Oracle® Communications Billing and Revenue Management Migrating Accounts to the BRM Database



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Oracle Communications Billing and Revenue Management Migrating Accounts to the BRM Database, Release 15.1

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Preface

This book describes how to migrate accounts from a legacy non-BRM database to a BRM database.

Audience

This book is for system database administrators and system administrators.

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1 Understanding Conversion Manager

This chapter describes how to use Oracle Communications Billing and Revenue Management (BRM) Conversion Manager to convert data from a legacy database to the BRM database.

Topics in this document:

- About Conversion Manager
- Overview of the Data Conversion Process
- About Testing Your Data Mapping
- About Mapping Data
- About Loading Data
- About Loading Data by Using Multiple Files
- About Reloading Data

About Conversion Manager

You use Conversion Manager to load legacy data into BRM. Conversion Manager supports the following types of data:

- Account data, such as the customer's name, address, profile, and discount information.
- Service data, such as the services subscribed to by the accounts.
- Charge offer data, such as charge offers purchased by the accounts.
- Billing data.
- Account hierarchy data.
- Balance data, including data for all balance elements. When data is migrated, rollover events can use the balance data to manage rollovers.

You can load account and balance data together, or you can load account data first and balance data second. All account data for an account must be loaded before loading balance data.

Before migrating data, do the following:

- Create a price list that applies to the migrated data before migrating account and balance data. Migrated data must reference the price list in the BRM database.
- Make sure that cycle arrears fees, billing-time discounts, and rollovers have been
 processed in the legacy system.

When the accounts are migrated, cycle forward fees and discount grants (for example, minutes) are applied. However, all delayed events are handled in the current bill.



Auditing is not supported by Conversion Manager.

Overview of the Data Conversion Process

Converting legacy data includes these tasks:

- Understanding the data in the legacy system and deciding how to convert it to the BRM database.
- Mapping the data in the legacy database to the BRM database. To do so, you create XML files, which are validated by the Conversion Manager XSD schema files.
- Migrating the data to the BRM database by using the pin_cmt utility. To migrate data:
 - Import data into the BRM database. The data is hidden from BRM processes.
 - Deploy the staged data to the production area.

See "Loading Legacy Data into the BRM Database" for more information.

Note:

BRM must be running when you import and deploy data.

About Testing Your Data Mapping

You test your data mapping by using a test database. To test the data mapping:

- 1. Create a subset of the data in an XML file. See "Mapping Legacy Data to the BRM Data Schema".
- 2. Load the data into the test database. See "Loading Legacy Data into the BRM Database".
- 3. Test the data. See "Testing the Imported Data".

After you determine that the data mapping works, you import the data into the production database.

About Mapping Data

You convert legacy data to XML format by using an extraction utility.

Note:

Conversion Manager does not include a utility for extracting legacy data into XML files. You need to develop your own extraction utility or obtain it from third-party sources.

Conversion Manager converts data from any type of legacy database; for example, Oracle.



To map data from the legacy database to the BRM data schema, you need a thorough understanding of the legacy data and how BRM stores data.

If your legacy data includes data not currently supported in BRM, you can create new storable classes, or extend storable classes, to support the custom data. You can then extend the Conversion Manager XML schema to migrate the data. See "Migrating Data by Using New and Extended Storable Classes".

You can configure data enrichment to allow system-wide values to be bulk inserted and to provide batch controls for operational integrity.

About Loading Data

You use the **pin_cmt** utility to load the converted data into the BRM database. Loading data includes two processes: importing accounts and deploying accounts.

 First, you *import* the data into the BRM database. When the data is imported, it is hidden from BRM processes, so it is not part of your production system. (Data is hidden by changing the database number section in the Portal object ID (POID) of each imported object. The database number is set to a number defined in the **infranet.cmt.dbnumber** entry in the **Infranet.properties** file for the **pin_cmt** utility; for example, **0.0.12**.)

When you import data, you specify a *stage ID*. This enables you to load data in stages; for example, you can load a specific type of account first. A single database schema can include multiple stages.

• After the data is imported, you *deploy* the data. When you deploy data, the imported data is exposed as production data.

You control which accounts are deployed by entering the stage ID that you used when importing the data. In addition, you specify the billing day of month (DOM). Therefore, only those accounts with the specified stage ID and DOM are deployed.

After the data is deployed, the database number in the POID is changed to the actual database number, and the data becomes available for use by BRM processes.

Note:

- Events that apply to a migrated account are *not* processed until the account is deployed.
- When data is deployed, the database number used is defined in the infranet.cmt.targetdbnumber entry in the pin_cmt utility Infranet.properties file. By default, the number is 0.0.0.1.
- File processing data, such as the file name and batch ID, is stored in the *I* batch/cmt object.

When accounts are deployed:

- The bill cycles are started.
- Cycle fees are applied.
- If you use a multischema system, the uniqueness table in the primary database schema is updated.



About Verifying Data Before It Is Deployed

You can look at data that is imported but not yet deployed by logging in to Billing Care connected to a scoped Oracle Data Manager (DM). See "Viewing Data before Deploying".

About Migrating Data to Multischema Systems

To load data into a multischema system, run a separate instance of the **pin_cmt** utility for each database schema. The **pin_cmt** utility connects to the primary schema and creates a *I* **uniqueness** object for every account and service migrated to BRM.

Note:

If you have a multischema system, make sure the stage IDs are larger than the database IDs for the schemas. For example, if you have a schema with the number 0.0.0.5, use stage IDs larger than 5.

About Loading Data by Using Multiple Files

You can use multiple XML files to load data. For example, you can load account information separately from balance data. You can use the same staging area for multiple files.

Note:

- Load account data before loading balance data.
- Load parent accounts before loading child accounts.

About Reloading Data

If the **pin_cmt** utility runs out of space in your BRM database for data rows, the loading process stops. Data that is not loaded can be loaded after more space is made available in the database. See "Reloading Data".

2 Installing and Configuring Conversion Manager

This chapter describes how to install Oracle Communications Billing and Revenue Management (BRM) Conversion Manager.

Topics in this document:

- Installing Conversion Manager
- Configuring the pin_cmt Utility
- Improving Conversion Manager Performance

See also "Understanding Conversion Manager".

Installing Conversion Manager

Conversion Manager is available for the Linux operating system and for the Oracle database.

Note:

If you already installed the product, you must uninstall its features before reinstalling them.

Ensure that the **libocijdbc11.so** file is available in your system. Conversion Manager requires this OCI Instant JDBC Library.

To install Conversion Manager, see "Installing Individual BRM Components" in *BRM Installation Guide*.

Configuring the pin_cmt Utility

You use the **pin_cmt** utility to migrate the data. To configure performance, log file, and other settings for this utility, edit the **Infranet.properties** file in *BRM_homelapps/cmt*.

Note:

Many of the entries in the **Infranet.properties** file include default settings that are applicable for testing your data mapping; for example, the number of threads that the **pin_cmt** utility uses. You can change the settings when you load data into the production system.

In addition, you need to edit the **pin.conf** file for the **cmt_mta_cycle_fees** utility. This utility is run automatically by the **pin_cmt** utility to apply cycle fees. The **pin.conf** file is in *BRM_homel*



apps/cmt. It includes the standard connection parameters and multithreaded application (MTA) performance setting. You can also specify to not apply cycle fees to accounts.

See "Applying Cycle Fees to Deployed Accounts".

Referencing JAR Files

To ensure that the **pin_cmt** utility finds all the necessary JAR files, include them in the **pin_cmt** file, in the line that invokes Java. The format is:

```
BRM_home/jre/bin/java -Dfile.encoding=utf-8 -cp "jar_A:jar_B:jar_C:jar_D"
com.portal.cmt.Cmt $1 $2 $3 $4 $5 $6 $7 $8 $9
```

where *jar_A:jar_B:jar_C:jar_D* is the list of Java class JAR files. Oracle library references are appended at the end.

Include all entries on one line with no line breaks. Separate JAR entries with a colon. Do not include any spaces in the list of JAR files. The number of elements is limited only by command-line length (approximately 8 kilobytes on most machines).

The following shows an example:

```
BRM_home/jre/bin/java -Dfile.encoding=utf-8 -cp "BRM_home/apps/cmt/cmt.jar:BRM_home/jars/
xercesImpl.jar:BRM_home/jars/xmlParserAPIs.jar:BRM_home/jars/pcm.jar:BRM_home/jars/
pcmext.jar:BRM_home/apps/cmt" com.portal.cmt.Cmt $1 $2 $3 $4 $5 $6 $7 $8 $9
```

Defining Timestamp Validation for Finite Partitioned Classes

When you import data that is in finite partitioned classes, you can define the timestamp validation mode that is encoded in the POID of a finite partitioned class. You provide the timestamp validation mode as the value for the **infranet.cmt.timestampvalidation** entry in the **Infranet.properties** file for use by Conversion Manager.

Table 2-1 lists the valid entries for infranet.cmt.timestampvalidation.

| Input Value | Timestamp Validation Mode |
|-------------|--|
| 0 | No timestamp validations are performed. If an entry is provided in created_t , that creation time is used for a finite partitioned class. Otherwise, the current system time is used for a finite partitioned class. |
| 1 | The created_t entry is mandatory for any finite partitioned class. It should be provided in the input XML file containing the legacy data to be imported. If created_t is not provided, Conversion Manager generates an error. This is the default value for Infranet.cmt.timestampvalidation . |
| 2 | The default time is used for the POID encoding. If created_t is provided for any finite partitioned class, Conversion Manager generates an error. |

 Table 2-1
 Valid Modes for Timestamp Validation

To add the infranet.cmt.timestampvalidation entry to the Infranet.properties file:

- 1. Open the BRM_home/apps/cmt/Infranet.properties file in a text editor.
- 2. Add the following entry. Provide the required value for *n*. See Table 2-1.

infranet.cmt.timestampvalidation = n



If you provide an invalid input for **infranet.cmt.timestampvalidation**, BRM replaces that value with the default value (**1**).

3. Save and close the Infranet.properties file.

Viewing Data before Deploying

When you import data, the data is migrated to your production database, but it is not accessible to normal BRM processes until it is deployed. To view the data, you need to configure one or more Oracle Data Manager (DMs) as scoped DMs. A *scoped DM* can view accounts according to their stage ID. You can configure multiple scoped DMs, one for each staging area.

In addition to configuring scoped DMs, you also need to configure the production Oracle DM to support DM scoping.

A BRM system that includes scoped DMs is called a scoped system.

To configure a scoped system:

 Run the pin_convert_nonunique.sql script in BRM_homelapps/cmt/scripts. This script drops unique constraints for indexes used in account creation.

Note:

By default, the **pin_convert_nonunique.pl** script uses PINX00 to identify tablespaces for indexes. If you use a name other than PINX00, edit the **pin_convert_nonunique.pl** script to change PINX00 to your tablespace name.

 Run the BRM_homelsys/dd/data/cmt_copy_group_planlists_oracle.sql stored procedure. This procedure duplicates the /group/plan_list object with the staged database number, which enables you to create accounts by using Billing Care.

The stored procedure uses the following parameters:

- Database number; for example, 5
- Return code (number)
- Return message (varchar2(100))

The following shows a sample call using PL/SQL:

```
declare
p_return_code number;
p_return_mesg varchar2(100);
begin
CMT_COPY_GROUP_PLANLISTS_ORACLE(5,p_return_code,p_return_mesg);
end;
```

 Create a pin.conf file for each scoped Oracle DM. To do so, edit the Oracle DM pin.conf file in BRM_homelsys/dm_oracle.

Edit the following entries:

Set the scoped_system entry to 1. This enables database scoping.



- Set the **production_system** entry to **0**. This identifies the DM as a scoped DM.
- Set the staging_db_number entry to the stage ID used for importing data. If you use a multischema system, the stage ID must be larger than the largest schema database number.
- Include the table names for the data you are importing in the scoped_exception_tables entry.

For example, a scoped DM for stage ID 11 has the following entries:

- dm scoped_system 1

```
- dm production_system 0
```

```
- dm staging_db_number 11
```

```
- dm scoped_exception_tables channel_event_t channel_t config_t data_t deal_t plan_t product_t rate_plan_selector_t rate_plan_t rate_t search_t zonemap_t
```

- Repeat the DM pin.conf configuration for each scoped DM, using a different stage ID for each one.
- 5. Configure the production Oracle DM by editing the following entries:
 - Set the **scoped_system** entry to **1**.
 - Set the production_system entry to 1. This identifies the DM as the production DM.
 - Include the table names for the data you are importing in the scoped_exception_tables entry.

The configuration for the production system looks like this:

```
- dm scoped system 1
```

```
- dm production_system 1
```

```
- dm scoped_exception_tables channel_event_t channel_t config_t data_t deal_t plan_t product t rate plan selector t rate plan t rate t search t zonemap t
```

- 6. Start the scoped DMs.
- 7. Create a root account for each stage ID:
 - a. Start the scoped Oracle DMs.
 - b. Open the load_pin_acct script in BRM_homelapps/cmt/scripts.
 - c. Edit the first line of the script to point to a valid Perl path. For example:

/opt/portal/ThirdParty/perl/5.8.0/bin

d. Edit the **\$dm_port** entry to point to the Oracle DM port number. For example:

\$dm_port = 22251

e. Make sure the \$db_no entry points to the production database. For example, if the production database number is 0.0.0.1, and the staged database number is 0.0.0.11, use the following entry:

\$db no = 0.0.0.1

- f. Save and close the file.
- g. Run the **load_pin_acct** script using the following command:

```
load_pin_acct -I pin_init_acct
```

The input flist used when the root account is created still refers to the production database number because the staging DM translates it to the staging database number.

8. Stop and restart all Connection Managers and Oracle DMs used for accessing the staged data.

Enabling Multischema Loading

If you are migrating data to a multischema system, edit the entries shown in Table 2-2 in the *BRM_homelapps/cmt/Infranet.properties* file:

| Table 2-2 | Infranet.pro | perties File | Entries to | Enable | Multischema | Loading |
|-----------|--------------|--------------|------------|--------|-------------|---------|
|-----------|--------------|--------------|------------|--------|-------------|---------|

| Entry | Description |
|------------------------------|--|
| infranet.cmt.deploy.multidb | Enables or disables data migration in a multischema system. Enter true or false . |
| infranet.cmt.primarydbname | Specifies the database schema name (for example, pindb1). |
| infranet.cmt.primarydbuserid | Specifies the schema login name. |
| infranet.cmt.primarydbpasswd | Specifies the schema login password. |
| infranet.cmt.primarydbnumber | Specifies the database number for the primary schema (for example, 0.0.0.2). |

Enabling XML Validation

The **pin_cmt** utility can validate the input files to ensure that the data has the correct structure. However, this decreases performance. If you validate the XML prior to loading the data, you can leave validation disabled.

Note:

You can test the data mapping by enabling validation when you migrate data to a test database. You can also test the data mapping by using the Conversion Manager XSD file with an online XML validator or third-party tool.

To enable or disable XML validation, edit the **infranet.cmt.preprocess.validation** entry in the **Infranet.properties** file:

infranet.cmt.preprocess.validation = true

Configuring the Database Setup

Edit the following entries in the **Infranet.properties** file to match your typical account configuration:



- Use the infranet.cmt.avgnoofservices entry to specify the average number of services that each account owns. This entry reserves Portal object IDs (POIDs) for the objects that will be created by the pin_cmt utility. The default is 5.
- Use the infranet.cmt.avgnoofdevices entry to specify the average number of devices that each account owns. This entry reserves POIDs for the objects that will be created by the pin_cmt utility. The default is 2.
- Use the infranet.cmt.noofrecords entry to specify the average number of account records in each input XML data file.
- Use the infranet.cmt.dbnumber entry to set the staged database number (for example, 0.0.0.12). Use the infranet.cmt.dbname, infranet.cmt.userid, and infranet.cmt.passwd entries for the rest of the staged database information.
- Use the infranet.cmt.targetdbnumber entry to set the target database.

If an account owns more or fewer services or devices than the numbers you specify, the objects are still loaded.

Setting the Default Credit Limit Profile

When accounts are imported, balance groups are created for the accounts.

You can specify which credit limit profile is assigned to each balance group in the following ways:

• You can specify the default credit limit profile by editing the **infranet.cmt.creditprofile** entry in the **Infranet.properties** file:

```
infranet.cmt.creditprofile = IndexID
```

Each credit limit profile is stored in a PIN_FLD_PROFILES array in the *lconfigl* credit_profile object. Replace *IndexID* with the index ID of the appropriate PIN_FLD_PROFILES array. In this example, you would replace *IndexID* with **3**:

| 0 | PIN_FLD_PROFILES | ARRAY [3] allocated 3, used 3 |
|---|---------------------------|-------------------------------|
| 1 | PIN_FLD_CREDIT_FLOOR | DECIMAL [0] NULL |
| 1 | PIN_FLD_CREDIT_LIMIT | DECIMAL [0] 133 |
| 1 | PIN FLD CREDIT THRESHOLDS | INT [0] 0 |

- You can assign a credit limit, credit floor, and credit threshold to each balance group when you run the pin_cmt utility. To do so, add the following XML elements to the input XML file that you import with pin_cmt:
 - <CrdLmt>
 - <CrdFlr>
 - <CrdTrsh>

The values specified in the input XML file take higher precedence than the value of the **infranet.cmt.creditprofile** entry in the **Infranet.properties** file.

Applying Cycle Fees to Deployed Accounts

By default, the **pin_cmt** utility runs a separate utility, **cmt_mta_cycle_fees**, to apply cycle fees after deploying accounts. To disable this, edit the **infranet.cmt.deploy.opcode** entry in the *BRM_homelapps/cmt/Infranet.properties* file:

infranet.cmt.deploy.opcode = false

Migrating New Balances to an Account Without Deleting Existing Balances

By default, when you migrate new balances to an account that was previously migrated using Conversion Manager, the **pin_cmt** utility deletes the existing balances on the account and associates only the newly migrated balances to the account.

To migrate new balances to an account without deleting the existing balances:

- 1. Open the BRM_home/apps/cmt/Infranet.properties file in a text editor.
- 2. Add the following entry:

infranet.cmt.deleteexistingbalances = false

Save and close the file.

Supporting 31-Day Billing

If your BRM implementation uses 31-day billing, configure the following entries in the **Infranet.properties** file:

```
infranet.cmt.3ldaybilling = true
infranet.cmt.3ldaybilling.forward = true
```

If the **infranet.cmt.31daybilling.forward** entry is enabled, BRM performs forward billing if the billing day of month is greater than 28. If it is disabled, BRM performs backward billing.

For more information, see "About Using 31-Day Billing" in *BRM Configuring and Running Billing*.

Supporting Delayed Billing

If your BRM implementation uses delayed billing, configure the following entry in the **Infranet.properties** file:

infranet.cmt.billingdelay=true

For more information, see "Setting Up Delayed Billing" in *BRM Configuring and Running Billing*.

Improving Conversion Manager Performance

Conversion Manager performance depends on the data and features used for a given BRM implementation. Therefore, this documentation includes guidelines, but does not provide specific values for performance-related configuration settings.



XML File Formatting

Limit the number of accounts in an XML file to 10,000 accounts. Conversion Manager supports XML files with any number of accounts, but limiting the number of accounts enables you to debug the migration in the case of an error message.

When you create the XML files:

- Validate the files with the Conversion Manager physical XML schema.
- Use the proper tab (\t) and new line (\n).
- Do not use spaces.
- Make sure all the required tags are present in the XML.

Running Multiple Instances of the pin_cmt Utility

Use multiple instances of the pin_cmt utility to load multiple XML files simultaneously.

For example, you can write a batch/shell script similar to this:

```
cat >> run.sh << EOF
date > start.txt
pin_cmt -import -file one.xml 1 &
pin_cmt -import -file two.xml 1 &
pin_cmt -import -file three.xml 1 &
pin_cmt -import -file four.xml 1 &
pin_cmt -import -file five.xml 1 &
wait
date > end.txt
EOF
```

While running the script, measure the CPU load and time taken by the **pin_cmt** utility for this entire batch. You can then increase the number of **pin_cmt** instances until the CPU load reaches 90%.

Using Connection Pooling with Conversion Manager

To improve performance, you can use connection pooling with Conversion Manager. Configure the following entries in the **Infranet.properties** file:

- infranet.cmt.minconns
- infranet.cmt.maxconns
- infranet.cmt.timeout

For example:

```
infranet.cmt.minconns = 15
infranet.cmt.maxconns = 30
infranet.cmt.timeout = 1000
```

For more information, see "About Connection Pooling" in BRM System Administrator's Guide.

Configuring Log File Levels

For test migrations, the default log file settings are set to return troubleshooting information. For better performance, you should change those settings to report less information.



- In the *BRM_homelapps/cmt/pin.conf* file, change the *pin_mta loglevel* entry to 1.
- In the BRM_homelapps/cmt/Infranet.properties file, change the infranet.log.level entry to 1.

System Resources

Migrating data can use a lot of system resources. Performance can depend on:

- RAM size
- Number of CPUs
- Disk quotas
- File system usage

Conversion Manager Preload Tuning

After you have validated the XML files and are ready to load data, edit the *BRM_homel* **apps/cmt/Infranet.properties** file to maximize performance.

Turn off XML validation:

infranet.cmt.preprocess.validation = false

• Set the following entries to correspond to the amount of data in the XML files. The **infranet.cmt.noofrecords** entry specifies the number of accounts.

```
infranet.cmt.noofrecords = 1000
infranet.cmt.avgnoofservices = 5
infranet.cmt.avgnoofdevices = 2
```

Configure sufficient threads in the preprocess thread pool.

```
infranet.cmt.preprocess.num_of_threads = 5
```

The default value is 5, which is the optimal value in most cases.

Make sure there are enough connections in the staging database connection pool:

infranet.cmt.minconns = 15 infranet.cmt.maxconns = 30 infranet.cmt.timeout = 1000

Increasing Memory Allocation to Prevent a System Hang

To test your mapping, you can run the **pin_cmt** utility with the default memory allocation. However, when migrating a production database, you might need to increase the memory allocation to prevent a system hang.

Edit the pin_cmt script to avoid system hangs.



```
BRM_home/jre/bin/java $JAVA_OPTIONS -Dfile.encoding=utf-8 -cp "BRM_home/apps/cmt/
cmt.jar:BRM_home/jars/xercesImpl.jar:BRM_home/jars/xmlParserAPIs.jar:BRM_home/jars/
```



```
pcm.jar:BRM_home/jars/pcmext.jar:BRM_home/apps/
cmt"com.portal.cmt.Cmt $1 $2 $3 $4 $5 $6 $7 $8 $9
```

Conversion Manager Load Tuning

In the *BRM_homelapps/cmt/Infranet.properties* file, verify the command line parameters for the SQL*Loader.

infranet.cmt.sqlldr = sqlldr streamsize=2621440 readsize=2621440 columnarrayrows=5000

When you use the flag direct="true", make sure the BRM user has DBMS_LOCK permission.

Conversion Manager Deploy Tuning

Before you deploy data, edit the following entries in the Conversion Manager pin.conf file. The file is located in *BRM_homelapps/cmt*.

- Set the log level to 1:
 - pin_mta loglevel 1
- Specify the appropriate capacity settings for your system; for example:

| - | pin_mta | children | 5 |
|---|---------|-----------|------|
| - | pin_mta | per_batch | 500 |
| - | pin mta | per step | 1000 |

- pin_mta fetch_size 5000

Mapping Legacy Data to the BRM Data Schema

This chapter explains, in general terms, what you need to understand about your legacy data to successfully convert it to an Oracle Communications Billing and Revenue Management (BRM) database.

Topics in this document:

- About Creating XML Files
- About the XSD Files
- About the Types of Data to Convert
- Tables Affected by the Conversion Process

See also "Understanding Conversion Manager".

About Creating XML Files

To migrate data, you create XML files that contain the data. You then migrate the data to the BRM database by using the **pin_cmt** utility.

Note:

Ensure that there are no extra spaces in the input XML file. If you need to indent text in the XML file, use the TAB key to add space.

Sample XML files for each type of data are available in *BRM_homelapps/cmt/sample_data*. *BRM_home* is the directory in which the BRM server software is installed.

About the XSD Files

Conversion Manager includes two sets of XSD files:

- A set of *conceptual* files that you can use for mapping legacy data to BRM objects. These files are easier to read than the set of files used for converting data.
- A set of *physical* files that are used by Conversion Manager when converting data. These files are not as easy to read, but are written in a way that optimizes performance.

The difference between the types of files is how the XML tags are named. In the conceptual files, the XML tags use the same field names as the BRM object fields.

For example:

In the conceptual files:

PIN_FLD_ACCOUNT_NO = <FIdAccountNo>



• In the physical files:

PIN_FLD_ACCOUNT_NO = <ActNo>

To set up mapping, you can use the easily-readable conceptual files to determine how to map data. Then you can edit the physical files, after you know how the data is mapped.

The conceptual files are in *BRM_homelapps/cmt/schema_files/conceptual*.

The physical files are in BRM_homelapps/cmt/schema_files/physical.

Use the following physical XSD files to create your XML files:

- Use the **CMT_Subscriber.xsd** file for subscriber data.
- Use the CMT_Balances.xsd file for balance data.

Note:

- Before you use the pin_cmt utility to migrate data, validate the XML files with the physical XSD files.
- Do not use spaces while generating the XML files. Use tabs (\t) and new lines (\n).

About the Types of Data to Convert

Table 3-1 shows the types of legacy data that can be loaded into the BRM database.

| Type of Data | Description |
|---|--|
| Account data | Subscriber data such as name, address, profile, current account balances, charge sharing group, and account hierarchy. |
| Charge offers, discount offers, and bundles | Bundles purchased by the customer and associated with the account. |
| Bill | Bill information such as billing cycle and balances from the legacy billing system. |
| Services | Data pertaining to services owned by the account, such as a wireless data service. |
| | For example, when converting data for a wireless data service, the following data is also converted: |
| | Device SIM |
| | Device number |

 Table 3-1
 Legacy Data Storable in BRM Database

Tables Affected by the Conversion Process

Table 3-2 shows the BRM tables that are affected by the conversion process. For more information on the BRM tables and the fields in each table, see the following documents:

- "Storable Class-to-SQL Mapping" in BRM Developer's Reference
- "Storable Class Definitions" in *BRM Developer's Reference*



The database tables are created during BRM installation.

Table 3-2 Tables Affected by the Conversion Process

| Table Name | Description |
|----------------------|--|
| ACCOUNT_T | Primary account table that represents billable accounts in BRM. Only one row is added to this table for each account in BRM. |
| ACCOUNT_EXEMPTIONS_T | Contains an entry for each tax exemption that applies to an account. |
| ACCOUNT_NAMEINFO_T | Contains name and address information for accounts. There is one row for each name and address type (home address, work address, mailing address, and so forth). |
| | There must be at least one row in this table for each row in ACCOUNT_T. For example, you can have billing name and address information, technical contact name and address information, and sales name and address information. |
| ACCOUNT_PHONES_T | Contains a phone number and a phone type for each account. There is one row for each phone type (up to seven types are defined, including home, work, fax, and pager). If there is no phone number information for an account, there are no rows in the table for the account. |
| BALANCE_GROUP_T | Stores the balance information such as dollars, minutes, bytes, and frequent flier miles for various balance groups in an account. A balance group includes one or more sub-balances for each balance element. The sub-balance includes its current amount, validity dates, rollover data, and contributors. |
| BAL_GRP_BALS_T | Stores balance group data. |
| BAL_GRP_SUB_BALS_T | Stores sub-balance data. |
| BILL_T | Includes billing information, such as the amount due, amount adjusted, currency, and bill number. A /bill object is created at the end of a billing cycle. |
| | A /bill object is created for every account. The account receivable for a bill is stored in the /item objects that point to the balance groups associated with the bill. The /bill object points to the / account object, the account's bill unit (/billinfo object), and the / invoice object. |
| BILLINFO_T | Stores all billing, payment method, accounting cycle, and hierarchy information necessary to bill an account. A bill unit is created for every account. If the bill unit is nonpaying, the /billinfo object points to the paying parent /billinfo object. |
| DEVICE_T | Stores information about devices. There is a separate /device object for every device managed by BRM. Generic data applicable to all devices is stored in the parent /device object. Subclasses such as /device/num store information specific to a particular device type. |
| DEVICE_NUM_T | Stores device information specific to phone numbers managed by Number Manager. |
| DEVICE_SERVICES_T | Stores device/service mapping data. |



| Table Name | Description |
|-------------------------------|---|
| DEVICE_SIM_T | Stores device information specific to SIM cards managed by SIM Manager. |
| EVENT_T | Contains a row for each account that has a nonzero balance forward amount. This table stores data for every event that occurs for an account or service. In the case of conversion of an account that has a balance, you should add a row to reflect the posting of that balance. |
| | You also need to write an entry to this table for each entry you write to the EVENT_BILLING_DEAL_INFO_T and EVENT_BILLING_PRODUCT_ACTION_T tables. |
| | In addition, you can optionally add rows to this table to store past activity for an account. For example, use this table to add rows for importing past billing and payment history into BRM. These rows can be brought over as memo type events, which can be viewed, but they do not affect the current account balance (which should be calculated and posted separately). |
| EVENT_BAL_IMPACTS_T | Stores event data. |
| EVENT_ESSENTIALS_T | Stores event data. |
| GROUP_T | Represents collections of other objects that have an assigned set of shared attributes. This table is optional. If you use it at conversion time, one row must be added to this table if the account is a parent account. |
| GROUP_BILLING_MEMBERS_T | Rows for this table are optional and are included only for child accounts (that have a parent account). During conversion, one row needs to be added to this table for each child account (regardless of the child account's payment method). |
| GROUP_PERMITTEDS_T | Indicates which accounts are group accounts. Rows for this table are optional and are included only for parent accounts that have at least one child account. |
| GROUP_SHARING_MEMBERS_T | Stores members of a sharing group. |
| GROUP_SHARING_CHARGES_T | Stores charges of a sharing group. |
| GROUP_SHARING_DISCOUNTS _T | Stores discounts of a charge sharing group. |
| GROUP_SHARING_PROFILES_T | Stores the profile data that is shared in a profile sharing group. |
| ITEM_T | Created to bundle events, this table summarizes billable item activity by type. Rows in this table are added for each row in the BILL_T table. In a conversion scenario, only one type of ITEM_T entry is important, the /usage item. Although there are others (cycle forward item, payment item, dispute item, and so on), they are normally not pertinent for conversion. For conversion, a default /item/misc is created to bundle events. Also, a service item is created during conversion only if the recreate ='/item/<item-< b=""> type>' is specified in the input XML data.</item-<> |
| JOURNAL_T | Stores general ledger (G/L) journal data. |
| ORDERED_GROUPS_T | Stores ordered balance group data. |
| ORDERED_BALGROUP_T | Stores ordered balance group data. |

Table 3-2 (Cont.) Tables Affected by the Conversion Process



| Table Name | Description |
|-----------------------------------|---|
| PAYINFO_T | Stores generic payment method information for an account. Only one row is added in this table for each row in ACCOUNT_T. |
| | In addition to a row in PAYINFO_T, there must also be a row added to the applicable payment method table. For example, you have to add a row to PAYINFO_INV_T if the payment method for an account is Invoice . |
| | Additionally, if you have created a custom payment method and a PAYINFO_ <i>paymentMethod</i> _T table, where <i>paymentMethod</i> is the custom payment method, you must add a row to that table for each account with that payment method. |
| PAYINFO_CC_T | Contains a row for each account that has a payment method of Credit Card . This row is in addition to a row in PAYINFO_T. |
| | Note: This payment method assumes that you are using the BRM- provided FirstUSAPaymentech or FDC modules to process your credit cards or that the clearing house or bank you use can process the same information. If your credit card processing is significantly different, you might want to set it up as another payment method and store information on that payment method separately. |
| | If you migrate tokenized credit or debit card numbers, ensure that you add the card type value for each credit card account. This ensures that the legacy credit and debit card data is migrated in the same format used for storing the credit card data in the PAYINFO_CC_T table. |
| | The following card type values are used in the PAYINFO_CC_T table: |
| | 1 for VISA card |
| | 2 for MASTER card 3 for American Express card |
| | • 5 for Discover card |
| | • 6 for Diners Club card |
| | • 7 for Carte Blanche |
| | • 8 for JCB |
| | • 9 for SWITCH |
| | 10 for unknown card types |
| PAYINFO_DD_T | Contains a row for each account that has a payment method of Direct Debit . This row is in addition to a row in PAYINFO_T. |
| PAYINFO_INV_T | Contains a row for each account that has a payment method of Invoice . Optionally, the table can also contain purchase order (PO) information. |
| PROFILE_T | Contains profile information, if any. This table can be left empty if you decide not to convert profile information. You can populate only one row in this table for each row in ACCOUNT_T. |
| PROFILE_customTable_T | Rows are added to this table only if rows are added to PROFILE_T, where <i>customTable</i> is the unique identifier you choose; for example, company name. For each row added to PROFILE_T, a corresponding row is added to PROFILE_ customTable_ T. |
| PROFILE_ACCT_EXTRATING_D ATA_T | Contains profile information. |
| PROFILE_SERV_EXTRATING_T | Contains profile information. |

Table 3-2 (Cont.) Tables Affected by the Conversion Process



| Table Name | Description |
|-----------------------------------|--|
| PROFILE_SERV_EXTRATING_D ATA_T | Contains profile information. |
| PURCHASED_DISCOUNT_T | Contains an entry for each discount owned by an account at the time of conversion. |
| PURCHASED_PRODUCT_T | Contains an entry for each charge offer owned by an account at the time of conversion. |
| SERVICE_T | Stores generic service type information for accounts. There is one row in this table for each applicable service for each entry in ACCOUNT_T. In addition to a row in this table, a row must be created in the service type table, such as broadband service or email. |
| SERVICE_ALIAS_LIST_T | Stores service aliases, used to identify customers by phone number. |
| SERVICE_TELCO_T | Stores telco service data. |
| SERVICE_TELCO_FEATURES_T | Stores telco service data. |
| SERVICE_TELCO_GSM_T | Stores telco service data. |
| UNIQUENESS_T | Stores data that enforces uniqueness of logins across different database schemas in a multischema environment. |

Table 3-2 (Cont.) Tables Affected by the Conversion Process

In addition, the following audit tables are affected:

- AU_ACCOUNT_T
- AU_BAL_GRP_T
- AU_GROUP_SHARING_CHARGES_T
- AU_GROUP_SHARING_DISCOUNTS_T
- AU_GROUP_SHARING_PROFILES_T
- AU_GROUP_T
- AU_ORDERED_BALGROUP_T
- AU_ORDERED_GROUPS_T
- AU_PROFILE_ACCT_EXTRATING_DATA_T
- AU_PROFILE_SERV_EXTRATING_DATA_T
- AU_PROFILE_SERV_EXTRATING_T
- AU_PROFILE_T
- AU_PURCHASED_DISCOUNT_T
- AU_PURCHASED_PRODUCT_T
- AU_SERVICE_ALIAS_T
- AU_SERVICE_T
- AU_UNIQUENESS_T



Loading Data into Additional Audit Tables

You can configure Conversion Manager to load legacy data into audit tables that are not listed in "Tables Affected by the Conversion Process" by:

- 1. Creating control files for each additional audit table
- 2. Adding the list of additional audit tables to the pin_cmt utility's Infranet.properties file

The following procedure describes how to configure Conversion Manager to load legacy data into the **AU_ACCOUNT_NAMEINFO_T** audit table, but you can follow a similar procedure to load legacy data into other audit tables.

To load legacy data into the AU_ACCOUNT_NAMEINFO_T audit table:

- 1. Go to the BRM_homelapps/cmt/ctl_files directory.
- Copy the control file for the ACCOUNT_NAMEINFO_T table to the BRM_homelapps/cmt/ ctl_files/audit directory:

cp account_nameinfo_t.ctl BRM_home/apps/cmt/ctl_files/audit/account_nameinfo_t.ctl

- Open the BRM_homelapps/cmt/ctl_files/audit/account_nameinfo_t.ctl file in a text editor.
- Change all instances of ACCOUNT_NAMEINFO_T to AU_ACCOUNT_NAMEINFO_T.

For example, change these lines:

```
LOAD DATA
APPEND
INTO TABLE ACCOUNT_NAMEINFO_T
```

to the following:

```
LOAD DATA
APPEND
INTO TABLE AU ACCOUNT NAMEINFO T
```

- 5. Save and close the file.
- 6. Open the BRM_homelapps/cmt/ctl_files/Infranet.properties file in a text editor.
- 7. Add account_nameinfo_t to the infranet.cmt.auditloaders line:

infranet.cmt.auditloaders = account_t; bal_grp_t; group_sharing_charges_t;...;
account_nameinfo_t;

8. Save and close the file.

Migrating Data by Using New and Extended Storable Classes

This chapter describes how to migrate data to your Oracle Communications Billing and Revenue Management (BRM) database when the data requires new or extended storable classes.

Topics in this document:

- About Migrating Data by Using New and Extended Storable Classes
- Example of Extending a Service Storable Class
- Example of Extending a Device Storable Class
- Example of Creating a Storable Class
- Example of Migrating Hierarchical Accounts
- Example of Migrating Hierarchical Bill Units within an Account

See also "Understanding Conversion Manager".

About Migrating Data by Using New and Extended Storable Classes

If your legacy data includes data not currently supported in BRM, you support the custom data by creating storable classes or extending storable classes. You can then extend the Conversion Manager XML schema to migrate the data.

Note:

Conversion Manager does not support extensions for all BRM storable classes. See "About Extended Storable Classes for Migration".

To use new or extended storable classes:

- Create the new or extended storable classes. See "About Extended Storable Classes for Migration".
- Create XML files that include the migrated data. See "Creating XML Files for New or Extended Storable Class Data".
- Create control files to add tables to the BRM database. See "Creating Control Files for Extended Storable Classes".
- Run the pin_cmt utility as you would for migrating nonextended data. See "Loading Legacy Data into the BRM Database".



- When you import data for new storable classes, you use a different pin_cmt utility parameter (-import_custom). When you migrate data into custom storable classes, the pin_cmt utility performs the additional step of activating the custom data when it is deployed.
- Import all custom data before you deploy any data. The only exception is if all the custom data belongs to the root account; for example, custom system configuration data.

About Extended Storable Classes for Migration

You can extend the following storable classes:

- /service
- /device
- /payinfo
- /profile

For example:

- /service/extension1
- /service/extension1/extension

About Linking to Data from New or Extended Storable Class Data

Data in new or extended storable classes can include links to other objects. For example, a *I* **service**/extended object can include a link to an */account* object by including the account ID in the PIN_FLD_ACCOUNT_OBJ field.

You can link to the following types of objects:

- /account
- Iservice (and extended service storable classes)
- *Idevice* (and extended device storable classes)
- /payinfo (and extended payinfo storable classes)
- *Iprofile* (and extended profile storable classes)
- /group/sharing/charges
- /group/sharing/discounts

When creating new or extended storable classes, follow the BRM standards and restrictions. For example:

- You cannot nest substructs.
- An array can include an array, but no further levels are allowed.

Creating XML Files for New or Extended Storable Class Data

Use these guidelines when creating an XML file for data for new or extended storable classes:



- Use the XML myExtension element for extended data.
- Use the XML NewClass element for new custom storable classes.
- Use the myArray and mySubstruct elements for arrays and substructs in the extended data.
- Use the table attribute in each array and substruct to define the table that stores the data.
- Use the **elem** attribute in each array to define the index.
- Use the RefObj element to create links to other objects. To do so, use the ID of the object being linked to. For example:

```
<RefObj type ="/account"> 1234 </RefObj>
```

If the **pin_cmt** utility does not find the object being linked to, it reports a warning and inserts a null value in the Portal object ID (POID) being referenced.

- Use the type attribute in all new and extended elements to define the type of data.
 - The type attribute for a *new* storable class is defined in the base storable class element. For example:

<NewClass id="1243" type="/myclass" table="myclass t" read="L" write="L" >

 The type attribute for an *extended* storable class is defined in the base storable class element. For example:

```
<ActSrv id="771" type="/service/extended" precreate="/item/misc" global="true">
```

For XML examples, see the following sections:

- Example of Extending a Service Storable Class
- Example of Extending a Device Storable Class
- Example of Creating a Storable Class

Creating an XSD File for Extended Data

To validate the XML file, you must create an XSD file for the extended information. You can use the **myExtension.xsd** file in *BRM_homelapps/cmt/sample_data* as a starting point. *BRM_home* is the directory in which the BRM server software is installed.

Note:

For each type of extended information, use a different namespace to avoid collisions caused by using the same name **myExtension**.

If the extended information contains BRM extensions (for example, *Iservicelx*, *Ipayinfolx*, *I devicelx*, and *IprofileIx*), include the custom XSD in the CMT_Subscribers.xsd file. This allows the extended information to be validated along with the subscriber information.

If the extended information includes a custom storable class (for example, *Imy_profile*), the custom XSD does not need to be included in the **CMT_Subscribers.xsd** file. The extended information can be validated by the custom XSD file.

Put the custom XSD file in the folder specified in the **infranet.cmt.schema.location** entry in the **pin_cmt** utility **Infranet.properties** file. By default, the folder is *BRM_homelapps/cmt/* **schema_files/physical**.



To enable XML validation, use the **infranet.cmt.preprocess.validation** entry in the **pin_cmt Infranet.properties** file. See "Enabling XML Validation".

Creating Control Files for Extended Storable Classes

Control files add tables to the BRM database. You create a control file for each table. You need to create a control file for each of the following:

- New storable classes
- Substructs in new or extended storable classes
- Arrays in new or extended storable classes

When you create a control file, the name of the control file is used as the table name. For example, if you create a new storable class named *Imyclass*, which includes a substruct named PIN_FIELD_MYSUBSTRUCT, the table name would be MYCLASS_SUBSTR_T. The control file name would be **myclass_substr_t.ctl**.

Note:

- The order of columns in the control file must be the same as the order of columns in the table.
- The order of data in the XML input file must be the same as the order of data in the control file and table.
- While adding tables to the BRM database, ensure that the tables listed in the pin_cmt utility Infranet.properties file belong to the main storable class.

For control file examples, see the following sections:

- Example of Extending a Service Storable Class
- Example of Extending a Device Storable Class
- Example of Creating a Storable Class

To use your custom control files:

- 1. Put the control files in *BRM_homelapps/cmt/ctl_files*.
- 2. Edit the pin_cmt utility Infranet.properties file.
 - For control files that add substruct and array data, edit the infranet.cmt.loaders entry. Add the control file names. For example:

```
infranet.cmt.loaders = account_t; account_nameinfo_t; ...; extended2_substr1_t;
extended_cust1_t; extended2_cycle_t;
```

 For control files that add data for a new storable class, add the infranet.cmt.customtables entry. Add the table names, separated by semicolons. For example:

```
infranet.cmt.customtables = myclass_t;
```



By default, the **infranet.cmt.customtables** entry is not included in the **Infranet.properties** file.

Creating Control Files for Custom Event Tables in a Virtual Column-Enabled System

BRM Conversion Manager includes control files that are suitable for a virtual column-enabled system for migrating event tables (the **event_t** and **event_bal_impacts_t** tables). If you have custom event tables to be migrated (for event-type objects that are not in the BRM system), you must create the control files as described in this chapter. In addition, in a virtual column-enabled system, the BRM Conversion Manager event control files cannot perform insert operations on the virtual columns (the *field_name_type* columns) of event tables in the BRM database; they must, instead, perform insert operations on the virtual column's associated supporting column *field_name_type_id*.

See *BRM System Administrator's Guide* for information about using virtual columns on event tables.

Example of Extending a Service Storable Class

The following example shows the XML data for an extended /service storable class:

```
<ActSub>
    <ActSrv id="771" type="/service/extended" precreate="/item/misc" global="true">
       <CWhn>2004-10-02T01:22:15-07:00</CWhn>
        <Log>159-51090219-237205-0-24083-1-tahoe</Log>
       <Pass>md5|5f4dcc3b5aa765d61d8327deb882cf99</Pass>
       <SrvSta>A</SrvSta>
        <Eff>2004-02-02T01:22:15-07:00</Eff>
        <SClsInfo>
        <myExtension>
            <mySubstruct table="extended substr1 t" >
                <FldCustName type="string">abc</FldCustName>
                <FldCustType type="integer">99</FldCustType>
            </mySubstruct>
            <myArray table="extended cust1 t" elem="1">
                    <FldAmt type="integer">190</FldAmt>
                    <FldDate="date">2004-02-02T01:22:15-7:00</FldDate>
                    <myArray table="extended cycle t" elem="1">
                        <Fldtype type="integer">190</Fldtype>
                    </myArray>
                </myArray>
        </myExtension>
        </SClsInfo>
    </ActSrv>
</ActSub>
```

In Developer Workshop, the extended *Iservice* storable class definition looks like this:

/service/extended CMT_ARRAY CMT_NAME PIN_FLD_ACCOUNT_TYPE



```
CUST_ARRAY

PIN_FLD_CYCLE

PIN_FLD_CUSTOMER_TYPE

PIN_FLD_CYCLE_DISC_AMT

PIN_FLD_CYCLE_END_T
```

After loading the data, the extended fields are included in the stored object like this:

| 0 | PIN_FLD_POID | POID [0] 0.0.0.1 /service/extended 11813 3 |
|---|------------------------|--|
| 0 | PIN_FLD_CREATED_T | TSTAMP [0] (1083337746) Fri Apr 30 08:09:06 2004 |
| 0 | PIN FLD MOD T | TSTAMP [0] (1083338129) Fri Apr 30 08:15:29 2004 |
| | | |
| | | |
| | | |
| 0 | PIN FLD TYPE | ENUM [0] 0 |
| 0 | PIN FLD ALIAS LIST | ARRAY [0] allocated 1, used 1 |
| 1 | PIN FLD NAME | STR [0] "00491110102" |
| 0 | 10000 | SUBSTRUCT [0] allocated 2, used 2 |
| 1 | 10004 | STR [0] "abc" |
| 1 | PIN FLD ACCOUNT TYPE | ENUM [0] 99 |
| 0 | 10005 | ARRAY [1] allocated 3, used 3 |
| 1 | PIN FLD CYCLE DISC AMT | DECIMAL [0] 190 |
| 1 | PIN FLD CYCLE END T | TSTAMP [0] (1075713735) Mon Feb 2 01:22:15 2004 |
| 1 | PIN FLD CYCLE | ARRAY [1] allocated 1, used 1 |
| 2 | PIN FLD CUSTOMER TYPE | ENUM [0] 190 |

The following examples show the control files used for loading the data for the extended *I* **service** storable class. The substruct and arrays require new tables. The array tables include the columns REC_ID or REC_ID2; the substruct does not include these columns.

Example Control File for Substruct

```
-- extended_substr1_t.ctl

LOAD DATA

APPEND

INTO TABLE EXTENDED_SUBSTR1_T

(

OBJ_ID0 INTEGER EXTERNAL TERMINATED BY ',',

NAME CHAR TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"',

TYPE INTEGER EXTERNAL TERMINATED BY ','

)
```

Example Control File for Array

```
-- extended_cust1_t.ctl

LOAD DATA

APPEND

INTO TABLE EXTENDED_CUST1_T

(

OBJ_ID0 INTEGER EXTERNAL TERMINATED BY ',',

REC_ID INTEGER EXTERNAL TERMINATED BY ',',

AMOUNT INTEGER EXTERNAL TERMINATED BY ','

END_T INTEGER EXTERNAL TERMINATED BY ','
```

Example Control File for Array

```
-- extended_cycle_t.ctl
LOAD DATA
APPEND
```



```
INTO TABLE EXTENDED_CYCLE_T
(
OBJ_ID0 INTEGER EXTERNAL TERMINATED BY ',',
REC_ID INTEGER EXTERNAL TERMINATED BY ',',
REC_ID2 INTEGER EXTERNAL TERMINATED BY ',',
TYPE INTEGER EXTERNAL TERMINATED BY ',')
```

Setting a Service Balance Group

The following example shows attributes in the input XML file that you set to associate a balance group with a service.

To create a balance group and associate it with a service, set the **bal_grp** attribute to **true**.

To associate the balance group of a bill unit (*/billinfo* object) with a service, set the skip_bal_grp_crt and bal_grp attributes to true. The balance group of the bill unit is associated with the service.

Example of Extending a Device Storable Class

The following example shows the XML data for an extended /device storable class:

```
<DeviceInfo>
   <Device id="778" type="/device/extended2">
        <DevId>00982110309</DevId>
        <Src>source2</Src>
        <Mnufr>Airtel2</Mnufr>
        <Mdl>A4IR124</Mdl>
        </Device>
        <myExtension>
        <fldAmount type="integer">11</FldAmount>
        <fldDate type="date">2004-03-15T01:22:15-07:00</FldDate>
        </myArray>
        </myExtension>
        </myExtension>
        </myArray</pre>
```

In Developer Workshop, the extended *Idevice* storable class definition looks like this:



```
/device/extended2
PIN_FLD_ENTRIES
PIN_FLD_ENTRY_AMOUNT
PIN_FLD_ENTRY_T
```

After loading the data, the extended fields are included in the stored object like this:

```
# number of field entries allocated 14, used 14
0 PIN_FLD_POID POID [0] 0.0.0.1 /device/extended2 11811 0
0 PIN_FLD_CREATED_T TSTAMP [0] (1083337746) Fri Apr 30 08:09:06 2004
0 PIN_FLD_MOD_T TSTAMP [0] (0) <null>
0 PIN_FLD_READ_ACCESS STR [0] "L"
0 PIN_FLD_WRITE_ACCESS STR [0] "A"
0 PIN_FLD_ACCOUNT_OBJ POID [0] 0.0.0.1 /account 1 0
0 PIN_FLD_DESCR STR [0] ""
0 PIN_FLD_DEVICE_ID STR [0] "00982110309"
0 PIN_FLD_MANUFACTURER STR [0] "Airtel2"
0 PIN_FLD_MODEL STR [0] "Airtel2"
0 PIN_FLD_SOURCE STR [0] "source2"
0 PIN_FLD_SERVICES ARRAY [3] allocated 2, used 2
1 PIN_FLD_SERVICE_OBJ POID [0] 0.0.0.1 /account 11806 0
1 PIN_FLD_SERVICE_OBJ POID [0] 0.0.0.1 /service/extended2 11813 0
0 PIN_FLD_ENTRYES ARRAY [1] allocated 2, used 2
1 PIN_FLD_ENTRY_AMOUNT DECIMAL [0] 11
1 PIN_FLD_ENTRY T TSTAMP [0] (1079342535) Mon Mar 15 01:22:15 2004
```

The following example shows the control file used for loading the data for the extended **/device** storable class:

```
LOAD DATA

APPEND

INTO TABLE DEV_EXTENDED2_t

(

OBJ_ID0

REC_ID

AMOUNT

ENTRY_T

)

INTEGER EXTERNAL TERMINATED BY ',',

INTEGER EXTERNAL TERMINATED BY ',',

INTEGER EXTERNAL TERMINATED BY ','
```

Example of Creating a Storable Class

The following example shows the XML data for a new storable class named *Imyclass*:

In Developer Workshop, the *Imyclass* definition looks like this:

```
/myclass

PIN_FLD_ACCOUNT_OBJ

PIN_FLD_CREATED_T

PIN_FLD_MOD_T

PIN_FLD_POID

PIN_FLD_READ_ACCESS
```



```
PIN FLD RULES
   PIN FLD RUM ID
   PIN FLD SCENARIO_DESCR
   PIN FLD SCHEDULE_DOWNTIME_START
PIN FLD WRITE ACCESS
```

After loading the data, the stored object looks like this:

```
0 PIN FLD POID
                                       POID [0] 0.0.0.1 /myclass 43567 0
0 PIN FLD CREATED T
                                      TSTAMP [0] (1083780256) 5/6/04 3:04 AM
0 PIN FLD MOD T
                                      TSTAMP [0] (1083780256) 5/6/04 3:04 AM
                                     STR [0] "L"
0 PIN FLD READ ACCESS
                                      STR [0] "L"
0 PIN FLD WRITE ACCESS
0 PIN FLD ACCOUNT OBJ
                                      POID [0] 0.0.0.1 /account 1 1
0 PIN FLD RULES
                                      ARRAY [0] allocated 4, used 4
1
   PIN FLD RUM ID
                                      INT [0] 222
    PIN_FLD_SCENARIO DESCR
1
                                      STR [0] "sachin"
1
    PIN FLD SCHEDULE DOWNTIME START TSTAMP [0] (1159732335) 10/2/06 4:52 AM
```

The following example shows the control file used for loading the data for the new **Imyclass** storable class:

```
myclass t.ctl
LOAD DATA
APPEND
                     INTO TABLE MYCLASS T
                       (
                                      POID_DBINTEGER EXTERNAL TERMINATED BY ',',POID_ID0INTEGER EXTERNAL TERMINATED BY ',',POID_TYPECHAR TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"',POID_REVINTEGER EXTERNAL TERMINATED BY ',',CREATED_TINTEGER EXTERNAL TERMINATED BY ',',MOD_TINTEGER EXTERNAL TERMINATED BY ',',READ_ACCESSCHAR TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"',WRITE_ACCESSCHAR TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"',ACCOUNT_OBJ_DBINTEGER EXTERNAL TERMINATED BY ',',ACCOUNT_OBJ_ID0INTEGER EXTERNAL TERMINATED BY ',',ACCOUNT_OBJ_TYPECHAR TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"',ACCOUNT_OBJ_REVINTEGER EXTERNAL TERMINATED BY ','
```

)

The following example shows the control file used for loading the data for the *Imyclass* storable class PIN FLD RULES substruct:

```
myclass_rules_t.ctl
LOAD DATA
APPEND
   INTO TABLE MYCLASS RULES T
    (
       OBJ ID0 INTEGER EXTERNAL TERMINATED BY ',',
       REC ID INTEGER EXTERNAL TERMINATED BY ',',
       RUM ID
                INTEGER EXTERNAL TERMINATED BY ',',
       DESCR CHAR TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"',
       START T INTEGER EXTERNAL TERMINATED BY ','
     )
```



Example of Migrating Hierarchical Accounts

The following example shows the various attributes that you need to specify for different accounts at different hierarchy levels in the input XML file while performing the migration:

Parent account: The following attributes should exist for the parent account:

```
<ActSbsc id="0.0.0.1-10001" isParent="Y">
```

Set id to the unique string by which the account will be identified. Set isParent to Y.

 Child account whose bill units are paying: The following attributes should exist for the child account whose bill units are paying:

<ActSbsc id="0.0.0.1-10002" parenRef="0.0.0.1-10001">

Set **id** to the unique string by which the account will be identified. Set **parenRef** to a reference to the parent ID.

 Child account whose bill units are nonpaying: The following attributes should exist for the child account whose bill units are nonpaying:

```
<ActSbsc id="0.0.0.1-10003" parenRef="0.0.0.1-10001" payParenRef="0.0.0.1-10001">
```

Set **id** to the unique string by which the account will be identified. Set **parenRef** to a reference to the parent ID. Set **payParenRef** to a reference to the paying parent ID.

The pay_type (PTyp) attribute under billinfo should be set to NPC as follows:

</ABinfo>

The **payinfo_obj_type** attribute under **payinfo** should be set to **/payinfo.** Also, comment out the **payinfo** section as follows:

</APinfo>

- **Paying and nonpaying child**: Child accounts can have multiple paying bill units and nonpaying bill units:
 - Paying bill unit: The following attributes should exist for each paying bill unit:

```
<ActSbsc id="0.0.0.1-10004" parenRef="0.0.0.1-10001">
```

```
<ActSrv id="0.0.1.1-10224" type="/service/telco/fixedretail" billInfoElem="2">
```



<ABinfo elem="2" parentElem="1" bal_grp="False" payInfoRefId="0.0.0.1-114"> <APinfo id="0.0.0.1-114" type="/payinfo/invoice">

Nonpaying bill unit: The following attributes should exist for each nonpaying bill unit:

<ActSbsc id="0.0.0.1-10004" parenRef="0.0.0.1-10001">

<ActSrv id="0.0.1.1-10334" type="/service/telco/prepaid" billInfoElem="1">

<ABinfo elem="1" parentElem="1" payingParenRefId="0.0.0.1-10001">

Set **payingParentRefId** to a reference to the parent account ID that owns the paying bill unit. This creates another **/billinfo** record for the child account. The **ar_billinfo_obj_id0** field of that record stores the ID of the paying bill unit.

Setting an Account Bill Unit

The following example shows attributes in the input XML file that you set to define a **/billinfo** object as the account bill unit.

To define a **/billinfo** object as the account bill unit, set the **isAccBillinfo** attribute in the **<ABInfo> /billinfo** object to **Y**. The balance group associated with the **/billinfo** object then becomes the account default balance group.

Note:

There can be only one **<ABinfo>** /billinfo object for which the **isAccBillinfo** attribute is set to **Y**. If there are duplicate **<ABinfo>** /billinfo objects, BRM returns an error and the migration stops.

</ABinfo>

Example of Migrating Hierarchical Bill Units within an Account

The following example shows hierarchical bill units within an account.



To create the hierarchical bill units in the same account, set the **thisActHierarchy** attribute to **true**. In the following example, the bill units **BI1** and **BI2** are in account A. **BI1** is the parent of **BI2**.

```
<ABinfo global="true" spnrCnt="1" spnreeCnt="2" elem="1" bal grp="true"
payInfoRefId="MyAPInfo 1">
      <ACDom>26</ACDom>
      <ActqType>B</ActqType>
      <ANxt>2013-07-01T01:22:15-07:00</ANxt>
      <CrtT>2013-06-07T01:22:15-07:00</CrtT>
      <BlWn>1</BlWn>
      <BlSgmnt>RC</BlSgmnt>
      <PTyp>INV</PTyp>
      <BISta>A</BISta>
      <BillStat>3</BillStat>
      <ExmtFrmColl>A</ExmtFrmColl>
      <BIStaFlag>SBCA</BIStaFlag>
      <BillInfoId>MyBillId3</BillInfoId>
    </ABinfo>
<ABinfo global="true" spnrCnt="1" spnreeCnt="2" elem="2" parentElem="1"
thisActHierarchy="true" bal grp="true" payInfoRefId="MyAPInfo 1">
      <ACDom>26</ACDom>
      <ActgType>B</ActgType>
      <ANxt>2013-07-01T01:22:15-07:00</ANxt>
      <CrtT>2013-06-07T01:22:15-07:00</CrtT>
      <BlWn>1</BlWn>
      <BlSgmnt>RC</BlSgmnt>
      <PTyp>NPC</PTyp>
      <BISta>A</BISta>
      <BillStat>3</BillStat>
      <ExmtFrmColl>A</ExmtFrmColl>
      <BIStaFlag>SBCA</BIStaFlag>
      <BillInfoId>MyBillId1</BillInfoId>
</ABinfo>
<ABinfo global="true" spnrCnt="1" spnreeCnt="2" elem="3" parentElem="1"
thisActHierarchy="true" bal grp="true" payInfoRefId="MyAPInfo 1">
      <ACDom>26</ACDom>
      <ActgType>B</ActgType>
      <ANxt>2013-07-01T01:22:15-07:00</ANxt>
      <CrtT>2013-06-07T01:22:15-07:00</CrtT>
      <BlWn>1</BlWn>
      <BlSgmnt>RC</BlSgmnt>
      <PTyp>NPC</PTyp>
      <BISta>A</BISta>
      <BillStat>3</BillStat>
      <ExmtFrmColl>A</ExmtFrmColl>
      <BIStaFlag>SBCA</BIStaFlag>
      <BillInfoId>MyBillId2</BillInfoId>
```

</ABinfo>



5 Loading Legacy Data into the BRM Database

This chapter describes how to load legacy data into your Oracle Communications Billing and Revenue Management (BRM) database.

Topics in this document:

- Importing Data
- Deploying Converted Data
- Reloading Data
- Troubleshooting Conversion Manager
- Testing the Imported Data

Before you can load data, you must extract it from the legacy database into XML files. See:

- Understanding Conversion Manager
- Mapping Legacy Data to the BRM Data Schema

For information about performance tuning, see "Improving Conversion Manager Performance".

Importing Data

You import legacy data into the BRM database one file at a time.

Note:

To specify a database connection, edit the **pin_cmt utility Infranet.properties** file in *BRM_homelapps/cmt*. *BRM_home* is the directory in which the BRM server software is installed.

To import legacy data into the BRM database:

- 1. Go to BRM_homelapps/cmt.
- 2. Do one of the following:
 - To import data that is not stored in a new storable class, run the pin_cmt utility using the following syntax:

```
pin_cmt -import -file XML_input_data_file stage_ID
```

For example:

```
pin_cmt -import -file data.xml 100
```



If you have a multischema system, make sure the stage IDs are larger than the database schema IDs. For example, if you have a schema with the number 0.0.0.5, use stage IDs larger than 5.

 To import data that is stored in a new storable class, run the pin_cmt utility using the following syntax:

pin_cmt -import_custom -file XML_input_data_file stage_ID

For example:

pin_cmt -import_custom -file data.xml 100

See "pin_cmt" for more information.

Possible errors:

- On all parser errors, Conversion Manager rejects the whole file. Take corrective action based on the errors logged in **cmt.pinlog** and resubmit the corrected file.
- A record is rejected and not imported if its reference object is not found. For example, in case of importing a child account when the parent account is not found, the child record is rejected. The error is noted in the log file.
- I/O errors, such as the inability to find or open the specified document. The whole file is rejected and an error is logged.
- You run out of database space. Use pin_cmt with the -recover parameter to recover your data. For more information, see "Reloading Data".

Deploying Converted Data

When you deploy the data, the staging accounts are made available for production by updating the database ID number in the object Portal object IDs (POID).

Note:

To specify a database connection, edit the **pin_cmt utility Infranet.properties** file in *BRM_homelapps/cmt*.

To deploy your converted data, run **pin_cmt** using the following syntax:

pin_cmt -deploy DOM stage_ID

where:

- DOM is the billing cycle's day of month.
- stage_ID is the identity of the staging area.

See "pin_cmt" for more information.



Reloading Data

If **pin_cmt** runs out of space in your BRM database for data rows, the importing process stops. Data that was not imported can be imported after more space is made available in the database.



To import data when the utility runs out of database space:

- 1. Add space to the database.
- 2. Read the log files in *BRM_homelapps/cmt* to find the following information:
 - How many records were processed.
 - The batch ID for the import process that did not complete.
- 3. Edit the control files:
 - a. At the beginning of every control file, replace the string LOAD_DATA with CONTINUE_LOAD_DATA.
 - b. In each table's control file, specify the number of records to skip for that table by using the INTO TABLE clause. For example:

```
INTO TABLE account_t SKIP 756
```

where 756 is the number of previously processed records.

4. Run the pin_cmt utility with the -recovery load parameter:

pin_cmt -recovery load batch_ID

See "pin_cmt" for more information.

Troubleshooting Conversion Manager

When Conversion Manager imports legacy data into the BRM database, it creates a log file (**cmt.pinlog**) with a list of errors and warnings depending on the reporting level set for message logging. (See "Setting the Reporting Level for Logging Messages" in *BRM System Administrator's Guide*.)

In addition, the log file lists successfully processed records and failed records.

To find any error messages, read the cmt.pinlog file in the BRM_homelapps/cmt directory.

You can also read the Connection Manager and Data Manager log files.

Common pin_cmt Utility Error Messages

Table 5-1 shows common pin_cmt error messages.

ORACLE

| Table 5-1 Common pi | n_cmt Messages |
|---------------------|----------------|
|---------------------|----------------|

| Error Message | Description |
|---------------------------------------|--|
| CMD_LINE_ARG_ERR | Error in the pin_cmt utility command line syntax. |
| MISSING_RESOURCE_ERR | A required configuration entry in the pin_cmt utility Infranet.properties file is missing. |
| DB_CONNECTION_ERR | The database connection configuration in the pin_cmt utility Infranet.properties file is incorrect. This error occurs when the database is down. |
| BAD_INFRANET_CONNECTION | One of the following: |
| | BRM is not running The CM connection information in the pin_cmt utility Infranet.properties file is incorrect. |
| FILE_NOT_FOUND_ERR | The input XML file is missing from the location specified in the command line. |
| PARSING_ERR | The input XML file is either not well-formed or not valid with respect to CMT XSD. |
| IL_PR_PARENT_NOT_FOUND_ERR | The input XML file includes an incorrect parent (/group/ billing) reference. |
| IL_PR_PAYING_PARENT_NOT_FOUND_E RR | The input XML file includes an incorrect paying parent (<i>I</i> group/billing) reference. |
| INCORRECT_DEVICE_REF | The input XML file includes an incorrect device reference. |
| INCORRECT_SUB_OBJ_SERVICE_REF | The input XML file includes an incorrect subscription service reference. |
| INCORRECT_GSC_PARENT_REF | The input XML file includes an incorrect group sharing charges reference. |
| INCORRECT_GSD_PARENT_REF | The input XML file includes an incorrect group sharing discounts reference. |
| INCORRECT_GSP_PARENT_REF | The input XML file includes an incorrect group sharing profiles reference. |
| PROCESS_IS_RUNNING | The input XML file is either already loaded or currently being loaded by another pin_cmt instance. |
| SQL_ERROR | Internal pin_cmt error. |

Testing the Imported Data

You test the data to verify that the objects have been created correctly and that record pointers are consistent.

Use any of the following tools to validate the data in your BRM database:

- The testnap utility and Object Browser. See "Using testnap and Object Browser to Validate the Database".
- Billing Care. See "Using Billing Care to Validate Data".
- SQL. See "Using SQL to Validate Data".



Before performing the initial test conversion, prepare a test database by using the **pin_setup** script, and then create a backup of the database. Then load the current price list and create another backup. This saves time because it is easier to reload a database than to create one.

Using testnap and Object Browser to Validate the Database

Use **testnap** to verify that the following objects have been created correctly in the BRM database. Use Object Browser to look at the contents of each new object in the BRM database.

- /account
- /bill
- /item
- /event
- Iservice
- /group
- /payinfo
- /billinfo
- /balance_group
- /device
- /device/num
- /device/sim

Note:

Print the results of your **testnap** commands and match the objects in the list. This allows you to make any necessary notes.

For information on how to use **testnap**, see "Using the testnap Utility to Test BRM" in *BRM Developer's Reference*.

Validating /account Objects

To validate *laccount* objects:

- 1. Use testnap or Object Browser to display the data in the object.
- 2. Examine each field to ensure the data in the field matches the input data file.
- 3. Verify that all the charge offers and services owned by this account are present.
- Verify that all of the balances for this account are correct.



Validating /bill, /item, /event, /service, and /payinfo Objects

To validate these objects:

- 1. Find the POIDs of these objects in the *laccount* object.
- 2. Use testnap or Object Browser to display the data for each of these objects.
- 3. Examine each field in the object to ensure that the data contained in the field matches the data in the input data file.
- 4. Ensure that these objects reference the correct *laccount* object.

Using Billing Care to Validate Data

To validate data, verify the following:

- You can retrieve account data without any errors.
- You can update an account without any errors.
- You can change payment methods successfully. For example, change an account payment method from credit card to invoice and back to credit card (use the **answer_s** and **answer_b** daemons, if necessary).
- If parent-child billing data was converted, verify that the parent-child grouping works correctly. To check this, do the following:
 - Change some of the existing child accounts to orphan accounts, and some of the existing orphan accounts to child accounts.
 - Add a few arbitrary hierarchies.
 - Move accounts to and from the parent accounts and verify that there are no errors.

Using SQL to Validate Data

You can use SQL to check the various record counts in BRM.

Note:

BRM contains the root account, which increases the number of accounts by 1. Remember to consider this at the time of validation.

Verify the following:

• The total number of accounts created is equal to the total number of accounts converted from your legacy system. Use the following SQL statement:

```
select count(*) from ACCOUNT_T
```

 The total number of account name and address records is equal to the total number of accounts converted from your legacy system. Use the following SQL statement:

```
select count(*) from ACCOUNT_NAMEINFO_T
```



If your implementation has more than one name and address type, you need to take this into account.

 The total number of bill objects is equal to the total number of accounts converted from your legacy system. This number must equal the number of records in the ACCOUNT_T table. Use the following SQL statement:

```
select count(*) from BILL_T
```

 The total number of payment objects is equal to the total number of accounts converted from your legacy system. This number should equal the number of records in the ACCOUNT_T table. Use the following SQL statement:

```
select count(*) from PAYINFO_T
```

Also verify that the total records in the PAYINFO_INV_T, PAYINFO_CC_T, and PAYINFO_DD_T tables match the number of records in the ACCOUNT_T table. Use these SQL statements:

select count(*) from PAYINFO_INV_T
select count(*) from PAYINFO CC T

 The total number of */profile* objects (if created) is equal to the total number of accounts converted from your legacy system: this number should equal the number of records in the ACCOUNT_T table. Use the following SQL statement:

```
select count(*) from PROFILE_custom_table_T
```

where *custom_table* is the implementation-unique identifier you choose; for example, company name.

 The total number of child accounts whose bill units are nonpaying matches the number of rows in the GROUP_BILLING_MEMBERS_T table. Use the following SQL statement:

```
select count(*) from GROUP_BILLING_MEMBERS_T where
object_type = '/account'
```

 The total number of parent accounts matches the number of rows in the GROUP_T table. Use the following SQL statement:

select count(*) from GROUP_T where poid_type= '/group/billing'

 The total number of parent accounts matches the number of rows in the GROUP_PERMITTEDS_T table. Use the following SQL statement:

```
select count(*) from GROUP_PERMITTEDS_T where type = '/account'
```



6

Migrating Legacy Data into BRM Table Partitions

This chapter describes how to load data from legacy billing systems into Oracle Communications Billing and Revenue Management (BRM) table partitions.

Topics in this document:

- About Migrating Legacy Data into Table Partitions
- About Partitioning
- About Making Conversion Manager Aware of Partitions
- Setting Up Your System to Load Legacy Data into Table Partitions

Before you read this chapter, you should be familiar with the following:

- Partitioning. See "Partitioning Tables" in BRM System Administrator's Guide
- Conversion Manager. See "Understanding Conversion Manager"

About Migrating Legacy Data into Table Partitions

To load legacy data into BRM table partitions, do the following:

- Create back-dated partitions for storing legacy data. See "About Your Partitioning Scheme".
- Configure Conversion Manager to encode a creation timestamp into specified object POIDs. See "About Making Conversion Manager Aware of Partitions".

About Partitioning

Some BRM tables, such as the BILL_T table, store large amounts of data, which can slow BRM search times. Dividing large tables into smaller, more manageable chunks, called partitions, makes it easier for BRM to find data because it needs to search only a single partition for data rather than an entire table.

In BRM, you create table partitions based on dates and divided by a specified interval: month, week, or day. For example, you could set one partition for May 1 to May 31, the subsequent one for June 1 to June 30, and so on. Objects are stored in partitions according to their creation date and time. For example, *levent* objects created in May 2009 could be stored in the May 2009 partition of the EVENT_T table.

About Your Partitioning Scheme

Before you begin loading legacy data into BRM, you must determine your partitioning scheme, including which tables to partition and how many months of legacy data to load into BRM. For example, you might decide to load only the last five months of your billing data into the BRM system. In this case, you would create five back-dated partitions with a monthly interval for the BILL_T table.



After determining your partitioning scheme, you must create the following:

- Back-dated table partitions for your legacy data. For example, if you are loading legacy billing and item data into BRM, create back-dated table partitions for the */bill* storable class (BILL_T table) and the */item* storable class (ITEM_T table). Your back-dated tables must also comply with the following restrictions.
 - The oldest back-dated partition that you create must have a start date prior to the creation date of the oldest legacy object you are loading into BRM. For example, if the oldest object that you are loading has a creation date of March 8, 2005, you must create a back-dated table partition that starts on or before March 7, 2005.
 - The most recent back-dated partition that you create must have an end date that is at least one day prior to the BRM installation date. For example, if you install BRM on August 15, 2009, the most recent back-dated partition must end on or before August 14, 2009.
- Future-dated partitions for data created on your new BRM system. Create futuredated partitions for any storable classes you would like partitioned. The first future-dated partition must start two days after the BRM installation date. For example, if you install BRM on August 15, 2009, the first partition's start date must be August 17, 2009, or later.

For example, assume you install BRM on August 15, 2009, and the oldest billing object in your legacy system has a creation date of January 20, 2009. In this example, you would create seven back-dated partitions and one or more future-dated partitions for your */bill* storable class (BILL_T table) as shown in Table 6-1.

| Partition | Date Range for Each BILL_T Partition |
|-----------|--|
| 1 | January 15, 2009, through February 14, 2009 |
| 2 | February 15, 2009, through March 14, 2009 |
| 3 | March 15, 2009, through April 14, 2009 |
| 4 | April 15, 2009, through May 14, 2009 |
| 5 | May 15, 2009, through June 14, 2009 |
| 6 | June 15, 2009, through July 14, 2009 |
| 7 | July 15, 2009, through August 14, 2009 |
| 8 | August 17, 2009, through September 16, 2009 |
| 9 | September 17, 2009, through October 16, 2009 |
| 10 | partition_last |

Table 6-1 Partitioning Scheme Example

In this example, objects are loaded into partitions as shown below:

- Objects with creation timestamps prior to February 15, 2009, are automatically loaded into Partition 1.
- Objects with creation timestamps on or after February 15, 2009, and prior to March 15, 2009, are loaded into Partition 2.
- Objects with creation timestamps after August 14, 2009, and prior to August 17, 2009, are loaded into Partition 8.



If an object's creation timestamp is not covered by one of the partition ranges, the object is automatically loaded into the next higher-range partition.

• Objects with creation timestamps after October 16, 2009, are loaded into partition 10 (partition_last).

Note:

If an object's creation timestamp is not covered by one of the partition ranges and a higher-range partition does not exist, the object is automatically loaded into **partition_last**.

About Making Conversion Manager Aware of Partitions

Conversion Manager can now encode timestamps into the object POIDs of partitioned and purgeable storable classes, allowing the object to be loaded into the correct table partition. For example, if a legacy bill object was created in May, Conversion Manager encodes the creation timestamp into the **/bill** object's POID. The **/bill** object can then be loaded into the BILL_T table's May 2009 partition.

About the Timestamps Encoded in Object POIDs

The timestamp encoded in object POIDs can be either:

- The creation timestamp passed in by the legacy system. In this case, you must pass the object creation timestamp in the CrtT element of the input XML file.
- The system time when you run Conversion Manager. It does not use the timestamp from pin_virtual_time.

You must make sure that the creation time is applied consistently to all related objects. For example:

- When you migrate unpaid bills and open items from your legacy billing system to BRM, the bill objects and their associated item objects must all use the legacy object's creation time. Otherwise, the billing and invoicing utilities will not find all items associated with a bill.
- When you migrate balances from your legacy system to BRM, the account objects and their associated balances must all use the legacy object's creation time.

Conversion Manager Tasks for Partitioned Storable Classes

When Conversion Manager is configured to encode timestamps into object POIDs, it performs these additional tasks:

- Determines which storable classes are partitioned and purgeable by reading the BRM data dictionary. In the data dictionary, partitioned and purgeable storable classes have their IS_PARTITIONED field set to 1 and their PARTITION_MODE field set to Finite.
- Reserves a set of POIDs for each partitioned, purgeable storable class and a single set of POIDS for all nonpartitioned storable classes. For example, if the *Ibill* and *litem* storable



classes are partitioned and purgeable, Conversion Manager reserves three sets of POIDs: one for **/bill** objects, one for **/item** objects, and one for objects of all nonpartitioned storable classes.

- Assigns POIDs to objects based on the storable class type:
 - If the storable class is partitioned and purgeable, Conversion Manager assigns a POID from the storable class's reserve of partitioned POIDs and encodes the timestamp. It uses either the timestamp passed in from the legacy system or the system time when you ran Conversion Manager.
 - If the storable class is not partitioned, Conversion Manager assigns a POID from the reserve of nonpartitioned POIDs.

Note:

If the set of reserved POIDs is already depleted, Conversion Manager reserves a new set of POIDs before assigning one to an object.

The object is then loaded into a partition according to the storable class type and the timestamp encoded in the object POID.

During the loading phase, if no corresponding partition is available for the timestamp encoded in the object POID, the object is loaded into the next higher-range partition. If no higher-range partition is available, the object is loaded into **partition_last**.

If a storable class is not partitioned, the object is loaded directly into the target table.

About Configuring Conversion Manager to Encode Timestamps in POIDs

To configure Conversion Manager to encode timestamps in object POIDs, you specify the following in the Conversion Manager **Infranet.properties** file:

- The number of POIDs to reserve at a time.
- Which timestamp to encode into POIDs.

For more information, see "Configuring Conversion Manager for Partitioning".

Setting Up Your System to Load Legacy Data into Table Partitions

To set up your system to load data from legacy billing systems into BRM table partitions:

- Make sure partitioning is enabled in your BRM system by doing either or both of the following:
 - When installing BRM, choose to partition your tables.
 - After installing BRM, convert nonpartitioned storable classes to partitioned storable classes.

For more information, see "Partitioning Tables" in BRM System Administrator's Guide.

 Determine the oldest object for each storable class that will be partitioned in the BRM database. The oldest partition's start date must be prior to the oldest object's creation date for that storable class.



- 3. Create partitions with the **partition_utils** utility. See "Creating Partitions for Your Legacy Data".
- Configure Conversion Manager for partitioning. See "Configuring Conversion Manager for Partitioning".
- 5. Include the legacy object's creation timestamp in the Conversion Manager input XML file. See "Passing Object Creation Timestamps in the Input XML File".

Creating Partitions for Your Legacy Data

To create back-dated partitions, enter the following command:

```
partition_utils -o add -t realtime -s start_date -u month|week|day -q quantity
        [-c storable_class] [-w width] -b
```

where:

- start_date specifies the starting date for the first partition. The format is MMDDYYYY. The start date must be before the BRM installation date. The oldest partition's start date must be before the oldest object's creation date.
- quantity specifies the number of partitions to add.
- storable_class specifies the storable class to store in the partition. The default is levent.
- width specifies the number of units in a partition, such as 3.

You must also create future-dated partitions for objects generated by your new BRM system. For more information on how to create future-dated partitions, see "Partitioning Database Tables" in *BRM System Administrator's Guide*.

Configuring Conversion Manager for Partitioning

By default, Conversion Manager does not encode timestamps in object POIDs. You configure Conversion Manager to do so through its **Infranet.properties** file.

To configure Conversion Manager for partitioning:

- Open the BRM_homelapps/CMT/Infranet.properties file in a text editor. BRM_home is the directory in which the BRM server software is installed.
- 2. Set the entries for creating partitioning-aware object POIDs:
 - Use infranet.cmt.timestampvalidation to specify which timestamp to encode in generated POIDs. See "Configuring Which Timestamp to Encode".
 - Use infranet.cmt.noofrecords to specify the number of POIDs to reserve for partitioned POIDs. See "Configuring the Number of POIDs to Reserve".
- 3. Save and close the file.

Configuring Which Timestamp to Encode

The timestamp encoded in object POIDs can be either the object creation time passed in from the legacy system or the system time when you run **pin_cmt**.

If you specify to use the system time, Conversion Manager loads all of the legacy data into one partition. You must configure and size the appropriate partition to store the volume of data that will be loaded into it.

You specify which timestamp to encode by using the following Infranet.properties file entry:

infranet.cmt.timestampvalidation = Value

where Value is one of the following:

- **0**: The timestamp is set to the creation time passed in the input XML file. If a creation time is not passed in, Conversion Manager assigns the system time when you run **pin_cmt**.
- 1: The timestamp is set to the creation time passed in the XML file only. If a creation time is
 not passed in, Conversion Manager generates an error. This setting ensures that all
 partitioned classes include the original creation timestamp. This is the default.
- 2: The timestamp is set to the system time when you run **pin_cmt**. If a creation timestamp *is* passed in, Conversion Manager generates an error. This ensures that all partitioned classes are loaded with the system time.

Note:

This parameter cannot enforce validations across multiple runs of Conversion Manager. Loading some objects with the system time and other objects with the object creation time could cause system inconsistencies and business operations to fail.

Configuring the Number of POIDs to Reserve

Conversion Manager reserves a set of POIDs for each storable class type that is partitioned and reserves another set of POIDs for all other nonpartitioned storable classes.

To configure the number of POIDs to reserve:

For partitioned storable classes, use the following entry:

infranet.cmt.noofrecords = Number

where Number specifies the number of POIDs to reserve. The default is 1.

Conversion Manager reserves the specified number of POIDs for each storable class that is partitioned.

• For nonpartitioned storable classes, use the following entries:

```
inframet.cmt.noofrecords = Number
inframet.cmt.avgnoofservices = Services
inframet.cmt.avgnoofdevices = Devices
```

where:

- Number specifies the number of POIDs to reserve. The default is **1**.
- Services specifies the average number of services in your accounts. The default is 5.



Devices specifies the average number of devices in your accounts. The default is 2.

Conversion Manager multiplies these three values (*Number * Services * Devices*) to compute the total number of POIDs to reserve for nonpartitioned storable classes.

For example, assume you partition the */bill* and */item* storable classes and the **Infranet.properties** file includes the following entries:

```
infranet.cmt.noofrecords = 1000
infranet.cmt.avgnoofservices = 5
infranet.cmt.avgnoofdevices = 3
```

In this example, Conversion Manager reserves the following POIDs:

- 1,000 POIDs for /bill objects.
- 1,000 POIDs for *litem* objects.
- 15,000 POIDs for all other objects.

Passing Object Creation Timestamps in the Input XML File

The Conversion Manager input XML file includes a **CrtT** element for all storable classes. If you want to encode the legacy object's creation time in your POIDs, you must pass the object's creation time in the **CrtT** element of the input XML file.

When passing the legacy object's creation time, make sure:

- The object creation timestamp is correct. Conversion Manager does not perform any validations on values passed in the CrtT element.
- Objects using the legacy creation time are not combined in the same partitioned, purgeable table as objects using the system time.



7 Conversion Manager Utilities

This chapter provides reference information for Oracle Communications Billing and Revenue Management (BRM) Conversion Manager utilities.

Topics in this document:

- cmt_mta_cycle_fees
- pin_cmt

cmt_mta_cycle_fees

Note:

The **cmt_mta_cycle_fees** utility is run internally by the **pin_cmt** utility. Do not run this utility by itself.

The **cmt_mta_cycle_fees** utility applies cycle forward fees to BRM accounts that have been deployed by the **pin_cmt** utility. See "Understanding Conversion Manager" and "Loading Legacy Data into the BRM Database".

Note:

- Conversion Manager is an optional component, not part of base BRM.
- To connect to the BRM database, the **cmt_mta_cycle_fees** utility needs a configuration file in the directory from which you run the utility.

Location

BRM_homelapps/cmt

where BRM_home is the directory in which the BRM server software is installed.

Syntax

cmt_mta_cycle_fees -stage_id stage_ID -cycle_dom day_of_month

Parameters

-stage_id stage_ID

The stage ID used when the data was imported.

-cycle_dom day_of_month

The billing day of month for the accounts that need cycle fees applied.



Results

The **cmt_mta_cycle_fees** utility notifies you when it runs successfully. Otherwise, look in the **pin_mta.pinlog** file in *BRM_homelapps/cmt* for errors.

pin_cmt

Use the **pin_cmt** utility to load legacy data in XML format into your BRM database. See "Understanding Conversion Manager" and "Loading Legacy Data into the BRM Database".

Note:

- Conversion Manager is an optional component, not part of base BRM.
- To specify a database connection, edit the **pin_cmt Infranet.properties** file in *BRM_homelapps/cmt*.

Location

BRM_homelapps/cmt

Syntax

Parameters

-import -file XML_input_data_file stage_ID Imports the specified data file into the BRM database.

Note:

Ensure that there are no extra spaces in the input XML file. If you need to indent text in the XML file, use the TAB key to add space.

-import_custom -file XML_input_data_file stage_ID

Imports data that uses new storable classes into the BRM database.

-recovery load batch_id

Reloads data after a failed load process. The batch ID is recorded in the **cmt.pinlog** file in *BRM_homelapps/cmt*.

-deploy DOM stage_ID

Deploys data. DOM is the billing cycle's day of the month. *stage_ID* is the stage ID used when the data was imported.

In this example, accounts with a billing day of month of 15 and stage ID of 100 are deployed:

pin_cmt -deploy 15 100



Results

The **pin_cmt** utility notifies you when it runs successfully. Otherwise, look in the **cmt.pinlog** file in *BRM_homelapps/cmt* for errors. In addition, look for errors in the log file specified in the **pin.conf** file for the **cmt_mta_cycle_fees** utility.

