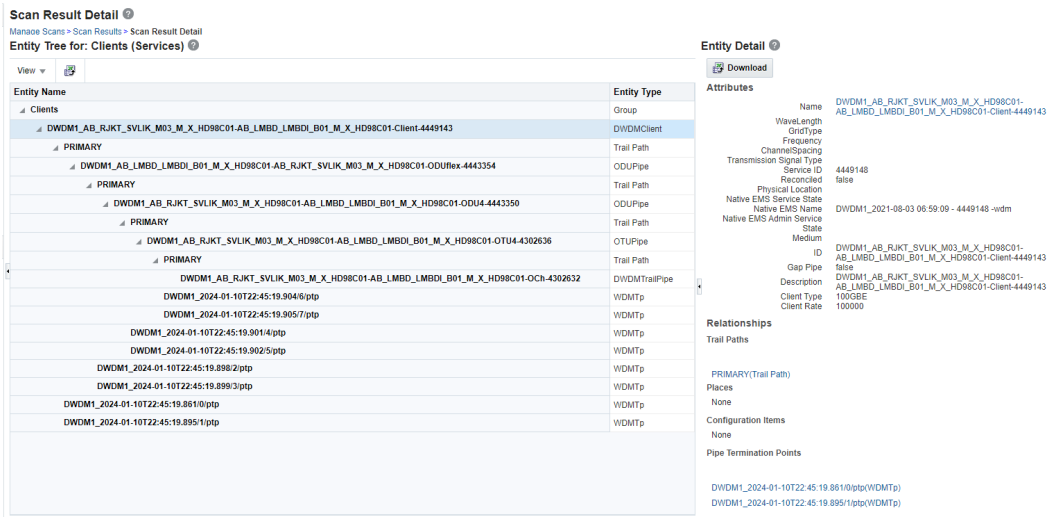
To run an incremental discovery scan:

1. Go to the Manage Scan page.
2. Click **Create Scan**.
3. On the Create Scan page, enter the following details:
   - **Name**: The name of the scan.
   - **Enabled**: Select to run the scan.
   - **Scan Action**: Select **Discover WDM Services**.
4. Provide the Scan Action Parameters as follows:
   - **Ems Connection**: Provide an input for the field to connect with EMS/NMS system.
   - **Incremental Scan Params**: Provide an input for the field to run incremental discovery based on the notification collected from EMS/NMS system.
5. After entering all details, click **Save and Close** to save the scan.
6. Run **Incremental DWDM Logical Discovery Scan**.
7. Go to the **Manage Scan** page.
8. Search for the created scan using **Scan Action** as **Discover WDM Services**.
9. Select the scan and click **Start Scan** to start the scan.
10. After the scan is successful, click **Display Scan Result** to show the scan result.
11. The scan result is divided into two groups: **OCH** and **Clients**.
    After a successful discovery, a notification appears.

The OCH Inventory Group has the starting layer as **OCH** and then linked to **OMS** that is in turn linked to **OTS**.



The Client Inventory Group has the starting layer as **Client** then linked to **ODU** that is in turn linked to **OTU** and has termination on **DWDM Trail** path, which is the **OCH** layer.



2

Oracle Communications DWDM Logical Assimilation Cartridge

This chapter provides information about the Oracle Communications DWDM Logical Assimilation cartridge.

About the Oracle Communications DWDM Logical Assimilation Cartridge

The Oracle Communications DWDM Logical Assimilation cartridge supports the reconciliation and import of DWDM connectivity and pipe.

The DWDM Logical Assimilation cartridge provides the following functionality:

- Client subnetwork connection resolution and Client connectivity import
- ODU subnetwork connection resolution and ODU connectivity import
- OTU subnetwork connection resolution and OTU connectivity import
- OCH subnetwork connection resolution and OCH pipe import
- OMS subnetwork connection resolution and OMS pipe import
- OTS subnetwork connection resolution and OTS pipe import
- Discrepancy detection and resolution on modeled data

This cartridge generates logical connectivity hierarchies that represent an imported DWDM layer and association.

The logical hierarchy includes a logical connectivity or pipe, and port as the termination point.

The first association is at the logical connectivity or pipe level, between the parent connectivity or pipe and the child connectivity or pipe, and the second association is at the interface level between physical ports and logical connectivity/pipe.

The discovery and reconciliation of physical hierarchies for DWDM devices is done by using the Optical TMF 814 CORBA cartridge, and Optical UIM Integration cartridge. For more information, see *Network Integrity Optical TMF814 CORBA Cartridge Guide* and *Network Integrity Optical UIM Integration Cartridge Guide*.

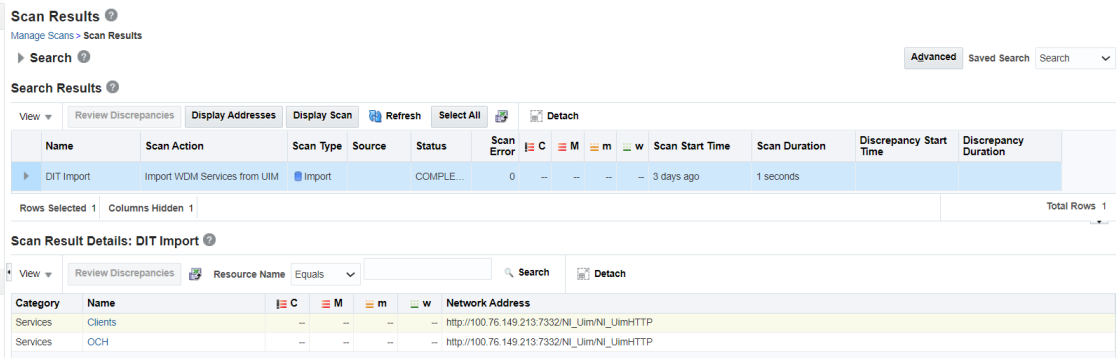
To reconcile DWDM device physical hierarchy, Property Locations and Network Entity Codes should be loaded into UIM. The reconciliation of physical layer data into UIM is necessary for the reconciliation of DWDM logical layer data, which is created by DWDM Logical Discovery. All references to ports and device interfaces are created by the physical layer cartridge by NI at the time of logical layer reconciliation.

This cartridge imports and reconciles the following network entities:

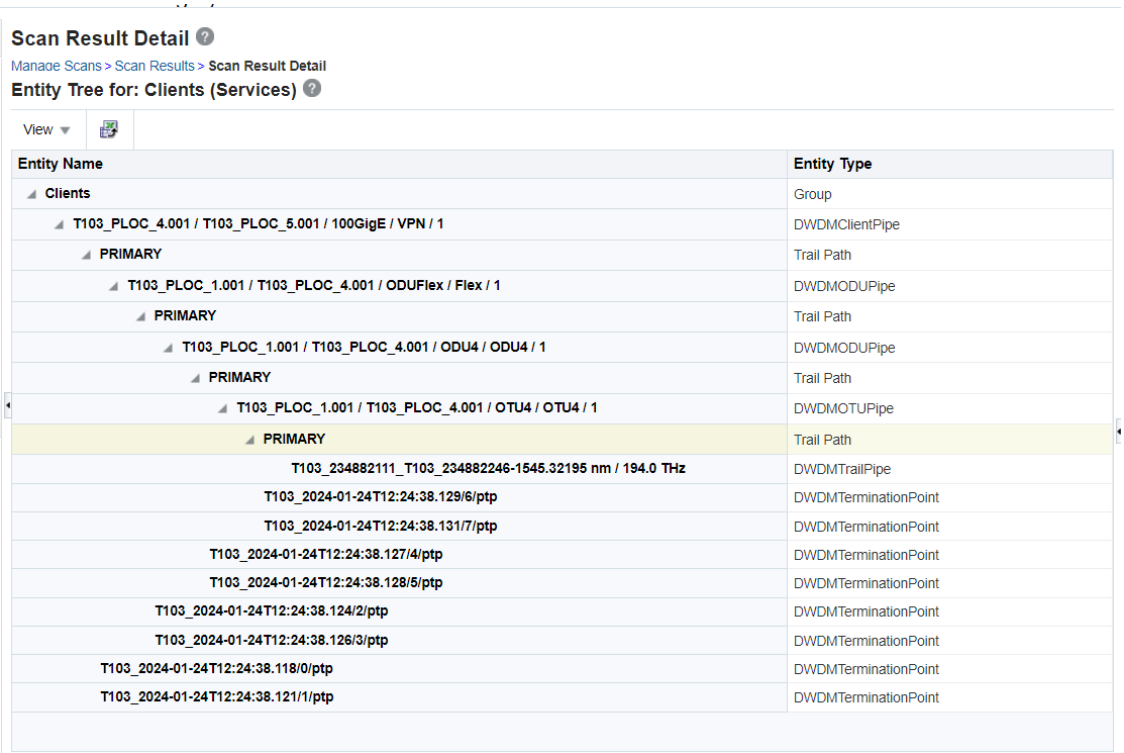
- Pipe
- Connectivity

Sample Imported DWDM Logical Hierarchy

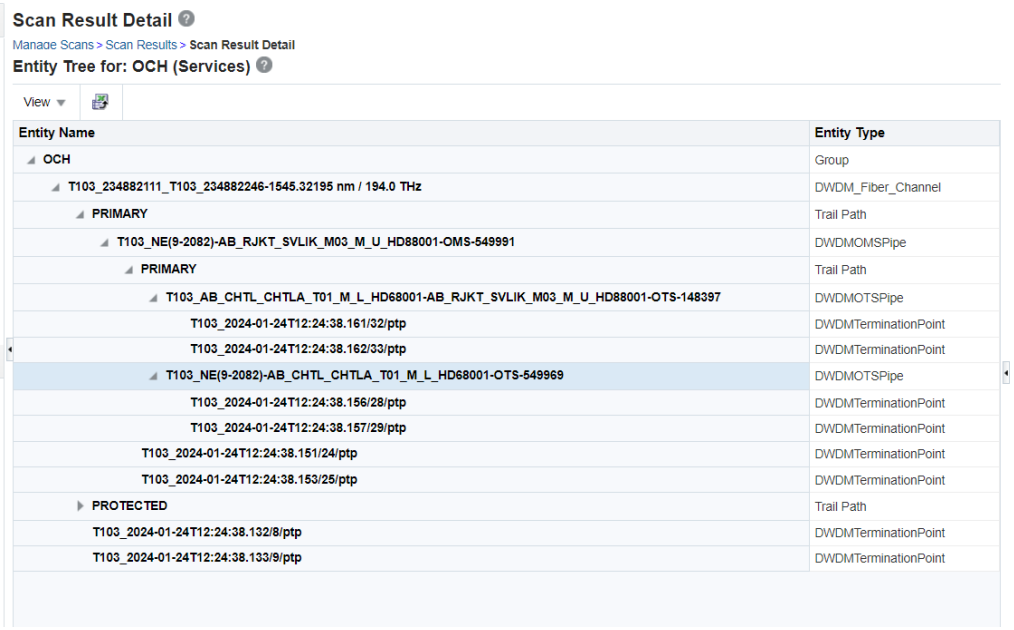
The following figures show a sample imported DWDM logical hierarchy and its corresponding OCH and Client layers.



A sample Client layer of the cartridge is as follows:



A sample OCH layer of the cartridge is as follows:



This cartridge is designed to be used on a standalone environment while displaying the model hierarchy within Network Integrity.

The cartridge does not provide any integration with other products but can be extended.

This cartridge is designed to import and reconcile the DWDM subnetwork connection logical hierarchy and attempts to discover other logical hierarchy results in a scan failure.

In addition to an import action, this cartridge provides discrepancy detection and discrepancy resolution for integration with Unified Inventory Management.

Discrepancy detection provides a process to allow a filtered comparison of DWDM subnetwork connection logical hierarchy between what is discovered and what is imported from UIM.

The discrepancy resolution action enables the discovered logical DWDM subnetwork connection hierarchy to be created and updated in UIM.

For more information about discrepancy detection actions and processors, see Network Integrity Developer's Guide.

About Cartridge Dependencies

This section provides information on dependencies that the DWDM Logical Assimilation cartridge has on other entities.

Run-Time Dependencies

For the cartridge to work at run-time, the following cartridges must be deployed to Network Integrity:

- Address_Handlers
- TMF814Discovery_Cartridge
- Optical UIM Integration cartridge
- UIM Integration cartridge

UIM must be installed and be accessible to Network Integrity.

The following components must be deployed to UIM:

- UIM Integration web service
- ora_uim_network_device
- ora_ni_uim_ocim
- ora_ni_uim_sdh_optical
- ora_ni_uim_device_ports_interfaces_connectors
- ora_ni_uim_device_dwdm_optical
- ora_uim_basewdm
- ora_uim_basetechnologies
- ora_uim_basemeasurements

Design-Time Dependencies

The DWDM Logical Assimilation cartridge has the following dependencies:

- NetworkIntegritySDK
- DWDM_Logical_Discovery_Cartridge
- UIM_Integration_Cartridge
- UIM Integration Web Service
- ora_uim_model
- ora_uim_mds
- ora_uim_basemeasurements
- ora_uim_basetechnologies
- ora_uim_basewdm
- ora_ni_uim_sdh_optical
- ora_uim_network_device
- UIM_DWDM_Logical_Model

Opening the Cartridge Files in Design Studio

To review and extend the DWDM Logical Assimilation cartridge, you must first download the Oracle Communications DWDM Logical Assimilation Cartridge software from the Oracle software delivery web site: https://edelivery.oracle.com

The software contains the DWDM Logical Assimilation cartridge ZIP file, which has the following structure:

- \UIM_Cartridge_Projects\
- \Network_Integrity_Cartridge_Projects\
- DWDM_Logical_Assimilation_Cartridge.iar
- \UIM_Cartridge_Projects\UIM_DWDM_Logical_Model
- \UIM_Cartridge_Projects\ora_uim_basewdm

- \UIM_Cartridge_Projects\ora_uim_basetechnologies
- \UIM_Cartridge_Projects\ora_uim_basemeasurements
- \UIM_Cartridge_Projects\ora_ni_uim_device_dwdm_optical
- \Network_Integrity_Cartridge_Projects\UIM_Integration_Cartridge
- \Network_Integrity_Cartridge_Projects\DWDM_Logical_Assimilation_Cartridge

See *SCD Design Studio Modeling Network Integrity* and *Network Integrity Developer's Guide* for information about opening files in Design Studio.

Building and Deploying the Cartridge

See Design Studio Help for information about building and deploying cartridges.

Configure NI_UIM Webservice

To configure the NI_UIM webservice:

1. Go to the domain path *<domain>/UIM/app/7_5_1*.
2. Download **custom.ear** from https://edelivery.oracle.com
3. Update **custom.ear** with the latest **NI_Uim.war** file.
4. Login to the console and update **custom.ear**.

About the Cartridge Components

The DWDM Logical Assimilation cartridge contains the following actions:

- Abstract Import WDM Services
- Import WDM Services
- Detect WDM Service Discrepancies
- Reconcile WDM Services

Action: Abstract Import WDM Services

For this action, the result category is **Services** and type is **Abstract**.

Table 2-1 Scan Parameter Group

Name	Description	Type
Parallel Process	Enable the checkbox to enable the multithreading.	Checkbox

Table 2-2 Model: DWDM_Logical_Assimilation_Cartridge

Name	Description	Entity Type
DWDMClientPipe	This entity is used to model Client subnetwork connection.	pipe
DWDMODUPipe	This entity is used to model ODU subnetwork connection.	pipe

Table 2-2 (Cont.) Model: DWDM_Logical_Assimilation_Cartridge

Name	Description	Entity Type
DWDMOTUPipe	This entity is used to model OTU subnetwork connection.	pipe
DWDM_Optical_Fiber	This entity is used to model OCH subnetwork connection.	pipe
DWDM_Fiber_Channel	This entity is used to model OCH subnetwork connection.	pipe
DWDMOMSPipe	This entity is used to model OMS subnetwork connection.	pipe
DWDMOTSPipe	This entity is used to model OTS subnetwork connection.	pipe
DWDMTrailPipe	This entity is used to model association between parent and child subnetwork connection.	pipe
DWDMTerminationPoint	This entity is used to model Pipe termination point.	pipetp

Table 2-3 Processor

Name	Description	Owner Action	Imported Action
Initialize Holder	This processor is used to initialize common objects.	DWDM_Logical_Assimilation_Cartridge	NA
Init Import Service	This processor is used to initialize import system.	DWDM_Logical_Assimilation_Cartridge	NA
Import And Model Client Full Hierarchy	This processor is used to import and model client connectivity full hierarchy provided in scan param client name.	DWDM_Logical_Assimilation_Cartridge	NA
Import OTS Pipes	This processor is used to import OTS pipe from inventory system if scan param import OCH layer selected.	DWDM_Logical_Assimilation_Cartridge	NA
Import OMS Pipes	This processor is used to import OMS pipe from inventory system if scan param import OCH layer selected.	DWDM_Logical_Assimilation_Cartridge	NA
Import and Model OCH Pipe	This processor is used to import OCH pipe from inventory system if scan param import OCH layer selected.	DWDM_Logical_Assimilation_Cartridge	NA
Import OTU Connectivity	This processor is used to import OTU connectivity from inventory system if scan param import Client layer selected.	DWDM_Logical_Assimilation_Cartridge	NA

Table 2-3 (Cont.) Processor

Name	Description	Owner Action	Imported Action
Import ODU Connectivity	This processor is used to import ODU connectivity from inventory system if scan param import Client layer selected.	DWDM_Logical_Assimilation_Cartridge	NA
Import and Model Client Connectivity	This processor is used to import Client connectivity from inventory system if scan param import Client layer selected.	DWDM_Logical_Assimilation_Cartridge	NA

Action: Import WDM Services

For this action, the result category is **Services** and type is **Main**.

Table 2-4 Scan Parameter Group

Name	Description	Type
Client Connectivity Name	Provide Client Connectivity name to import their hierarchy.	Text
Client Connectivity Names Folder Path	File path which contains Client Connectivity names to import their hierarchy.	Text
Import Client Layers	Select this checkbox to Import Client layer and ODU and OTU hierarchy.	Checkbox
Import OCH Layers	Select this checkbox to Import OCH layer and OMS and OTS hierarchy.	Checkbox

Table 2-5 Incremental Scan Parameter (Source: NI_SDK)

Name	Description	Type
Incremental Scan	Enable this checkbox to process dwdm nms notification.	Text
Nms Notification Circle	Nmsdetails table OSS entry should be provided here.	Text
Nms Notification Vendor	Nmsdetails table VENDOR entry should be provided here.	Text
Nms Notification Count	Count of notification to be processed.	Text

Table 2-6 Model: DWDM_Logical_Assimilation_Cartridge

Name	Description	Entity Type
DWDMClientPipe	This entity is used to model Client subnetwork connection.	pipe
DWDMODUPipe	This entity is used to model ODU subnetwork connection.	pipe

Table 2-6 (Cont.) Model: DWDM_Logical_Assimilation_Cartridge

Name	Description	Entity Type
DWDMOTUPipe	This entity is used to model OTU subnetwork connection.	pipe
DWDM_Optical_Fiber	This entity is used to model OCH subnetwork connection.	pipe
DWDM_Fiber_Channel	This entity is used to model OCH subnetwork connection.	pipe
DWDMOMSPipe	This entity is used to model OMS subnetwork connection.	pipe
DWDMOTSPipe	This entity is used to model OTS subnetwork connection.	pipe
DWDMTrailPipe	This entity is used to model association between parent and child subnetwork connection.	pipe
DWDMTerminationPoint	This entity is used to model Pipe termination point.	pipetp

Table 2-7 Processor

Name	Description	Owner Action	Imported Action
Initialize Holder	This processor is used to initialize common objects.	Abstract Import WDM Services	Abstract Import WDM Services
Initialize Scan Params	This processor is used to initialize scan params.	Import WDM Services	Import WDM Services
Init Import Service	This processor is used to initialize import system.	Abstract Import WDM Services	Abstract Import WDM Services
Collect Notification	This processor is used to collect DWDM notification if incremental scan is enabled.	Import WDM Services	Import WDM Services
Import And Model Client Full Hierarchy	This processor is used to import and model client connectivity full hierarchy provided in scan param client name.	Abstract Import WDM Services	Abstract Import WDM Services
Import OTS Pipes	This processor is used to import OTS pipe from inventory system if scan param import OCH layer selected.	Abstract Import WDM Services	Abstract Import WDM Services
Import OMS Pipes	This processor is used to import OMS pipe from inventory system if scan param import OCH layer selected.	Abstract Import WDM Services	Abstract Import WDM Services
Import and Model OCH Pipe	This processor is used to import OCH pipe from inventory system if scan param import OCH layer selected.	Abstract Import WDM Services	Abstract Import WDM Services

Table 2-7 (Cont.) Processor

Name	Description	Owner Action	Imported Action
Import OTU Connectivity	This processor is used to import OTU connectivity from inventory system if scan param import Client layer selected.	Abstract Import WDM Services	Abstract Import WDM Services
Import ODU Connectivity	This processor is used to import ODU connectivity from inventory system if scan param import Client layer selected.	Abstract Import WDM Services	Abstract Import WDM Services
Import and Model Client Connectivity	This processor is used to import Client connectivity from inventory system if scan param import Client layer selected.	Abstract Import WDM Services	Abstract Import WDM Services
Update Notifications	This processor is used to update DWDM notification status if incremental scan is enabled.	Import WDM Services	Import WDM Services

Action: Detect WDM Service Discrepancies

For this action, the result category is **Discover WDM Services (Services)** and type is **Normal**.

Table 2-8 Model: DWDM_Logical_Assimilation_Cartridge

Name	Description	Entity Type
DWDMClientPipe	This entity is used to model Client subnetwork connection.	pipe
DWDMODUPipe	This entity is used to model ODU subnetwork connection.	pipe
DWDMOTUPipe	This entity is used to model OTU subnetwork connection.	pipe
DWDM_Optical_Fiber	This entity is used to model OCH subnetwork connection.	pipe
DWDM_Fiber_Channel	This entity is used to model OCH subnetwork connection.	pipe
DWDMOMSPipe	This entity is used to model OMS subnetwork connection.	pipe
DWDMOTSPipe	This entity is used to model OTS subnetwork connection.	pipe
DWDMTrailPipe	This entity is used to model association between parent and child subnetwork connection.	pipe
DWDMTerminationPoint	This entity is used to model Pipe termination point.	pipetp

Table 2-9 Processor

Name	Description	Owner Action	Imported Action
WDM Pipe Discrepancy Filter	This processor is used to filter discrepancy on DWDM layers.	DWDM_Logical_Assimilation_Cartridge	NA
Discrepancy Detector	This processor is used to detect discrepancy	NI_SDK	NI_SDK

Action: Reconcile WDM Services

For this action, the lable is **Reconcile WDM Services to UIM**, result source is **Discover WDM Services (Services)** and type is **Normal**.

Table 2-10 Model: DWDM_Logical_Assimilation_Cartridge

Name	Description	Entity Type
DWDMTrailPipe	This entity is used to model association between parent and child subnetwork connection.	pipe
DWDMTerminationPoint	This entity is used to model Pipe termination point.	pipetp
DWDMOTUPipe	This entity is used to model OTU subnetwork connection.	pipe
DWDMOTSPipe	This entity is used to model OTS subnetwork connection.	pipe
DWDMOMSPipe	This entity is used to model OMS subnetwork connection.	pipe
DWDMODUPipe	This entity is used to model ODU subnetwork connection.	pipe
DWDMClientPipe	This entity is used to model Client subnetwork connection.	pipe
DWDM_Optical_Fiber	This entity is used to model OCH subnetwork connection.	pipe
DWDM_Fiber_Channel	This entity is used to model OCH subnetwork connection.	pipe

Table 2-11 Processor

Name	Description	Owner Action	Imported Action
WDMReconcilationDispatcher	This processor is used to resolve discrepancy.	DWDM_Logical_Assimilation_Cartridge	NA
WDMReconciliationInitializer	This processor is used to initialize discrepancy resolution.	DWDM_Logical_Assimilation_Cartridge	NA

Groom Support for DWDM

Grooming a DWDM connectivity is changing the design path of a connectivity by either changing segment's channel within a facility or to a channel from different facility. For example,

when you groom a ODU4 connectivity, you change the OTU channel within same OTU facility or to a OTU channel from different OTU facility.

The groom feature can also be used for:

- Reallocating bandwidth to ensure optimal usage
- Consolidating traffic to make better use of high-capacity links
- Upgrading equipment with newer, more capable devices

Grooming frequently happens due to network modifications that introduce new routes or render existing ones less effective. For example, the addition of new devices to a network might cause existing routes to have unacceptable number of hops. Planning and management procedures identify such scenarios and recommend more efficient routing adjustments through grooming. For more information, see UIM Concepts

UIM exposes a Groom API via the REST protocol. Network Integrity identifies design path discrepancies for each connectivity rider, triggering a groom request and calling UIM's Groom endpoint. Upon receiving the groom request, UIM promptly acknowledges it with a 202 response and processes it in the background. Network Integrity then regularly checks UIM for a Groom response and addresses the discrepancies accordingly.

For more information on how to invoke Groom REST APIs, see REST API for Unified Inventory Management.

A default API is introduced within the DiscrepancyHandler interface of the UIM_Integration_Cartridge, which takes collections of discrepancies (such as attribute mismatches, missing or extra pipe segments) and the reference pipe entity (either trails or tunnels) as inputs, as shown below. You can use reconciliation handler classes to override this API.

Groom can be used by modifying the necessary segments, or changing channel(s) within existing segments.

```
public default void handleDiscrepancyGroom(Collection<DisDiscrepancy> missingEntity,
Collection<DisDiscrepancy>
        extrEntity, Collection<DisDiscrepancy> attributeMismatch, Pipe pipe) {
   }
```

The input to the API is passed from the oracle.communications.integrity.uim.resolutionprocessors.base.BaseResolutionElement class within the UIM_Integration_Cartridge. This class has the logic to group discrepancies respective to the attribute mismatches, missing or extra entities, and reference root entities for each result group.

The oracle.communications.integrity.dwdm.logical.assimilation.service.handler.DWDMLogicalEntityPipeDiscrepancyHandler OOB reconciliation handler has the logic to groom DWDM layers.

Rehome Support for DWDM

When you rehome a connectivity, you alter one of its endpoints. This action may be necessary for load balancing purposes or due to the removal or replacement of devices and interfaces. For more information, see UIM Concepts.

The rehome feature can also be used for:

- Moving customer connections to different network nodes to improve service quality
- Physical moving network devices to different location

- Switching network services from one provider to another
- Shifting network resources, such as IP addresses or bandwidth, to different parts of the network.

Rehoming a facility requires changes to the termination of the facility itself and to any channels it provides. Channels are re-terminated on sub-device interfaces provided by the new device interface on which the facility is terminated.

UIM exposes a Rehome API over REST protocol. Network Integrity detects such port change discrepancies for each connectivity facility and generates a Rehome request and invokes Rehome endpoint of UIM. Upon receiving the rehome request, UIM immediately acknowledges with a 202 response and processes it in the background. Network Integrity then regularly checks UIM for a Rehome response and addresses the discrepancies accordingly.

For more information on how to invoke Rehome REST APIs, see REST API for Unified Inventory Management.

A default API is introduced within the DiscrepancyHandler interface of the UIM_Integration_Cartridge, which takes a collection of discrepancies (such as missing or extra pipe or PTP entities) as input, as shown below. The design path can be modified by making device changes or termination point changes on one side.

```
public default void handleDiscrepancyRehome(DisDiscrepancy missingEntity, DisDiscrepancy
extrEntity) {
}
```

The input to the API is passed from the oracle.communications.integrity.uim.resolutionprocessors.base.BaseResolutionElement class within the UIM_Integration_Cartridge. This class has the logic to group discrepancies respective to the missing or extra entities for each result group.

The oracle.communications.integrity.dwdm.logical.assimilation.service.handler.PipeTerminationPointHandler OOB reconciliation handler has the logic to rehome DWDM layers.

Using the Cartridge

This section provides instructions for using the Oracle Communications Network Integrity DWDM Logical Assimilation cartridge in Network Integrity.

Configuring Import System in NI

To configure Import System in NI:

1. Open **Manage Import System** in NI.
2. Under **Import System Details**, enter the following:
   a. Enter **Name** as **Import**.
   b. Enter the required address.
   c. Enter your **User Name** and **Password**.
3. Press **Enter** from your keyboard.
   The Import System is configured in NI.
4. Verify using the Webservice test URL:

   `http://<ip>:<port>/NI_Uim/NI_UimHTTP`

Run DWDM Import Scan

To run the DWDM Import scan:

1. Go to the Manage Scan page in NI.
2. Click **Create Scan**.
3. On the Create Scan page provide following:
   - **Name**: Name of the scan.
   - **Enabled**: Select to run the scan.
   - **Scan Action**: Select **Import WDM Services from UIM**.
4. Under **Scan Action Parameters**, select **Scan Parameter Group** as **WDM Service Parameters** for WDM Service Parameters and provide the corresponding parameters.
5. Under **Scan Action Parameters**, select **Scan Parameter Group** as **Parallel Process Parameters** for Parallel Process Parameters and provide the corresponding parameters.

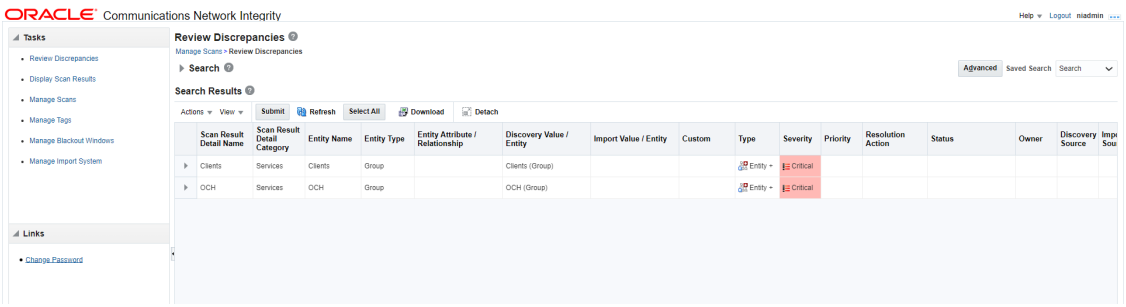
> **Note:**
>
> By default, **Parallel Process** is enabled along with the thread count configured at time of NI installation.

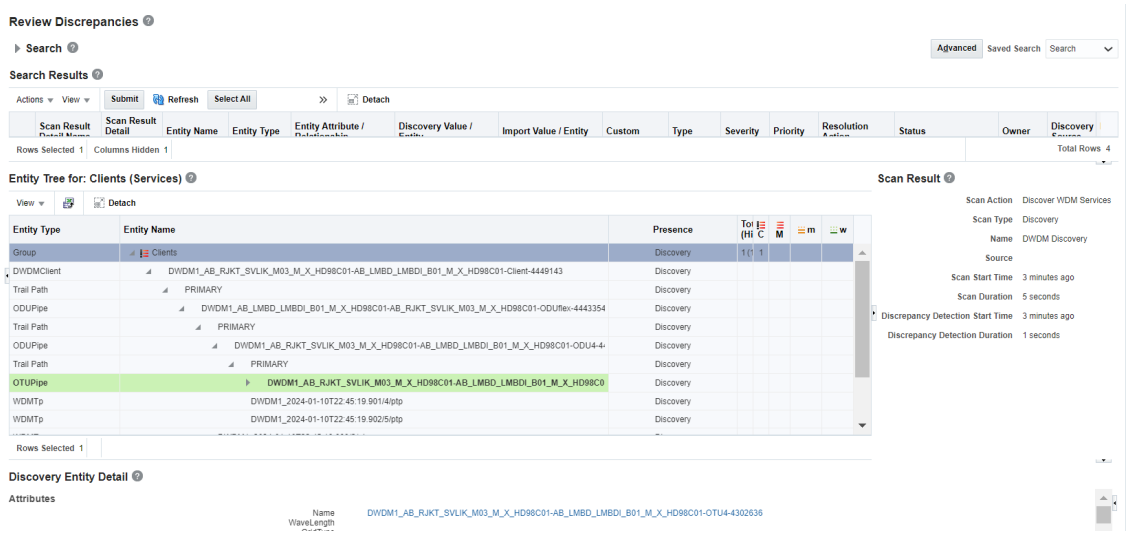
6. Click **Save and Close**.
7. Run the Import scan.
   The scan results appear.

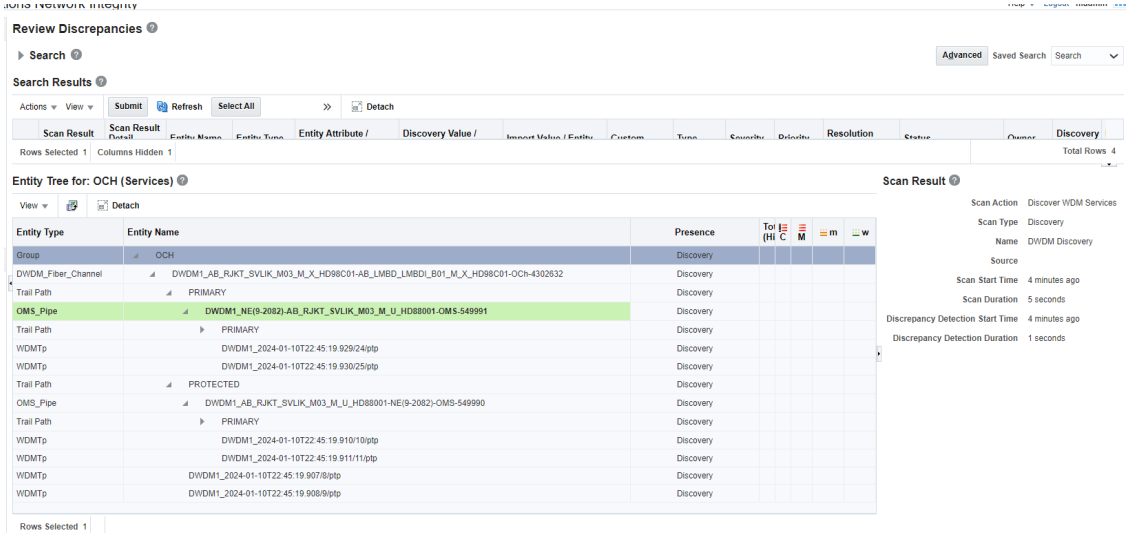
Detecting Discrepancy between DWDM Discovered and Imported Data

To detect discrepancy between DWDM discovered and imported data:

1. Open Manage Scans.
2. From the list of scans, select the required DWDM Discovery scan.
3. Click **Edit**.
4. Under the **General** tab, select **Detect Discrepancies**.
5. Run the scan.
   The scan results appear.
6. Click **Review Discrepancies**.
   The Review Discrepancies page appears as shown in the following figures.







Resolving Discrepancies

To resolve discrepancies:

1. Before resolving a discrepancy, ensure that DWDM physical layer data is present in UIM.
2. Usually, the cartridge that discovers and reconciles physical layer data such as device, shelf, card, port, device interface, and so on, already exists. Only then, the logical layer discover and reconciliation happens.

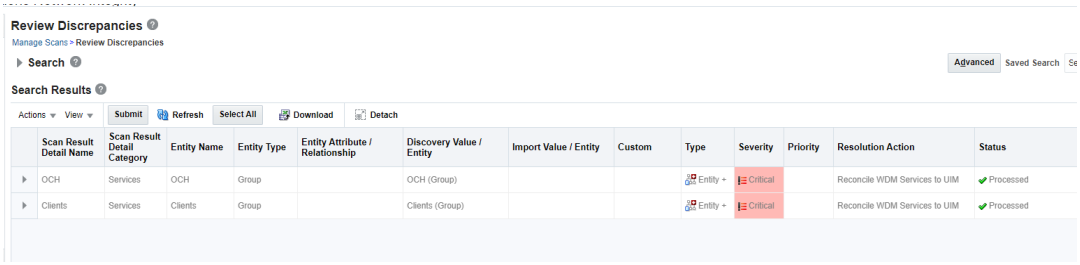
Reconciling Discrepancy

You must perform reconciliation in the following order:

1. OCH layer: The action for OCH layer reconciliation is **Reconcile WDM Services**.
2. Client layer: The action for client layer reconciliation is **Reconcile WDM services**

> **Note:**
>
> You must perform Client layer reconciliation only after performing OCH layer reconciliation.

The following figure shows a sample of reconciliation results.

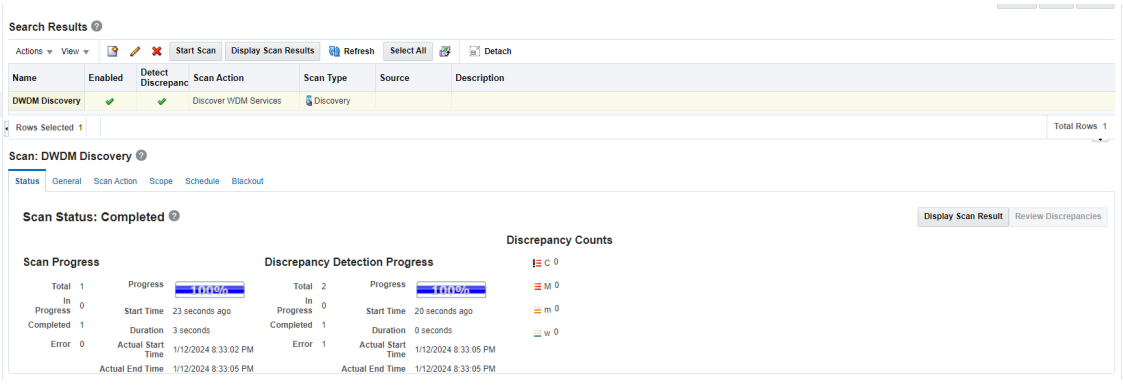


3. Verify the reconciled data in UIM.

Verifying Reconciled Data between UIM and NI

To verify the reconciled data between UIM and NI:

1. Go to Manage Scans.
2. Run an Import scan.
3. Verify the scan results.
4. Verify the results for all layers.
5. Verify if the network data and UIM data is in synchronization as follows:
   a. Run a Discovery scan with **Detect Discrepancy** enabled.
   b. Check the scan results.
6. If the data under **Discrepancy Counts** columns shows zeros, the discovered data created in UIM is correct as shown in the following sample.



Running an Incremental Import Scan

The prerequisite for running an incremental import scan is:

- Collect DWDM logical layer notification from NMS/EMS system using NMS listener.

To run an incremental import scan:

1. Go to Manage Scans in NI.
2. Open a required import scan.
3. Click **Edit**.
   The Edit Scan page appears.
4. Under **Scan Action Parameters**, select **Scan Parameter Group** as **IncrementalScanParameter**.
5. Enter the corresponding parameters for the selected group.
6. Run the scan.
   The scan results appear.
7. Verify if the scan status is changed from **INITIAL** to **IMPORTED**.

> **Note:**
>
> You can perform an Import scan using multithreading for a better performance.

Handling Entity Discrepancy

If UIM has a DWDM hierarchy and it is removed from the network, the corresponding discrepancies appear when you run the Discrepancy Detection Entity.

Perform the tasks in the following order for resolution:

1. Address the entity disparity on the client layer.
2. OCH layer discrepancy is the next resolved entity.

In UIM, the SNC hierarchy is generated in a different sequence than its deletion. When an entity + is created, it is resolved on the OCH layer first, and then it is resolved on the client layer. The top layer is erased first, followed by the child layer, while deleting.

Run the import and discovery scan again after resolving the entity discrepancy.

Filtering DWDM data based on Vendor and Circle Parameters

You can filter DWDM data during discovery and import scans by defining the Nms Notification Vendor and Nms Notification Circle parameters. This ensures that only data matching these criteria will be available in the scan results. When reconciling this data with UIM, the pipe and connectivity will include both vendor and circle as characteristics.

To reconcile DWDM data based on vendor and circle parameters:

1. Create a DWDM import scan with the requisite Nms Notification Vendor and Nms Notification Circle parameter values and run the scan.

2. Create a DWDM discovery scan with the requisite Nms Notification Vendor and Nms Notification Circle parameter values and run the scan with discrepancy detection enabled.

> **Note:**
>
> Ensure that the Nms Notification Vendor and Nms Notification Circle parameter values entered in both import and discovery scans are the same.

3. Perform the OCH layer reconciliation first. Then perform the reconciliation of the client group.
4. Verify the reconciled data by using the same Nms Notification Vendor and Nms Notification Circle parameter values. See "Verifying Reconciled Data between UIM and NI" for more information on verifying reconciled data.