Oracle® Communications
Billing and Revenue Management
Configuring Roaming in Pipeline Manager
Release 7.5
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Preface

This document provides information about rating roaming usage using Oracle Communications Billing and Revenue Management (BRM) TAP Roaming Manager.

Audience

This document is intended for systems integrators, system administrators, database administrators, and other individuals who are responsible for maintaining BRM from release to release.

Downloading Oracle Communications Documentation

Product documentation is located on Oracle Technology Network:

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This chapter provides an overview of rating roaming usage using Oracle Communications Billing and Revenue Management (BRM) TAP Roaming Manager.

**Note:** TAP Roaming Manager is an optional feature that requires a separate license.

Before reading this document, you should be familiar with the following topics:

- Pipeline rating. See “About Pipeline Rating” in *BRM Configuring Pipeline Rating and Discounting*.
- BRM concepts. See “Introducing BRM” in *BRM Concepts*.

### About Roaming

Roaming is the ability of a wireless network operator to provide services to mobile customers from another wireless network. For example, when a mobile customer makes a call from outside his home network, roaming allows him to access the same wireless services that he has with his home network provider through a visited wireless network operator.

A roaming agreement between the home network operator and the visited network operator defines the terms that enable each other’s customers access to the wireless networks. The visited network operator records the activities performed by the roaming subscriber and then sends the call event details to the home network operator in the format agreed upon in the roaming agreement, usually Transferred Account Procedure (TAP) format. TAP is the process that allows a visited network operator to send call event detail records of roaming subscribers to their respective home network operators to be able to bill for the subscriber’s roaming usage.

When the visited network operator sends a TAP file to the home network operator, after the initial TAP file is received, the home network operator expects more TAP files from the visited network operator.

If the visited network operator does not provide the TAP files for seven calendar days, the home network operator sends the Stop Return Returned Account Procedure (RAP) files to alert and notify the visited network operator that the TAP files have not been received for the last seven days.
Note: The Stop Return RAP file is generated only if the home network operator has previously received, at a minimum, one TAP file from the visited network operator.

The Stop Return RAP file is generated every seven days, until a TAP file is received from the visited network operator.

The home network operator validates the data in the TAP files to ensure that it conforms to the TAP standard and to the terms of the roaming agreement. If the received TAP file contains any errors, the home network operator can reject the entire file or only the incorrect call event detail records. The incorrect file or records are returned to the visited network operator in a Returned Account Procedure (RAP) file.

RAP process is used to return rejected TAP files and records to the visited network operator for corrections. A RAP file contains the rejected TAP file or records and additional data about the error, such as the error code or the error cause. The visited network operator corrects the errors and sends the corrected TAP file back to the home network operator.

The visited network operator bills the home network operator for the roaming subscriber’s usage using a rate agreed upon in the roaming agreement. The home network operator settles the charges with the visited network operator as part of the settlement process.

The home network operator then aggregates the roaming charges and bills its own subscribers for their usage in the visited network.

TAP Roaming Manager supports TAP3 format. With TAP Roaming Manager, you can do the following:

- When your subscribers (home subscribers) make calls on another network, the other network operator rates their calls and sends you an invoice along with the call event details for the calls. You can charge your subscribers for their roaming usage, and settle the charges with the other network operator. In this case, you use TAP Roaming Manager to perform incollect processing. See “About Roaming Incollect Processing”.

- When customers from another network (visiting subscribers) use your network, you can rate those calls. In this case, you use TAP Roaming Manager to perform outcollect processing. See “About Roaming Outcollect Processing”.

- Use the settlement process to settle incollect and outcollect settlement. See "About Settling Roaming Charges".

About Roaming Incollect Processing

You use roaming incollect processing to process TAP files that you receive from visited network operators. When your subscribers roam on a visited wireless network, the visited network operator records any activities that your subscribers perform on the visited network and sends you a TAP file describing your subscribers’ call details and the charges for these activities.

Roaming incollect processing involves:

- Validating information in the TAP files to make sure there are no errors and all required call detail information is present. See "About Validating Roaming Usage Data".
Rating or repricing the call event detail records in the TAP files so that you can bill your subscribers for their roaming usage. See "About Repricing Roaming Usage Events".

Handling errors in TAP files and sending them back to the visited network for corrections. See "About Handling Rejected TAP Files".

Performing settlement activities for your subscribers’ roaming charges you received from the visited network operator. See "About Settling Roaming Charges".

Generating the Stop Return RAP files and sending them to the visited network operators who have not provided the TAP files for seven calendar days. See "About Generating Stop Return RAP Files" for more information.

About Validating Roaming Usage Data

Validation of roaming usage data involves validating the TAP file and information in the call event detail records to ensure they conform to the GSM TD 57 specifications and to the terms of the roaming agreement. This includes:

- Checking for correct syntax.
- Checking that all mandatory fields are present and contain the correct data.
- Verifying batch information such as total charges and total number of records.
- Checking that the files are received in the correct order.

To validate the TAP file, the following types of validations are performed:

- **TAP3 fatal error validation**
  
  TAP3 fatal error validation is performed first to ensure all required data is present and valid. For example, if the TAP file is missing a required block, the entire file is rejected and written to a RAP file.

- **TAP3 severe error validation**
  
  TAP3 severe error validation is performed if fatal error validation is successful. TAP records are validated to check for incorrect or missing reference data or content. For example, if a TAP record is missing a required field, the record is rejected and written to a RAP file, but all other TAP records in the file are processed.

About Repricing Roaming Usage Events

When your subscribers use a roaming partner’s network to access wireless services, the roaming partner network operator tracks their activities and rates the usage based on rates agreed upon in the roaming agreement between you and your roaming partner. Call event details received from your roaming partner network operators normally contain a charge for your subscribers’ roaming usage based on this rate. This charge, referred to as the *incollect roaming charge*, is what you owe your roaming partner for your subscribers’ usage of their wireless network.

You can choose to accept the charges passed in by your roaming partner and use them to bill your subscribers or you can reprice or mark up the records based on your subscribers’ roaming subscription plan or retail rate.

Repricing includes a combination of prerating, rating, post-rating, discounting, and recycling activities. The rated records are then loaded into the subscriber’s account in the BRM database to impact the subscriber’s account balance.
About Generating Stop Return RAP Files

You use the Stop RAP Generator pipeline to generate Stop Return RAP files.

Important: Ensure that you set up the Stop RAP Generator pipeline to generate Stop Return RAP files. See "Configuring the Stop RAP Generator Pipeline" for more information.

To generate Stop Return RAP files, use the Stop RAP Generator pipeline in conjunction with the StopRapGen utility. The StopRapGen utility collects the information required by the Stop RAP Generator pipeline to generate the Stop Return RAP files. Therefore, ensure that the output directory of the flat file generated by the StopRapGen utility is the same as the input directory for the Stop RAP Generator pipeline.

When you run the StopRapGen utility in conjunction with the Stop RAP Generator pipeline, Stop Return RAP files are created for the following:

- TAP files that were received by BRM and stored in the database more than seven days ago
- Stop Return RAP files that were sent more than seven days ago to the visited network operator

Additionally, the timestamp for when the Stop Return RAP file was sent is updated in the database.

See "StopRapGen" in BRM Configuring Pipeline Rating and Discounting for more information on the StopRapGen utility.

About Roaming Outcollect Processing

You use roaming outcollect processing to track and rate activities of subscribers from other wireless networks that roam on your network. Outcollect processing allows you to rate the visiting subscribers’ roaming usage using InterCarrier Tariff rates and generate TAP files consisting of the visiting subscriber’s call event detail records, which you send to your roaming partners along with an invoice to bill them for their subscribers’ roaming usage.

Roaming outcollect processing involves:

- Splitting the call detail records (CDRs) from home subscribers and visiting subscribers. See "About Splitting Home CDRs from Visiting Subscribers’ CDRs".
- Rating the visiting subscribers’ roaming CDRs using InterCarrier Tariff rates specified in the roaming agreements and generating TAP files for each roaming partner. See "About Rating Visiting Subscribers’ Roaming CDRs".
- Handling errors in TAP files returned back to you from your roaming partner for corrections. See "About Handling Rejected TAP Files".
- Performing settlement activities for charges accrued by the visiting subscribers on your network. See "About Settling Roaming Charges".

About Splitting Home CDRs from Visiting Subscribers’ CDRs

Some CDRs that you receive from the network switches are generated by your subscribers and some by visiting subscribers. The splitting process analyzes the CDRs
About Settling Roaming Charges

and splits them into separate streams so that they can be rated by the appropriate rating pipeline.

- The rating pipeline processes the CDRs generated by your own subscribers.
- The outcollect rating pipeline processes the CDRs generated by visiting subscribers.

About Rating Visiting Subscribers’ Roaming CDRs

The outcollect rating process rates the visiting subscribers’ roaming CDRs based on the InterCarrier Tariff rates agreed upon between you and your roaming partners in the respective roaming agreements. This charge, referred to as the outcollect roaming charge, is what your roaming partner owes you for their subscribers’ usage of your wireless network.

If your roaming partners find errors in the TAP files, they reject the file or records and send them back to you in a RAP file for corrections.

About Handling Rejected TAP Files

TAP files are validated by roaming partner network operators to ensure the data in the files are correct. TAP files and records that are rejected are sent to a RAP file.

- When you send TAP files with visiting subscribers’ call event detail records to your roaming partner, your roaming partner generates RAP files consisting of the TAP files or call event detail records with errors and sends them back to you for corrections. RAP files received from your roaming partners are processed during outcollect processing.

- When your roaming partner sends you TAP files with your subscribers’ call event detail records, you generate RAP files consisting of the TAP files or call event detail records with errors and send them back to your roaming partner for corrections. RAP files to be sent to your roaming partners are generated during incollect processing.

RAP files are generated according to the GSM TD 32 specifications and includes information such as the receiving network operator of the RAP file; an error code indicating a fatal, severe, or missing error; the rejected TAP file or call event detail records; and the RAP file sequence number.

The RAP file error code is determined as follows:

- If there are errors in the TAP file, a fatal error RAP file is created consisting of the TAP file.
- If the TAP file has a sequence number that is greater than the one expected, a missing error RAP file is created indicating the missing files.
- If there are errors in the TAP records, a severe error RAP file is created consisting of only the rejected records.

For more information on TD 32 specifications, visit the GSMA Web site at:

http://www.gsma.com/

About Settling Roaming Charges

Roaming partner network operators bill each other for the roaming activities of their subscribers using a process known as settlement. Two activities occur during settlement:
Your roaming partner network operators bill you for your subscribers’ usage of their wireless network. This is referred to as incollect settlement.

You bill your roaming partner network operators for their subscribers’ usage of your wireless network. This is referred to as outcollect settlement.

Settlement events are not rated during the settlement process; instead, the event balance impacts are loaded into the BRM database for settlement.

For each roaming partner network operator, a network operator account is created in the Pipeline Manager database and a corresponding roaming partner account is created in the BRM database. The network operator configuration in the Pipeline Manager database stores product and rate information used to rate and reprice roaming events. The roaming partner account in the BRM database stores the incollect and outcollect settlement balance impacts used to bill the accounts.

When you run billing, for each roaming partner account, BRM billing opcodes read the settlement data and generate a bill for the total incollect charge amount (what you owe) and another bill for the total outcollect charge amount (what they owe). The amount that you owe your roaming partner network operator is the difference between the two.

About Near Real-Time Roaming Data Exchange and Roaming Fraud Detection

Near Real-Time Roaming Data Exchange (NRTRDE) is the exchange of roaming usage data between roaming partners in near real time. Exchanging roaming usage data in near real time enables network operators to monitor roaming usages frequently and to detect any fraudulent behavior and take necessary actions to minimize revenue loss. For example, network operators may decide to deny or limit access to subscribers that have exceeded their daily usage threshold (fraud limit).

You can set up Pipeline Manager for generating roaming usage data for NRTRDE. Once you have set up Pipeline Manager as required, you can run roaming NRTRDE reports. See "Detecting Roaming Fraud Using NRTRDE" for more information.
About Settling Roaming Charges

This chapter describes how settlement events for roaming charges are created and managed in Oracle Communications Billing and Revenue Management (BRM).

Before reading this document, you should be familiar with:

- How home subscribers’ roaming usage is processed. See "About Processing Home Subscribers’ Roaming Usage".
- How visiting subscribers’ roaming usage is processed. See "About Processing Visiting Subscribers’ Roaming Usage".

About Settlement Events

The settlement process creates settlement events with incollect roaming charges and outcollect roaming charges.

The settlement process stores incollect and outcollect settlement event records as individual events in the BRM database. This provides the following advantages:

- It gives you the ability to include the event details along with the aggregated total roaming charges when you bill or invoice your roaming partner network operators.
- It gives you the ability to generate reports based on the information stored in the settlement events.
- It gives you the ability to audit and analyze the event data and generate financial reports.

When you run billing, BRM billing opcodes read the settlement event data and generate a bill for the total incollect charge amount (what you owe) and another bill for the total outcollect charge amount (what they owe). The amount that you owe your roaming partner network operator is the difference between the two.

How Settlement Events Are Created

Settlement events are created and used to bill and settle charges with your roaming partners.

How Settlement Events for Incollect Roaming Charges Are Created

Using the information in the validation pipeline output file, the incollect settlement pipeline creates settlement events that are loaded into the BRM database and used to settle charges with your roaming partners.
The incollect settlement pipeline processes the input file as follows:

- The input module maps the contents of the file into an EDR container. For each EDR, it creates a DETAIL_ASS_ROAMING_EXT block and populates the SENDER and RECIPIENT fields. The sender is the network carrier (roaming partner) sending the TAP file and the recipient is the network carrier receiving the TAP file. Information stored in this block is used later by the pipeline to identify the roaming partner account information in the BRM database.

- The ISC_ConsolidatedCP module removes all non '00' impact_category charge packets.

The TAP input grammar creates individual charge packets as well as consolidated charge packets. However, the FCT_BillingRecord module considers all charge packets for creating balance packets. For this reason, the individual charge packets (non '00' impact category charge packets) are removed and only consolidated charge packets are considered so that the balance amounts in the balance packets are correct.

This module also assigns the G/L Id to each consolidated charge packet based on the GL_CODE registry entry.

- The FCT_ServiceCode module maps external service codes to internal service codes.

The FCT_ServiceCode module maps all external service codes to /service/roaming/settlement/incollect in the BRM database.

- The FCT_Account module uses the network operator account information in the pipeline in-memory cache to lookup the BRM account and associates the EDR with the BRM account and enriches the EDR with information related to the account service, product, and bill. For information about setting up network operator accounts, see "Defining Roaming Partner Accounts in the BRM Database".

- The FCT_ItemAssign module assigns the bill item associated with the roaming partner account’s incollect service to the EDR.

- The FCT_ExchangeRate module converts the charge amount in the charge packets, which is usually in SDR currency, to the subscriber’s billing currency.

- The FCT_BillingRecord module creates the balance impact information from the charge amount provided in the EDR and associates this impact to the bill item. Balance impact information will contain the resource name, charge amount, bill item, and service information.

After the EDRs are enriched, the FCT_EnhancedSplitting module routes the EDRs to GPRS and GSM output streams. You use RE Loader to load the events into the BRM database. See "How Settlement Events Impact Roaming Partner Account Balance".

If there is any error in the settlement pipeline, the entire input file is suspended. See "About Handling Suspended Settlement Events".

**How Settlement Events for Outcollect Roaming Charges Are Created**

Using the information in the outcollect TAP files, the outcollect settlement pipeline creates settlement events that are loaded into the BRM database and used for billing your roaming partners.

The outcollect settlement pipeline processes the outcollect TAP file as follows:

- The input module converts the outcollect TAP file back to EDR format and maps the TAP data to staging fields in the EDR container by using TAP input grammar.
The ISC_TAP_0312_InMap module maps the data in the staging fields to business fields in the EDR container. For each EDR, it creates a DETAIL.ASS_ROAMING_EXT block and populates the SENDER and RECIPIENT fields. The sender is the network carrier sending the TAP file and the recipient is the network carrier (roaming partner) receiving the TAP file. Information stored in this block is used later by the pipeline to identify the roaming partner account information in the BRM database.

The ISC_ConsolidatedCP module removes all non '00' impact_category charge packets.

The TAP input grammar creates individual charge packets as well as consolidated charge packets. However, the FCT_BillingRecord module considers all charge packets for creating balance packets. For this reason, the individual charge packets (non '00' impact category charge packets) are removed and only consolidated charge packets are considered so that the balance amounts in the balance packets are correct.

This module also assigns the G/L Id to each consolidated charge packet based on the GL_CODE registry entry.

The FCT_ServiceCode module maps external service codes to internal service codes.

The FCT_ServiceCode module maps all external service codes to the /service/roaming/settlement/outcollect in the BRM database.

The FCT_Account module uses the network operator account information in the pipeline in-memory cache to lookup the BRM account and associates the EDR with the BRM account and enriches the EDR with information related to the account service, product, and bill. For information about setting up network operator accounts, see "Defining Roaming Partner Accounts in the BRM Database".

The FCT_ItemAssign module assigns the bill item associated with the roaming partner account’s outcollect service to the EDR.

The FCT_ExchangeRate module converts the charge amount in the charge packets to SDR currency.

The FCT_BillingRecord module creates the balance impact information from the charge amount provided in the EDR and associates this impact to the bill item. Balance impact information will contain the resource name, charge amount, bill item, and service information.

After the EDRs are enriched, the FCT_EnhancedSplitting module routes the EDRs to GPRS and GSM output streams. You use RE Loader to load the events into the BRM database. See "About Loading Settlement Events into the BRM Database".

If there is any error in the settlement pipeline, the entire outcollect TAP file is suspended. See "About Handling Suspended Settlement Events".

After the settlement pipeline has successfully processed the outcollect TAP file, it generates a corresponding TAP Header Information file that stores lookup information. TAP files maintain a Lookup Directory for some items in the callEventDetails block, that specifies the item value.

For example, a callEventDetail specifies callEventStartTimeStamp by using two fields: LocalTimeStamp and UtcTimeOffsetCode. UtcTimeOffsetCode is a numeric code that points to the NetworkInfo->UtcTimeOffsetInfo entry in the Lookup Directory that specifies UtcTimeOffset value.
Any required lookup information such as UTC Time Offsets is written to the TAP Header Information file. This lookup information is later used by the RAP processing pipeline to reconstruct and reprocess the rejected TAP records. Based on the constructed rejected TAP records, the RAP processing pipeline generates the corresponding settlement backout record. See "About Processing Rejected Outcollect TAP Files and Records".

How Settlement Events Impact Roaming Partner Account Balance

Each roaming partner account in the BRM database is configured with two products, one for incollect settlement and another for outcollect settlement: for example, RoamingIncollect and RoamingOutcollect. The /service/settlement/roaming/incollect service is selected for the RoamingIncollect product and /service/settlement/roaming/outcollect service is selected for the RoamingOutcollect product. Each product is assigned a separate balance group and the balance groups are assigned separate bill units.

When incollect settlement events are loaded into the database, they are associated with the /service/settlement/roaming/incollect service and impact the bill unit for this service. The outcollect settlement events are associated with the /service/settlement/roaming/outcollect service and impact the bill unit for this service.

You create roaming partner accounts in Customer Center. For information on setting up roaming partner accounts, see "Setting Up Roaming for TAP".

For information about billing, see "About Billing" in BRM Configuring and Running Billing.

About Loading Settlement Events into the BRM Database

The incollect and outcollect settlement pipelines send settlement events to separate output streams based on the event type. The output files are generated using the RE Loader output grammar. RE Loader reads the output file and loads each event as an object into the BRM database.

For example, the GSM events are loaded into the /event/delayed/session/telco/gsm/roaming object and the GPRS events are loaded into the /event/delayed/session/telco/gprs/roaming object.

The event object contains the roaming partner account and billing information.

Incollect settlement events are stored against the /service/settlement/roaming/incollect service object of the roaming partner account. As a result, all charges for incollect roaming events impact the roaming partner’s bill unit associated with the /service/settlement/roaming/incollect service.

Outcollect settlement events are stored against the /service/settlement/roaming/outcollect service object of the roaming partner account. As a result, all charges for outcollect roaming events impact the roaming partner’s bill unit associated with the /service/settlement/roaming/outcollect service.

For outcollect settlement events, RE Loader also creates a statistical record using the outcollect TAP file and stores the record in the /batch/rel object. This record contains the file name, sequence number in the header of the file, number of events in the file, and other information. Each /event/delayed/session/telco/gsm/roaming and /event/delayed/session/telco/gprs/roaming object created from the output file includes a link to the /batch/rel object. The information stored in the /batch/rel object is used to back out balance impacts of TAP records during RAP file processing.
After the events are loaded into the BRM database, you can run BRM billing to generate invoices and to settle the roaming charges with your roaming partners.

To configure RE Loader, see "Configuring Rated Event Loader to Load Settlement Events into the BRM Database".

About Handling Suspended Settlement Events

It is possible for processing errors to occur in the settlement pipeline; for example, when the pipeline fails to associate the EDR with a roaming partner account.

The ISC_RollbackSettlement module checks for errors in the EDR. When there is an error, it notifies the Transaction Manager (TAM) to roll back the transactions in the settlement pipeline. The TAM then notifies the FCT_BatchSuspense module to suspend the entire input file. FCT_BatchSuspense creates a batch file that contains the input file name, location of the file, reason code specifying the reason the file was suspended, pipeline name specifying the pipeline that suspended the file, and the EDRs in the input file. This file is loaded into the BRM database by using SB Loader.

Using Suspense Management Center, you can query the suspended file and resubmit the file for processing. When the Pipeline Manager receives the resubmit request, the DAT_ResubmitBatch module routes the file back to the settlement pipeline that originally suspended the file for processing again.

For detailed information about batch suspense, see "About Suspense Manager" in BRM Configuring Pipeline Rating and Discounting.

For more information about the TAM, see "About Pipeline Manager Transactions" in BRM System Administrator’s Guide.

To configure Suspense Manager for settlement, see:
- Configuring Suspense Manager for the Incollect Settlement Pipeline
- Configuring Suspense Manager for the Outcollect Settlement Pipeline

About Validating the Bill Amount

You can perform a rate plan check on the TAP files received from your roaming partner network operators to validate them against the rate plans in the appropriate roaming agreement.

After incollect settlement events have been loaded into the BRM database, you can run billing, which will generate a bill for the incollect roaming charges. Use the information on this bill to validate the invoices issued by your roaming partner network operators.
This chapter describes the roaming incollect process in Oracle Communications Billing and Revenue Management (BRM) for rating home subscribers’ roaming usage.

**Important:**

- The following sections describe the incollect process for processing TAP files only.
- To process TAP files, TAP Roaming Manager requires Suspense Manager, Rated Event (RE) Loader, and InterConnect Manager to rate roaming usage. Suspense Manager, RE Loader, and InterConnect Manager are not part of TAP Roaming Manager and require separate licenses. You must install these supporting managers to rate roaming events. See "About Suspense Manager" and "Understanding Rated Event Loader" in *BRM Configuring Pipeline Rating and Discounting* for more information.

Before reading this document, you should be familiar with the following:

- BRM concepts and architecture. See "Introducing BRM" and "BRM System Architecture" in *BRM Concepts* for more information.
- Pipeline Manager. See "About Pipeline Rating" in *BRM Configuring Pipeline Rating and Discounting* for more information.
- Roaming. See "About Rating Roaming Events" for more information.

**Understanding Roaming Incollect Architecture and Process Flow**

You use roaming incollect processing to process TAP files that contain call event detail records (TAP records) for all roaming activities performed by your subscribers on your roaming partners’ networks. The incollect process architecture primarily consists of the validation, reprice, and settlement pipelines. These pipelines perform the following tasks:

- The validation pipeline performs fatal error and severe error validations of the data in the incoming TAP files according to the GSM TD 57 standards.
The reprice pipeline rates the call event detail records in the TAP files using your subscriber’s roaming plan. The rated events are loaded into the BRM database and impact the subscriber’s account balance.

The settlement pipeline creates settlement events by associating the rated roaming usage events with the roaming partner accounts in the BRM database. The settlement events are loaded into the BRM database and impact your roaming partner’s account balance.

The Stop RAP Generator pipeline generates the Stop Return RAP files required to be sent to the visited network operator. The Stop Return RAP files sent to the visited network operator are loaded into the database.

Figure 3–1 depicts a high-level overview of the roaming incoll ect process architecture:

As Figure 3–1 illustrates, incoming TAP files are handled during the incoll ect process as follows:

1. The validation pipeline converts the TAP records in the TAP files into event data record (EDR) format and performs fatal error and severe error validations of the TAP file. For each file, one of the following actions is taken:

   - In the roaming registry file (Pipeline_home/conf/roaming.reg, where Pipeline_home is the directory where Pipeline Manager is installed), the name of the validation pipeline is TAPInProcessing.
How Roaming Usage Data Is Validated

The validation pipeline processes TAP files as follows:

- TAP records are converted to event data record (EDR) format.
  
  The INP_GenericStream module provides the input interface to the validation pipeline using the TAP input grammar file. The input grammar converts call event detail records in TAP files to the internal EDR format and maps all call event detail fields (including mandatory, conditional, and optional fields) into staging fields in the EDR container.

2. The reprice pipeline processes the validation pipeline output file and rates the roaming usage events using the subscriber’s roaming plan. Rated events are loaded into the BRM database by RE Loader.

   If the reprice pipeline fails to rate an event, the event is suspended and loaded into the BRM database using Suspended Event (SE) Loader. Using Suspense Management Center, the suspended events can be corrected and recycled to the reprice pipeline to be rated again.

   See "About Charging Your Subscribers for Their Roaming Usage" for more information.

3. The settlement pipeline processes the validation output file and creates settlement events by associating the rated events with the roaming partner account in the BRM database. Settlement events are then loaded into the BRM database by RE Loader.

   If the settlement pipeline fails to create settlement events for any record, the pipeline rejects all the records in the file and the entire file is suspended and loaded into the BRM database. The suspended file can be corrected and recycled back to the settlement pipeline by using Suspense Manager.

   See "How Settlement Events for Incollect Roaming Charges Are Created" for more information.

4. The Stop RAP Generator pipeline collects information on the incoming TAP files using the StopRapGen utility and generates the Stop Return RAP files to be sent to those visited network operators who have not provided the TAP files in seven days. The Stop Return RAP files sent to the visited network operator are loaded into the database by the UpdateTapInfo_StopRapout iScript.

   See "About Generating Stop Return RAP Files" for more information.

For detailed information on configuring incollect processing, see "Setting Up Pipeline Manager for Roaming Incollect Processing".

How Roaming Usage Data Is Validated

The validation pipeline processes TAP files as follows:

- TAP records are converted to event data record (EDR) format.

   The INP_GenericStream module provides the input interface to the validation pipeline using the TAP input grammar file. The input grammar converts call event detail records in TAP files to the internal EDR format and maps all call event detail fields (including mandatory, conditional, and optional fields) into staging fields in the EDR container.

See "How Roaming Usage Data Is Validated" for more information.
The sequence number of the incoming TAP file is validated to identify any duplicate or missing TAP files.

Each TAP file is assigned an individual sequence number by the roaming partner from which the file originates. If the sequence number of the TAP file received is greater than the one expected, a missing error RAP file is created indicating the missing files.

The Sequence Checker is an instance of the Sequencer module that validates the sequence number of the incoming TAP file for each roaming partner to identify duplicate or missing files. Using Pricing Center, you define a single instance of the Sequence Checker with multiple sequences. Each sequence corresponds to a roaming partner. You define each sequence by specifying a sequence key that is the same as the Sender ID (the roaming partner sending the file). Depending upon the roaming partner who sent the TAP file, the Sequence Checker selects the sequence based on the sequence key to validate the sequence number of the incoming TAP file.

For more information on the Sequencer, see "About Sequence Checking" in BRM System Administrator's Guide.

Data in the TAP file is validated.

The ISC_TAP_0312_Validations module performs fatal error and severe error validations. Severe error validation is performed only if fatal error validation was successful. It ensures that all the required blocks in the file and all the required fields in the call event details are present.

When it detects a fatal error, the ISC_TAP_0312_Validations module rejects the file and creates a fatal error RAP file and demands that the Transaction Manager (TAM) roll back all transactions and restore the original input file and the state of all the modules in the pipeline to how they were prior to starting the transaction.

**Note:** In Pipeline Manager, any module that maintains a state has to register itself with the TAM. When a module demands that the TAM roll back transactions, the TAM then notifies all the registered modules to roll back their state.

When it detects a severe error, the ISC_TAP_0312_Validations module rejects the record and adds the error to the TAP Error Record block in the EDR container. See "About Validation Error Codes".

**Note:**

- Only call event detail records with errors are rejected; remaining call event detail records in the TAP file are processed normally.
- By default, the validation pipeline does not check for duplicate call event detail records. If you need to perform duplicate checks for the roaming records, you can configure the FCT_DuplicateCheck module to perform duplicate checks.

Data in the staging fields is mapped to the business fields in the EDR container.

The ISC_TAP_0312_InMap module maps the data in the staging fields to business fields in the EDR container. Data from the batchControlInfo, accountingInfo, networkInfo blocks in the TAP file is mapped to the header record. Data from the
How Roaming Usage Data Is Validated

The `auditControlInfo` block of the TAP file is mapped to the trailer record. Data from the `callEventDetails` block in the TAP file is mapped to detail records.

- Rejected records are sent to the reject output stream.
  The `FCT_Reject` module evaluates the errors in the EDR container and sends rejected EDRs to the reject output stream. The reject output stream generates a severe error RAP file using RAP output grammar.

- Valid records are written to an output file for further processing by the reprice and settlement pipelines.
  The `OUT_GenericStream` module uses standard output grammar (BRM SOL42) to write valid EDRs to an output file.

  The output file created by `OUT_GenericStream` is sent to the reprice and the settlement pipelines simultaneously. This is done by using the Event Handler. When the output file is ready, the validation pipeline notifies the Event Handler by sending it the `EVT_OUTPUT_FILE_READY` event. Upon receiving this event notification, the Event Handler launches the `move_incollect_roam.pl` script to copy the output file to the input directory of the reprice pipeline. When the copy is complete, the Event Handler moves the original output file to the input directory of the settlement pipeline.

For information about configuring the validation pipeline, see "Configuring the Validation Pipeline".

About Validation Error Codes

When a TAP file validation failure occurs, Pipeline Manager reports an error code and a description of the error. The error codes are categorized as fatal (ERR_TAP3_FATAL), severe (ERR_TAP3_SEVERE), or warning (ERR_TAP3_WARNING). The description of the error includes the TAP field name, TAP field numeric ID, TD 57 error code, and a description of the failure.

The following is an example of a fatal validation error:

Pipeline Error Name:

ERR_TAP3_FATAL

Pipeline Error Description:

TAP Field Name: AccountingInfo, TAP Field Id: 15, TAP Error: 30, No Taxation group present and batch contains taxes.

TAP Validations That Are Not Supported

The ISC_TAP_0312_Validations module does not support all the TAP validations. For instance:

- Syntax error validations on Integer fields that are handled by the parser.
- Validations based on the roaming agreements.
- Validations that are not possible due to pipeline architecture limitations.

The following tables list the validations that are not performed by the ISC_TAP_0312_Validations module. You can implement these validations by writing your own custom iScript or by adding these validations to the ISC_TAP_0312_Validations module.
### Syntax Error Validations on Integer Fields

Table 3–1 lists the syntax error validations on integer fields. These validations are not supported.

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action Code</td>
<td>10</td>
<td>SS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Advised Charge</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Bearer Service Code</td>
<td>10</td>
<td>MOC, MTC</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Bearer Service Code</td>
<td>11</td>
<td>SS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Call Event Details Count</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Call Reference</td>
<td>10</td>
<td>MOC, MTC, SS, LCS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Call Type Level 1</td>
<td>10</td>
<td>MOC, GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Call Type Level 2</td>
<td>10</td>
<td>MOC, GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Call Type Level 3</td>
<td>10</td>
<td>MOC, GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Called Place</td>
<td>10</td>
<td>MOC</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Called Region</td>
<td>10</td>
<td>MOC</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>CAMEL Invocation Fee</td>
<td>10</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>CAMEL Service Key</td>
<td>10</td>
<td>MOC, MTC, GPRS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>CAMEL Service Level</td>
<td>10</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Cause For Termination</td>
<td>10</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Cell Identity</td>
<td>10</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Charge</td>
<td>10</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Charge Refund Indicator</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Chargeable Units</td>
<td>10</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Charged Party Id Type</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Charged Party Status</td>
<td>10</td>
<td>SCU</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Charged Units</td>
<td>10</td>
<td>CALLS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Charging ID</td>
<td>10</td>
<td>GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>CLIR Status Indicator</td>
<td>10</td>
<td>MOC, MTC, SCU</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Commission</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error and more than one timestamp present within Content Transaction Basic Info.</td>
</tr>
<tr>
<td>Content Charging Point</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error and only one timestamp present within Content Transaction Basic Info.</td>
</tr>
<tr>
<td>Content Charging Point</td>
<td>11</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Content Provider Id Type</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Content Provider Id Type</td>
<td>11</td>
<td>LCS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Content Provider Identifier</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
</tbody>
</table>
### Table 3–1 (Cont.) Syntax Error Validations on Integer Fields

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Provider Name</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Content Transaction Code</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Content Transaction Type</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>CSE Information</td>
<td>10</td>
<td>CALLS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Customer Id Type</td>
<td>10</td>
<td>LCS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Data Volume Incoming</td>
<td>10</td>
<td>GPRS, CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Data Volume Outgoing</td>
<td>10</td>
<td>GPRS, CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Default Call Handling Indicator</td>
<td>10</td>
<td>MOC, MTC, GPRS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Discount Code</td>
<td>10</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Discount Code</td>
<td>11</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Discount Rate</td>
<td>10</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Discount Value</td>
<td>10</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Discountable Amount</td>
<td>10</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Equipment Id</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Equipment Id Type</td>
<td>10</td>
<td>CONTENT, LCS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Exchange Rate</td>
<td>10</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Exchange Rate Code</td>
<td>10</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Exchange Rate Code</td>
<td>11</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Fixed Discount Value</td>
<td>10</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Fixed Network User Rate</td>
<td>10</td>
<td>MOC, MTC</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Home Id Type</td>
<td>10</td>
<td>CONTENT, LCS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Home Identifier</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Home Location Description</td>
<td>10</td>
<td>CALLS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>IMS Signalling Context</td>
<td>10</td>
<td>GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>ISP Id Type</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>ISP Identifier</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Location Area Code</td>
<td>10</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Location Area Code</td>
<td>10</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Location Id Type</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Location Id Type</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Location Identifier</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Message Description</td>
<td>10</td>
<td>MESS DESC</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Message Description Code</td>
<td>10</td>
<td>MESS DESC, SCU</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Message Status</td>
<td>10</td>
<td>SCU</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
</tbody>
</table>
Table 3-1 (Cont.) Syntax Error Validations on Integer Fields

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>10</td>
<td>SCU</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Network Id Type</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Network Init. PDP Context</td>
<td>10</td>
<td>GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Number Of Decimal Places</td>
<td>10</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Object Type</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Paid Indicator</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Payment Method</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Priority Code</td>
<td>10</td>
<td>SCU</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Release Version Number</td>
<td>10</td>
<td>NOTIFICTN, BTCH CTRL</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Serving Location Description</td>
<td>10</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>SMS Destination Number</td>
<td>10</td>
<td>MOC</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>SMS Originator</td>
<td>10</td>
<td>MTC</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Specification Version Number</td>
<td>10</td>
<td>NOTIFICTN, BTCH CTRL</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>TAP Decimal Places</td>
<td>10</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Tax Rate Code</td>
<td>10</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Tax Rate Code</td>
<td>11</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Tax Value</td>
<td>10</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Taxable Amount</td>
<td>10</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Advised Charge</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Advised Charge Refund</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Call Event Duration</td>
<td>10</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Charge</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Charge Refund</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Commission</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Commission Refund</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Data Volume</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Discount Refund</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Discount Value</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Tax Refund</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Tax Value</td>
<td>10</td>
<td>AUDIT</td>
<td>Fatal</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Total Transaction Duration</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Transaction Authorisation Code</td>
<td>10</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
</tbody>
</table>
### Out-of-Range Validations on Date Fields

Table 3–2 lists the out-of-range validations on date fields. These validations are not supported.

#### Table 3–2  Out-of-Range Validations on Date Fields

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Delivery Timestamp</td>
<td>20</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Value out of range and timestamp referenced as Charging Point.</td>
</tr>
<tr>
<td>Actual Delivery Timestamp</td>
<td>21</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Value out of range and timestamp not referenced as Charging Point.</td>
</tr>
<tr>
<td>Call Event Start Timestamp</td>
<td>20</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Charge Detail Timestamp</td>
<td>20</td>
<td>CALLS</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Charging Timestamp</td>
<td>20</td>
<td>CALLS</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Completion Timestamp</td>
<td>20</td>
<td>SCU</td>
<td>Warning</td>
<td>Value out of range and charging point is ‘D’.</td>
</tr>
<tr>
<td>Completion Timestamp</td>
<td>21</td>
<td>SCU</td>
<td>Severe</td>
<td>Value out of range and charging point is ‘C’.</td>
</tr>
<tr>
<td>Deposit Timestamp</td>
<td>20</td>
<td>SCU</td>
<td>Warning</td>
<td>Value out of range and charging point is ‘C’.</td>
</tr>
<tr>
<td>Deposit Timestamp</td>
<td>21</td>
<td>SCU</td>
<td>Severe</td>
<td>Value out of range and charging point is ‘D’.</td>
</tr>
<tr>
<td>Earliest Call Timestamp</td>
<td>20</td>
<td>AUDIT</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>File Available Timestamp</td>
<td>20</td>
<td>BTCH CTRL</td>
<td>Fatal</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>File Available Timestamp</td>
<td>21</td>
<td>NOTIFICTN</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>File Creation Timestamp</td>
<td>20</td>
<td>NOTIFICTN, BTCH CTRL</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
</tbody>
</table>
Validations Involving Bilateral Agreement

Table 3–3 lists the validations involving bilateral agreement. These validations are not supported.

Table 3–3  Validations Involving Bilateral Agreement

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting Information</td>
<td>33</td>
<td>TFBATCH</td>
<td>Fatal</td>
<td>Item TAP Currency not present and currency other than SDR specified in roaming agreement.</td>
</tr>
<tr>
<td>AUDIT Control Information</td>
<td>36</td>
<td>TFBATCH</td>
<td>Fatal</td>
<td>Item Total Tax Refund present and use of Content Transaction not bilaterally agreed.</td>
</tr>
<tr>
<td>AUDIT Control Information</td>
<td>37</td>
<td>TFBATCH</td>
<td>Fatal</td>
<td>Item Total Discount Refund present and use of Content Transaction not bilaterally agreed.</td>
</tr>
<tr>
<td>AUDIT Control Information</td>
<td>38</td>
<td>TFBATCH</td>
<td>Fatal</td>
<td>Group Total Advised Charge Value present and use of Content Transaction not bilaterally agreed.</td>
</tr>
<tr>
<td>Call Event Details</td>
<td>32</td>
<td>TFBATCH</td>
<td>Severe</td>
<td>Service Centre Usage present although not agreed bilaterally.</td>
</tr>
<tr>
<td>Call Event Details</td>
<td>34</td>
<td>TFBATCH</td>
<td>Severe</td>
<td>Content Transaction present although not agreed bilaterally.</td>
</tr>
<tr>
<td>Call Event Details</td>
<td>35</td>
<td>TFBATCH</td>
<td>Severe</td>
<td>GPRS Call present although not agreed bilaterally.</td>
</tr>
<tr>
<td>Call Event Details</td>
<td>36</td>
<td>TFBATCH</td>
<td>Severe</td>
<td>Location Service present although not agreed bilaterally.</td>
</tr>
<tr>
<td>CAMEL Invocation Fee</td>
<td>200</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>CAMEL Invocation Fee not in line with roaming agreement</td>
</tr>
<tr>
<td>CAMEL Service Used</td>
<td>41</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>Tax Information missing within the group and CAMEL Invocation Fee is greater than zero and taxation is expected according to roaming agreement.</td>
</tr>
</tbody>
</table>

Table 3–2  (Cont.) Out-of-Range Validations on Date Fields

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latest Call Timestamp</td>
<td>20</td>
<td>AUDIT</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Order Placed Timestamp</td>
<td>20</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Value out of range and timestamp referenced as Charging Point.</td>
</tr>
<tr>
<td>Order Placed Timestamp</td>
<td>21</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Value out of range and timestamp not referenced as Charging Point.</td>
</tr>
<tr>
<td>PDP Context Start Timestamp</td>
<td>20</td>
<td>GPRS</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Requested Delivery Timestamp</td>
<td>20</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Value out of range and timestamp referenced as Charging Point.</td>
</tr>
<tr>
<td>Requested Delivery Timestamp</td>
<td>21</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Value out of range and timestamp not referenced as Charging Point.</td>
</tr>
<tr>
<td>Transfer Cut Off Timestamp</td>
<td>20</td>
<td>BTCH CTRL</td>
<td>Fatal</td>
<td>Value out of range.</td>
</tr>
</tbody>
</table>
### Table 3–3 (Cont.) Validations Involving Bilateral Agreement

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMEL Service Used</td>
<td>42</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>Tax Information present within the group but not expected in accordance with roaming agreement for the call/event and Tax Value referenced within the group is greater than zero.</td>
</tr>
<tr>
<td>CAMEL Service Used</td>
<td>43</td>
<td>MOC, MTC, GPRS</td>
<td>Warning</td>
<td>Tax Information present within the group but not expected in accordance with roaming agreement for the call/event and Tax Value referenced within the group is not greater than zero.</td>
</tr>
<tr>
<td>Charge</td>
<td>100</td>
<td>CALLS</td>
<td>Severe</td>
<td>Charge not in line with roaming agreement.</td>
</tr>
<tr>
<td>Charge Information</td>
<td>34</td>
<td>CALLS</td>
<td>Severe</td>
<td>Group Tax Information missing within group but expected in accordance with roaming agreement for that particular call. Tax Information group missing must be interpreted as Tax Value zero.</td>
</tr>
<tr>
<td>Charge Information</td>
<td>35</td>
<td>CALLS</td>
<td>Severe</td>
<td>Group Discount Information missing within group but expected in accordance with roaming agreement.</td>
</tr>
<tr>
<td>Charge Information</td>
<td>38</td>
<td>MOC, MTC</td>
<td>Severe</td>
<td>Breakout of Charge Types AIR (01) and/or TOLL (03) not present on a duration based charge, but expected in accordance with roaming agreement; i.e., only Charge Type 00 present within group. This validation rule can be applied only where bilaterally agreed between Sender and Recipient.</td>
</tr>
<tr>
<td>Charge Information</td>
<td>39</td>
<td>MOC, MTC</td>
<td>Severe</td>
<td>In accordance with roaming agreement, charges are defined in individual Charge Types, but the Charge for Charge Type 00 does not equal sum of Charges for the other Charge Types as stated within roaming agreement. This validation rule can be applied only where bilaterally agreed between Sender and Recipient.</td>
</tr>
<tr>
<td>Charge Information</td>
<td>40</td>
<td>CALLS</td>
<td>Severe</td>
<td>Group Tax Information present within group but not expected in accordance with roaming agreement for the call/event and Tax Value referenced within the group is greater than 0 (zero).</td>
</tr>
<tr>
<td>Charge Information</td>
<td>41</td>
<td>CALLS</td>
<td>Warning</td>
<td>Group Tax Information present within group but not expected in accordance with roaming agreement for the call/event and Tax Value referenced within the group is not greater than 0 (zero).</td>
</tr>
<tr>
<td>Chargeable Subscriber</td>
<td>32</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Severe</td>
<td>MSISDN missing within group but expected in accordance with roaming agreement.</td>
</tr>
<tr>
<td>Charged Party Identifier</td>
<td>200</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Item is an IMSI of a known network operator and initial characters are different from the network operator’s MCC + MNC, or not as bilaterally agreed.</td>
</tr>
<tr>
<td>Customer Identifier</td>
<td>200</td>
<td>LCS</td>
<td>Severe</td>
<td>Item is an IMSI of a known network operator and initial characters are different from the network operator’s MCC + MNC, or not as bilaterally agreed.</td>
</tr>
<tr>
<td>Discount Code</td>
<td>200</td>
<td>CALLS</td>
<td>Severe</td>
<td>Referenced discount is not in line with roaming agreement.</td>
</tr>
</tbody>
</table>
Table 3–3 (Cont.) Validations Involving Bilateral Agreement

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discountable Amount</td>
<td>22</td>
<td>CALLS</td>
<td>Severe</td>
<td>Discountable Amount is not in line with roaming agreement.</td>
</tr>
<tr>
<td>Geographical Location</td>
<td>31</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Severe</td>
<td>Serving BID missing within group but expected in accordance with roaming agreement.</td>
</tr>
<tr>
<td>Geographical Location</td>
<td>32</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Severe</td>
<td>Serving Location Description missing within group but expected in accordance with roaming agreement.</td>
</tr>
<tr>
<td>IMSI</td>
<td>200</td>
<td>CALLS</td>
<td>Severe</td>
<td>First characters are different from home operators MCC + MNC, or not as bilaterally agreed (e.g., if the recipient has not been allocated a MCC and MNC).</td>
</tr>
<tr>
<td>Location Information</td>
<td>31</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Severe</td>
<td>Group Geographical Information missing but Serving BID expected in accordance with roaming agreement. This validation rule can be applied only where bilaterally agreed between Sender and Recipient.</td>
</tr>
<tr>
<td>Location Information</td>
<td>32</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Severe</td>
<td>Group Geographical Information missing but Serving Location Description expected in accordance with roaming agreement. This validation rule can be applied only where bilaterally agreed between Sender and Recipient.</td>
</tr>
<tr>
<td>MSISDN</td>
<td>10</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Syntax error and item MSISDN not expected in accordance with roaming agreement.</td>
</tr>
<tr>
<td>MSISDN</td>
<td>20</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Number not represented in international format and MSISDN not expected in accordance with roaming agreement.</td>
</tr>
<tr>
<td>Operator Specific Information</td>
<td>30</td>
<td>ALL</td>
<td>Warning</td>
<td>Item is present without bilateral agreement</td>
</tr>
<tr>
<td>SCU Charge Type</td>
<td>32</td>
<td>SCU</td>
<td>Severe</td>
<td>Item Distance Charge Band Code missing within group and distance defined as a pricing parameter within SMS bilateral agreement.</td>
</tr>
<tr>
<td>Serving Network</td>
<td>20</td>
<td>MOC, MTC, SS, SCU, GPRS</td>
<td>Severe</td>
<td>Value out of range, i.e. it is neither a TADIG PMN Code nor a bilaterally agreed value.</td>
</tr>
<tr>
<td>TAP Currency</td>
<td>200</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>TAP Currency not in line with bilateral agreement.</td>
</tr>
<tr>
<td>Tax Rate Code</td>
<td>200</td>
<td>CALLS</td>
<td>Severe</td>
<td>The referenced Tax Rate is not in line with the roaming agreement at the corresponding call date. Note that, where variable tax rates apply to the call/event the exact validation of the tax rate may not be possible and, therefore, cannot be carried out.</td>
</tr>
<tr>
<td>Tax Value</td>
<td>200</td>
<td>CALLS</td>
<td>Severe</td>
<td>Tax Value is not in line with the roaming agreement at the corresponding call event date.</td>
</tr>
<tr>
<td>Taxable Amount</td>
<td>100</td>
<td>CALLS</td>
<td>Severe</td>
<td>Taxable Amount not in line with roaming agreement.</td>
</tr>
</tbody>
</table>

Validations that Require Additional Component Involvement

Table 3–4 lists the validations that require additional component involvement. These validations are not supported.
Table 3–4 Validations that Require Additional Component Involvement

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Delivery Timestamp</td>
<td>200</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Actual Delivery Timestamp before the commercial roaming start date for the specific service and the TAP file is not a test file and the timestamp is referenced as the Charging Point.</td>
</tr>
<tr>
<td>Batch Control Information</td>
<td>37</td>
<td>TFBATCH</td>
<td>Warning</td>
<td>File Sequence Number previously received and rejected with fatal error, therefore RAP File Sequence Number expected but not present.</td>
</tr>
<tr>
<td>Batch Control Information</td>
<td>40</td>
<td>TFBATCH</td>
<td>Warning</td>
<td>RAP File Sequence Number present although File Sequence Number has not previously been rejected with a fatal error (e.g. previously missing or new files).</td>
</tr>
<tr>
<td>Call Event Start Timestamp</td>
<td>200</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>Call Event Start Timestamp before the commercial roaming start date for the specific network service and the TAP file is not a test file</td>
</tr>
<tr>
<td>Call Type Level 1</td>
<td>102</td>
<td>MOC, GPRS</td>
<td>Severe</td>
<td>Item not specified according to how the call has been priced (as verified against the Sender’s IOT).</td>
</tr>
<tr>
<td>Call Type Level 2</td>
<td>100</td>
<td>MOC, GPRS</td>
<td>Severe</td>
<td>Item not specified according to how the call has been priced (as verified against the Sender’s IOT).</td>
</tr>
<tr>
<td>Call Type Level 3</td>
<td>100</td>
<td>MOC, GPRS</td>
<td>Severe</td>
<td>Item not specified according to how the call has been priced (as verified against the Sender’s IOT).</td>
</tr>
<tr>
<td>Charging Timestamp</td>
<td>200</td>
<td>SS, LCS</td>
<td>Severe</td>
<td>Charging Timestamp before the commercial roaming start date for the specific service and the TAP file is not a test file.</td>
</tr>
<tr>
<td>Completion Timestamp</td>
<td>200</td>
<td>SCU</td>
<td>Severe</td>
<td>Completion Timestamp before the commercial roaming start date for the specific service and the TAP file is not a test file.</td>
</tr>
<tr>
<td>Content Transaction Basic Info</td>
<td>31</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Item RAP File Sequence Number missing and Content Transaction previously received and rejected.</td>
</tr>
<tr>
<td>Content Transaction Basic Info</td>
<td>32</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and Content Transaction not previously received and rejected.</td>
</tr>
<tr>
<td>Content Transaction Basic Info</td>
<td>33</td>
<td>CONTENT</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and TAP transfer batch being resubmitted as corrected (having been previously rejected with fatal error).</td>
</tr>
<tr>
<td>Deposit Timestamp</td>
<td>200</td>
<td>SCU</td>
<td>Severe</td>
<td>Deposit Timestamp before the commercial roaming start date for the specific service and the TAP file is not a test file.</td>
</tr>
<tr>
<td>Exchange Rate</td>
<td>200</td>
<td>ACCTNG</td>
<td>Fatal</td>
<td>Exchange Rate less than expected and referenced by one or more Call Event Details.</td>
</tr>
<tr>
<td>Exchange Rate Code</td>
<td>202</td>
<td>CALLS</td>
<td>Warning</td>
<td>The Exchange Rate referenced by Exchange Rate Code in Call Event Details is greater than expected.</td>
</tr>
<tr>
<td>File Sequence Number</td>
<td>200</td>
<td>NOTIFICTN , BTCH CTRL</td>
<td>Warning</td>
<td>File sequence number of the received file is greater than that expected.</td>
</tr>
<tr>
<td>File Sequence Number</td>
<td>201</td>
<td>NOTIFICTN , BTCH CTRL</td>
<td>Fatal</td>
<td>File sequence number of the received file has already been received and successfully processed and the file is not a copy of the original file.</td>
</tr>
</tbody>
</table>
### Table 3–4 (Cont.) Validations that Require Additional Component Involvement

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPRS Basic Call Information</td>
<td>31</td>
<td>GPRS</td>
<td>Severe</td>
<td>GPRS Call is being resubmitted and RAP File Sequence Number is missing within group.</td>
</tr>
<tr>
<td>GPRS Basic Call Information</td>
<td>38</td>
<td>GPRS</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and TAP transfer batch being resubmitted as corrected (having been previously rejected with fatal error).</td>
</tr>
<tr>
<td>GPRS Basic Call Information</td>
<td>41</td>
<td>GPRS</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and call not previously received and rejected.</td>
</tr>
<tr>
<td>Location Service</td>
<td>32</td>
<td>LCS</td>
<td>Severe</td>
<td>Item RAP File Sequence Number missing and Location Service previously received and rejected.</td>
</tr>
<tr>
<td>Location Service</td>
<td>33</td>
<td>LCS</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and Location Service not previously received and rejected.</td>
</tr>
<tr>
<td>Location Service</td>
<td>34</td>
<td>LCS</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and TAP transfer batch being resubmitted as corrected (having been previously rejected with fatal error).</td>
</tr>
<tr>
<td>MO Basic Call Information</td>
<td>33</td>
<td>MOC</td>
<td>Severe</td>
<td>Item RAP File Sequence Number missing and call previously received and rejected.</td>
</tr>
<tr>
<td>MO Basic Call Information</td>
<td>34</td>
<td>MOC</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and call not previously received and rejected.</td>
</tr>
<tr>
<td>MO Basic Call Information</td>
<td>36</td>
<td>MOC</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and TAP transfer batch being resubmitted as corrected (having been previously rejected with fatal error).</td>
</tr>
<tr>
<td>MT Basic Call Information</td>
<td>33</td>
<td>MTC</td>
<td>Severe</td>
<td>Item RAP File Sequence Number missing and call previously received and rejected.</td>
</tr>
<tr>
<td>MT Basic Call Information</td>
<td>34</td>
<td>MTC</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and call not previously received and rejected.</td>
</tr>
<tr>
<td>MT Basic Call Information</td>
<td>35</td>
<td>MTC</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and TAP transfer batch being resubmitted as corrected (having been previously rejected with fatal error).</td>
</tr>
<tr>
<td>Notification</td>
<td>37</td>
<td></td>
<td>Warning</td>
<td>File Sequence Number previously received and rejected with fatal error, therefore RAP File Sequence Number expected but not present.</td>
</tr>
<tr>
<td>Notification</td>
<td>38</td>
<td></td>
<td>Warning</td>
<td>RAP File Sequence Number present although File Sequence Number has not previously been rejected with a fatal error (e.g. previously missing or new files).</td>
</tr>
<tr>
<td>Order Placed Timestamp</td>
<td>200</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Order Placed Timestamp before the commercial roaming start date for the specific service and the TAP file is not a test file.</td>
</tr>
<tr>
<td>Requested Delivery Timestamp</td>
<td>200</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Requested Delivery Timestamp before the commercial roaming start date for the specific service and the TAP file is not a test file.</td>
</tr>
<tr>
<td>Service Centre Usage</td>
<td>31</td>
<td>SCU</td>
<td>Severe</td>
<td>Item RAP File Sequence Number missing and SCU previously received and rejected.</td>
</tr>
<tr>
<td>Service Centre Usage</td>
<td>32</td>
<td>SCU</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and SCU not previously received and rejected.</td>
</tr>
<tr>
<td>Service Centre Usage</td>
<td>37</td>
<td>SCU</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and TAP transfer batch being resubmitted as corrected (having been previously rejected with fatal error).</td>
</tr>
</tbody>
</table>
How Roaming Usage Data Is Validated

Table 3–4  (Cont.) Validations that Require Additional Component Involvement

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplementary Service Event</td>
<td>31</td>
<td>SS</td>
<td>Severe</td>
<td>Item RAP File Sequence Number missing and SS previously received and rejected.</td>
</tr>
<tr>
<td>Supplementary Service Event</td>
<td>32</td>
<td>SS</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and SS not previously received and rejected.</td>
</tr>
<tr>
<td>Supplementary Service Event</td>
<td>35</td>
<td>SS</td>
<td>Warning</td>
<td>Item RAP File Sequence Number present and TAP transfer batch being resubmitted as corrected (having been previously rejected with fatal error).</td>
</tr>
<tr>
<td>Supplementary Service Used</td>
<td>101</td>
<td>SS</td>
<td>Severe</td>
<td>Invalid or non transferable Supplementary Service Code and Action code combination present within group.</td>
</tr>
</tbody>
</table>

Supplementary Service Event

Table 3–5 lists other validations that are not supported.

Table 3–5  Other Validations that Are not Supported

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMEL Invocation Fee</td>
<td>201</td>
<td>MOC, MTC, GPRS</td>
<td>Severe</td>
<td>CAMEL Invocation Fee is greater than 0 (zero) and CAMEL call not expected.</td>
</tr>
<tr>
<td>CAMEL Service Used</td>
<td>31</td>
<td>MOC</td>
<td>Severe</td>
<td>CAMEL Destination Number missing within group although number was modified by CAMEL (logical group 3G CAMEL Destination).</td>
</tr>
<tr>
<td>CAMEL Service Used</td>
<td>37</td>
<td>GPRS</td>
<td>Severe</td>
<td>Group GPRS Destination missing within group although APN was modified by CAMEL (logical group 3G CAMEL Destination).</td>
</tr>
<tr>
<td>Charged Party Identifier</td>
<td>10</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Charged Party Identifier</td>
<td>20</td>
<td>CONTENT</td>
<td>Severe</td>
<td>Value out of range and item is a MSISDN.</td>
</tr>
<tr>
<td>Customer Identifier</td>
<td>20</td>
<td>LCS</td>
<td>Severe</td>
<td>Value out of range and item is a MSISDN.</td>
</tr>
<tr>
<td>Destination Network</td>
<td>10</td>
<td>SCU, MOC</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Destination Network</td>
<td>20</td>
<td>SCU, MOC</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Dialed Digits</td>
<td>20</td>
<td>MOC</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Discount Value</td>
<td>22</td>
<td>CALLS</td>
<td>Severe</td>
<td>Where the associated Discount Code relates to a Discount Rate, the Discount Value does not correspond to the Discountable Amount and Discount Rate.</td>
</tr>
<tr>
<td>Distance Charge Band Code</td>
<td>20</td>
<td>SCU</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Equipment Id</td>
<td>100</td>
<td>CONTENT, LCS</td>
<td>Warning</td>
<td>Item content does not match Equipment Id Type.</td>
</tr>
<tr>
<td>ESN</td>
<td>10</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
</tbody>
</table>
Transmitting TAP Files to the Validation Pipeline

When you receive TAP files from a clearing house or your roaming partner, you must put the files in the input directory of the validation pipeline for the pipeline to process them. If your mediation system does not automatically place the TAP files in this directory, you can configure a Batch Controller and write a custom Batch Handler to move the TAP files to the validation pipeline input directory.

For more information about Batch Controllers and Batch Handlers, see "Controlling Batch Operations" in *BRM System Administrator's Guide*.  

---

**Table 3–5 (Cont.) Other Validations that Are not Supported**

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>Error Code</th>
<th>Traffic Type</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESN</td>
<td>20</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>GPRS Call</td>
<td>200</td>
<td>GPRS</td>
<td>Warning</td>
<td>Number of GPRS partials received exceeds limit defined by BARG in BA.12.</td>
</tr>
<tr>
<td>Home BID</td>
<td>10</td>
<td>CALLS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Home BID</td>
<td>20</td>
<td>CALLS</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>IMEI</td>
<td>10</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>IMEI</td>
<td>20</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>IMSI</td>
<td>10</td>
<td>CALLS</td>
<td>Severe</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>IMSI</td>
<td>20</td>
<td>CALLS</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>MDN</td>
<td>10</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>MDN</td>
<td>20</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>MIN</td>
<td>20</td>
<td>CALLS</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Network Access Identifier</td>
<td>20</td>
<td>GPRS</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Originating Network</td>
<td>10</td>
<td>MTC, SCU</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Originating Network</td>
<td>20</td>
<td>MTC, SCU</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Serving BID</td>
<td>20</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Severe</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Serving BID</td>
<td>21</td>
<td>MOC, MTC, SS, GPRS</td>
<td>Severe</td>
<td>Value not assigned to Sender.</td>
</tr>
<tr>
<td>Supplementary Service Parameters</td>
<td>10</td>
<td>SS</td>
<td>Warning</td>
<td>Syntax error.</td>
</tr>
<tr>
<td>Supplementary Service Parameters</td>
<td>20</td>
<td>SS</td>
<td>Warning</td>
<td>Value out of range.</td>
</tr>
<tr>
<td>Tax Value</td>
<td>22</td>
<td>CALLS</td>
<td>Severe</td>
<td>Where the associated Tax Rate Code relates to a Tax Rate, the Tax Value does not correspond to the Taxable Amount (or Charge where no Taxable Amount present) and Tax Rate.</td>
</tr>
</tbody>
</table>
About Charging Your Subscribers for Their Roaming Usage

Normally, the call event detail records in a TAP file contain the roaming charge and the calculated tax amount that your roaming partner passes to you after having rated your subscribers’ usage based on the agreement between you and your roaming partner.

To bill your subscribers for their roaming charges, you can choose to accept the charges and the tax amount passed in by your roaming partner and use them to bill your subscribers or you can reprice or mark up the roaming EDRs based on your subscribers’ roaming subscription plan or retail rate. See "Charging Your Subscribers for Their Roaming Usage".

To specify whether or not to apply the tax amount, you set the taxation flag in the roaming partner’s account configuration. See "Choosing Whether to Apply Taxes for Roaming".

To rate the call event detail records, the reprice pipeline uses the same modules as the rating pipeline. For the list of modules used by the reprice pipeline, see "Configuring Reprice Pipeline Function Modules".

If the reprice pipeline is unable to process or rate the record due to errors such as incorrect rating configuration, the record is suspended and recycled using Suspense Manager. See "Processing EDRs Suspended by the Reprice Pipeline".

When the final charge calculation is complete, the IRL_EventTypeSplitting iRule routes the records to separate output streams based on the service type; for example, GSM and GPRS. The output module writes the records to an output file by using the RE Loader output grammar.

RE Loader reads the output file and loads each event into the BRM database. For instance, the GSM events are loaded into the /event/delayed/session/telco/gsm object and the GPRS events are loaded into the /event/delayed/session/telco/gprs object.

The event objects contain all data related to the event including your subscriber’s rating and billing information and are associated with the /service/telco/gsm object, for GSM records, and /service/telco/gprs object, for GPRS records, of the subscriber’s account. After the event objects are loaded into the database, you can run BRM billing to bill your subscribers for their roaming usage.

For information about RE Loader, see “Understanding Rated Event Loader” in BRM Configuring Pipeline Rating and Discounting.

Charging Your Subscribers for Their Roaming Usage

You can rerate the incollect data to bill your own subscribers for roaming usage. To do this, choose one of the following methods:

- **Passthrough rating**
  
  The rated events delivered from other network operator costs are passed through to your retail billing system without being rated by you. This means that you assume the rating carried out by the other operator is correct.

- **Markup adding**
  
  A specified value is added to the wholesale charge delivered by another network operator. The markup can be an absolute value, such as $1.00, or a percentage, such as 15%. Markup adding is usually performed after having applied a tariff check and validated the rated events from another network operator.

- **Complete rating**
The events are rated by using your pipeline configuration.

To specify how the call event detail records should be processed, you use Pricing Center to create rate plans and price models that define the criteria used to determine the charge. For more information, see "Defining Rate Plans for Rating Roaming Usage".

### Processing EDRs Suspended by the Reprice Pipeline

If the reprice pipeline is unable to rate an EDR, it sets the error in the EDR and suspends it. The FCT_Reject module evaluates the error and routes the EDR to the suspense output stream as specified by the RejectStream pipeline registry entry.

Using SE Loader, you load the suspended EDRs into the BRM database. Using Suspense Management Center, you can query the suspended events and make the necessary corrections. After the corrections are made, you can recycle the events for processing.

When Pipeline Manager receives the recycle request, the INP_Recycle module retrieves the suspended records from the BRM database and routes the events to the pre-recycle pipeline. The pre-recycle pipeline converts the suspended events back to EDR format and sends the EDRs back to the reprice pipeline for rating.

For detailed information about how EDRs are suspended and recycled, see "About Suspense Manager" in BRM Configuring Pipeline Rating and Discounting.

### Choosing Whether to Apply Taxes for Roaming

Your roaming partners will rate your subscribers’ roaming usage and also calculate and apply the tax amount. You can choose whether or not to pass this tax charge on to your subscribers. You do this by setting the taxation flag in the network operator configuration. For more information, see "About Setting Up Network Operator Accounts".

During incollect processing, the DAT_InterConnect module retrieves the taxation flag value for each network operator from the Pipeline Manager database and stores this information in the in-memory cache.

When processing the EDRs, the ISC_ApplyTax module retrieves the PLMN ID for the network operator and passes this ID to the DAT_InterConnect module to get the taxation flag value for the network operator from the in-memory cache. If the taxation flag is set to on, the tax amount is passed to the subscriber; otherwise, the tax amount is ignored.

### About Processing Your Subscribers’ Prepaid Roaming Charges

The TAP file may contain postpaid roaming activities in addition to the prepaid activities.

Postpaid records are processed by the reprice pipeline, to be repriced based on your subscriber’s roaming subscription plan, and by the settlement pipeline, for financial settlement with your roaming partner.

Unlike postpaid roaming activities, prepaid roaming activities are processed in real time. When a subscriber makes a prepaid call, the visited network operator sends the call data to the home network operator in real time. The home network operator rates the call and applies the balance impact in real time. The visited network operator also sends the roaming charges for the prepaid service to the home network operator in the
TAP file. For more information on how prepaid events are processed, see "Understanding Prepaid AAA" in BRM Telco Integration.

Prepaid roaming activities are represented as CAMEL records in the TAP file. CAMEL records are processed by the settlement pipeline for financial settlement with your roaming partner. The settlement pipeline associates the CAMEL records with the roaming partner account and creates settlement records that are loaded into the BRM database.

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Note: By default, CAMEL records are also passed to the reprice pipeline even though it is prepaid and may not need repricing. This provides you the flexibility of how you want to process CAMEL records. For example, using custom iScripts, you may want to update CAMEL records to have zero balance, or you can choose to remove the records so that they are not processed by the reprice pipeline at all.

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For more information about settling roaming charges, see "About Settling Roaming Charges".

About Repricing Optimally Routed Calls

Optimal call routing provides for seamless routing of calls. For example, suppose a mobile subscriber A has established mobile service with network operator X, and mobile subscriber B has mobile service with network operator Y in different service areas. In this case, calls between subscriber A and subscriber B are long-distance calls. However, when one subscriber is in the service area of the other, the call is routed locally.

If a call is optimally routed, the Destination Network field is set in the TAP file. The TAP mapping iScript maps the destination network into the DETAIL.DESTINATION_NETWORK field in the EDR container.

When the EDR is processed in the reprice pipeline, you can verify the roaming charges for optimally routed calls and reprice them. You can do this by using a custom iScript or by defining price models to reprice the call based on the value defined in the destination network field and use model selector to choose the proper price model at the time of repricing.

For more information about custom iScripts, see "Creating iScripts and iRules" in BRM Developer’s Guide.

For more information about creating price models, see "Setting Up Pipeline Rate Plans" in BRM Setting Up Pricing and Rating.
This chapter describes the roaming outcollect process in Oracle Communications Billing and Revenue Management (BRM) for rating visiting subscribers’ roaming usage.

Important:

- The following sections describe the outcollect process for processing TAP files only.
- To process TAP files, TAP Roaming Manager requires Suspense Manager, Rated Event (RE) Loader, and InterConnect Manager to rate roaming usage. Suspense Manager, RE Loader, and InterConnect Manager are not part of TAP Roaming Manager and require separate licenses. You must install these supporting managers to rate roaming events. See "About Suspense Manager" and "Understanding Rated Event Loader" in *BRM Configuring Pipeline Rating and Discounting* for more information.

Before reading this document, you should be familiar with the following:

- BRM concepts and architecture. See "Introducing BRM" and "BRM System Architecture" in *BRM Concepts* for more information.
- Pipeline Manager. See "About Pipeline Rating" in *BRM Configuring Pipeline Rating and Discounting* for more information.
- Roaming. See "About Rating Roaming Events" for more information.

**Understanding Roaming Outcollect Architecture and Process Flow**

You use roaming outcollect processing to process call detail records (CDRs) generated by visiting subscribers on your network. The outcollect process architecture primarily consists of the splitter, outcollect rating, and settlement pipelines. These pipelines perform the following tasks:

- The splitter pipeline separates home subscribers’ CDRs from visiting subscribers’ roaming CDRs.
- The outcollect rating pipeline rates the visiting subscribers’ roaming CDRs based on InterCarrier Tariff rates and generates outcollect TAP files for each roaming partner.
The settlement pipeline creates settlement events by associating visiting subscribers’ roaming CDRs with corresponding roaming partner accounts in the BRM database. These settlement events are loaded into the BRM database and impact your roaming partners’ account balance.

Figure 4–1 depicts a high-level overview of the roaming outcollect process architecture:

As Figure 4–1 illustrates, incoming CDRs are handled during the outcollect process as follows:

1. The splitter pipeline converts the CDRs into event data record (EDR) format and separates the EDRs into home subscribers’ EDRs and visiting subscribers’ roaming EDRs.
   - Home subscribers’ EDRs are sent to the normal rating pipeline to be rated and loaded into the BRM database by RE Loader. If the rating pipeline fails to rate the EDR, the EDR is suspended and recycled by using Suspense Manager.
   - Visiting subscribers’ roaming EDRs are sent to the outcollect rating pipeline to be rated.

See “How Home CDRs Are Separated from Visiting Subscribers’ CDRs” for more information.
The outcollect rating pipeline rates the visiting subscribers’ roaming EDRs and generates outcollect TAP files, for each roaming partner network operator, that you send to your roaming partners for verification and billing purposes. A copy of the outcollect TAP file is forwarded to the settlement pipeline for further processing.

If the outcollect rating pipeline fails to rate the roaming EDR, the EDR is suspended and recycled by using Suspense Manager. See "How Visiting Subscribers’ Roaming CDRs Are Rated" for more information.

The settlement pipeline processes the outcollect TAP file and creates settlement events by associating the events with roaming partner accounts in the BRM database. Settlement events are loaded into the BRM database by RE Loader.

If the settlement pipeline fails to create settlement events, the entire TAP file is suspended and loaded into the BRM database. The suspended TAP file can be corrected and recycled back to the settlement pipeline by using Suspense Manager. See "How Settlement Events for Incollect Roaming Charges Are Created" for more information.

For detailed information on configuring outcollect processing, see "Setting Up Pipeline Manager for Roaming Outcollect Processing".

How Home CDRs Are Separated from Visiting Subscribers’ CDRs

The splitter pipeline processes CDRs as follows:

- Incoming CDRs are converted to EDR format.
  
  The INP_GenericStream module provides the input interface to the splitter pipeline using BRM standard input grammar files. The input grammar converts CDRs into the internal EDR format that can be used by all BRM modules. If there are any errors, INP_GenericStream adds the error to the EDR container and sends the EDR to the reject stream. See "INP_GenericStream" in BRM Configuring Pipeline Rating and Discounting for more information.

- EDRs are separated into home and roaming EDRs.
  
  The FCT_EnhancedSplitting module separates the EDRs into home subscribers’ EDRs and visiting subscribers’ roaming EDRs so that they can be sent to the appropriate rating pipeline for processing.

  Home subscribers’ EDRs are sent to the normal rating pipeline. Visiting subscribers’ roaming EDRs are sent to the outcollect rating pipeline. You use Pricing Center to define the splitting rules: for example, you can define a rule using the source network EDR field to send home and roaming EDRs to different output streams. See "FCT_EnhancedSplitting" in BRM Configuring Pipeline Rating and Discounting for more information.

- EDRs are written to output files.
  
  The OUT_GenericStream module uses standard BRM SOL42 output grammar to write home and roaming EDRs to separate output files.

  As soon as the splitter pipeline generates the output files with the roaming EDRs, the outcollect rating pipeline retrieves the files and rates the roaming EDRs. See
Transmitting CDRs to the Splitter Pipeline

External CDRs must be placed in the input directory of the splitter pipeline for the pipeline to process them. If your mediation system does not automatically place the CDRs in this directory, you can configure a Batch Controller and write a custom Batch Handler to move the CDRs to the splitter pipeline input directory.

For more information about Batch Controllers and Batch Handlers, see "Controlling Batch Operations" in BRM System Administrator’s Guide for more information.

How Visiting Subscribers’ Roaming CDRs Are Rated

The outcollect rating pipeline processes the roaming EDRs as follows:

- The contents of the splitter pipeline output file are mapped to the EDR container.
  
  The INP_GenericStream module uses BRM standard input grammar to parse the file and convert its contents into EDRs for rating.

- A plan and product are selected to rate the roaming EDR.
  
  Based on the roaming agreement you have with your roaming partner, you set up intercarrier tariff plans and intercarrier products in Pricing Center. These plans and products are stored in the following tables:
  - IFW_NETWORKOPER
  - IFW_NETWORKMODEL
  - IFW_ICPRODUCT
  - IFW_ICPRODUCT_GRP
  - IFW_ICPRODUCT_RATE
  - IFW_ICPRODUCT_CNCF

To find the correct price basis for rating the roaming event, the FCT_CarrierIcRating module searches these tables to determine the rate plan that applies to the roaming event. It then adds the rate plan and other information such as the network operator, zones for the A and B numbers, and so forth to the EDR container. See "FCT_CarrierIcRating" in BRM Configuring Pipeline Rating and Discounting.
How Visiting Subscribers’ Roaming CDRs Are Rated

For information on setting up intercarrier tariff plans and intercarrier products, see "Defining Roaming Partner Accounts in the BRM Database".

- The impact category is selected.

  The FCT_PreRating module reads the EDR container to determine the phone number that originated the call, the destination phone number, and the start and end times of the call. Using this and other information in the EDR, this module determines the impact category and adds it to the EDR container along with supporting information on the zone model, service codes, and so forth.

- The EDR is rated and the result is rounded.

  The FCT_MainRating module evaluates the contents of the EDR and retrieves the appropriate pricing information from the pipeline database. It then calculates the charge amount for the event and adds information on the currency type and other rating characteristics. FCT_MainRating passes the EDR to the FCT_Rounding module, which rounds the charge amount.

- The charge for the event is converted from the local currency to Special Drawing Right (SDR) currency.

  The FCT_ExchangeRate module converts the amount in the charge packet to TAP currency (SDR).

- Basic service and supplementary service packets are added to the EDR container for GSM services.

  The ISC_MiscOutCollect module adds BASIC_SERVICE and SUPPLEMENTARY_SERVICE blocks to the EDR container for GSM services. This is done to ensure that the TAP file generated by the pipeline contains all the required information.

If the outcollect rating pipeline is unable to rate the EDR, the EDR is suspended. See "Processing EDRs Suspended by the Outcollect Rating Pipeline" for more information.

After the EDRs are rated, the output modules generate outcollect TAP files for each roaming partner. These files contain the rated EDRs (in TAP format) for that partner. Your roaming partner uses the outcollect TAP files to verify their subscribers’ roaming usage against the bill you send them and to perform their own rating on the events to bill their subscribers.

The following steps are performed to create and route outcollect TAP files to roaming partner network operator output streams:

1. A sequence number is generated for the outcollect TAP file.

   Each outcollect TAP file is assigned a sequence number. Your roaming partner uses the sequence number to ensure that the TAP file you have sent them is not a duplicate and that there are no missing TAP files.

   The Sequence Generator is an instance of the Sequencer module that generates sequence numbers.

   Using Pricing Center, you define a Sequence Generator for each roaming partner. You define each sequence by specifying a unique sequence key that identifies the roaming partner. Depending upon the roaming partner receiving the TAP file, the Sequence Generator generates the sequence number based on the sequence key. For more information about the Sequencer, see "About Sequence Checking" in BRM System Administrator’s Guide.

   A Sequence Generator can only be associated with one output stream. Because outcollect processing creates separate output streams for each roaming partner, a single Sequencer cannot be shared by multiple output streams. You must configure
How Visiting Subscribers’ Roaming CDRs Are Rated

2. The EDRs are written to the corresponding roaming partner output stream.

The FCT_EnhancedSplitting module routes each rated EDR to the corresponding roaming partner output stream. You use Pricing Center to define the splitting rules; for example, you can define a rule to route EDRs to different output streams based on the source network EDR field. The output module at each network operator output stream uses TAP output grammar to write the EDRs to output files. If FCT_EnhancedSplitting module is unable to route the EDR to an output stream, the EDR is routed to the suspense output stream.

When the outcollect TAP files are ready, the pipeline notifies the Event Handler by sending it the EVT_OUTPUT_FILE_READY event. Upon receiving this event notification, the Event Handler starts the move_outcollectTap.pl script, which copies the TAP files into the common directory (where all roaming partner network operator TAP files are stored until settlement events have been created) and moves the original outcollect TAP files to the settlement pipeline input directory for creating settlement events. See “About Settling Roaming Charges” for more information.

**Note:** Settlement events are created to record the roaming charges and used to bill your roaming partners. DO NOT send the outcollect TAP files to your roaming partner network operators until settlement events and TAP Header information file have been successfully created by the settlement pipeline. Otherwise, billing errors can occur.

**Note:** You must edit the move_outcollectTap.pl script to specify the common directory. By default, move_outcollectTap.pl copies the outcollect TAP files to the Pipeline_home/data/outcollect/tapout/common directory and moves the original outcollect TAP files to the Pipeline_home/data/outcollect/settlement/in directory. See “Configuring the Outcollect Rating Pipeline Input Processing” for more information.

For more information on configuring the outcollect rating pipeline, see “Configuring the Outcollect Rating Pipeline”.

**Processing EDRs Suspended by the Outcollect Rating Pipeline**

If the outcollect rating pipeline is unable to rate an EDR, it sets the error in the EDR and suspends it. The FCT_Reject module evaluates the error and routes the EDR to the suspense output stream as specified by the RejectStream pipeline registry entry.

Using Suspended Event (SE) Loader, you load the suspended EDRs into the BRM database. Using Suspense Management Center, you can query the suspended events and make the necessary corrections. After the corrections are made, you can recycle the events for processing.

When Pipeline Manager receives the recycle request, the INP_Recycle module retrieves the suspended records from the BRM database and routes the events to the pre-recycle pipeline. The pre-recycle pipeline converts the suspended events back to EDR format and sends the EDRs back to the outcollect rating pipeline for rating.
For detailed information about how EDRs are suspended and recycled, see "About Suspense Manager" in BRM Configuring Pipeline Rating and Discounting.

Transmitting Roaming EDRs to the Outcollect Rating Pipeline

In the default roaming registry, the outcollect rating pipeline’s input stream is the same as the splitter pipeline’s output stream. As soon as the splitter pipeline generates an output file, the outcollect rating pipeline processes the file.

You can choose to change the default behavior. For example, you can do any of the following:

- Transfer output files from the splitter pipeline to the outcollect rating pipeline at release intervals. For example, you might want to send roaming EDRs for rating twice a day.

  To transfer roaming EDRs from the splitter pipeline to the outcollect rating pipeline at release intervals, you can do the following:

  - Set up the outcollect rating pipeline’s input stream to be different from the splitter pipeline’s output stream.
  
  - Configure a Batch Controller and a Batch Handler to move the roaming EDRs from the splitter pipeline’s output stream to the input stream of the outcollect rating pipeline at specific time intervals.

  - Set the UnitsPerTransaction registry entry to a high number. The UnitsPerTransaction entry determines the number of input files received by the pipeline and consequently the number of output files generated.

- Configure the outcollect rating pipeline to process the output files from the splitter pipeline only after a certain number of files have accumulated.

  To configure the outcollect rating pipeline to start processing after a certain number of input files has accumulated, you use the UnitsPerTransaction registry entry to specify the number of input files. For instance, when UnitsPerTransaction is set to 1, the pipeline starts processing as soon as it receives one input file. However, if UnitsPerTransaction is set to 10, the pipeline waits until ten input files are received before it starts to process them. For more information about pipeline transactions, see "About Pipeline Manager Transactions" in BRM System Administrator’s Guide.

About Generation of Notification Files when there Is No Roaming Activity

The outcollect rating pipeline generates notification files when there is no roaming activity by a roaming partner’s subscribers. If the input file of the outcollect rating pipeline does not contain any roaming EDRs for a network operator configured in this pipeline, a notification file is generated.

The notification file informs your roaming partner that none of its subscribers have been roaming on your network. The notification file is generated based on the information in the EDR header and trailer records and does not contain any call detail records.
About Sending Outcollect TAP Files to Your Roaming Partner

**Note:** You send outcollect TAP files to your roaming partners only after settlement events and TAP Header information file have been successfully created by the settlement pipeline.

When the settlement pipeline finishes processing the outcollect TAP file, it notifies the Event Handler by sending it the EVT_OUTPUT_FILE_READY event. Upon receiving this event notification, the Event Handler starts the `move_TapSent.pl` script. This script identifies the corresponding outcollect TAP file previously stored in the common directory by the outcollect rating pipeline and moves the file to another pre-defined directory for sending the TAP file to your roaming partner or clearing house.

**Note:** You must edit the `move_TapSent.pl` script to specify the common directory used for storing the outcollect TAP files and the directory used for sending the TAP files to your roaming partners or clearing house. By default, `move_TapSent.pl` uses the `Pipeline_home/data/outcollect/tapout/common` directory as the common directory and moves the TAP files to the `Pipeline_home/data/outcollect/tapout/sent` directory. See "Configuring the Outcollect Settlement Pipeline Input Processing".

About Processing Rejected Outcollect TAP Files and Records

When you send outcollect TAP files to a roaming partner, the roaming partner validates the files to ensure there are no errors. If the validation fails, the partner generates a RAP file that includes the failed outcollect TAP file and records and sends it to you for corrections.

RAP file processing involves:

- Correcting and reprocessing the erroneous TAP files and records and generating new TAP files to send to your roaming partner.
- Backing out the balance impacts of settlement events associated with the erroneous TAP files and records that were previously recorded in the BRM database.

RAP files are handled by the RAP processing pipeline as follows:

- The RAP file is parsed by the input module and a RAP Acknowledgment file is generated that you send to your roaming partner. The file includes information about the network operator who sent the RAP file, network operator receiving the file, RAP file sequence number, Acknowledgment file creation timestamp, and Acknowledgment file available timestamp.

- For a fatal error RAP file, the entire file is suspended and sent to the TAP correction pipeline for corrections. See "Error Correction for TAP Files with Fatal Errors" for more information.

- For a severe error RAP file, the records are suspended and sent to the outcollect rating pipeline for processing. See "Error Correction for TAP Files with Severe Errors" for more information.

- For a missing error RAP file, a set of TAP notification files is generated for each missing sequence number.
To back out the balance impacts of the outcollect TAP file or records, the pipeline creates an ASCII file that specifies the extraction criteria for extracting settlement events associated with the TAP file or records. The `pin_event_extract` utility uses this file to extract the settlement events from the BRM database for backout-only rerating. See "Backing Out the Balance Impacts for the Rejected TAP Files and Records" for more information.

For information on configuring the RAP processing pipeline, see "Configuring the RAP Processing Pipeline".

Figure 4–2 depicts a high-level overview of the RAP processing architecture:

**Figure 4–2 RAP Processing Architecture**

Error Correction for TAP Files with Fatal Errors

TAP files with fatal errors are processed by RAP processing pipeline as follows:

- The input module converts the contents of the TAP file back to EDR format and maps the contents to staging fields in the EDR container by using RAP input grammar.
About Processing Rejected Outcollect TAP Files and Records

- The ISC_RAP_0105_InMap module maps the data in the staging fields to business fields in the EDR container. It creates a header and a trailer EDR that contain information about the RAP file and a single detail EDR that contains information about the rejected outcollect TAP file.

- The ISC_DupRAPRecords module sends a copy of the detail EDR to an output stream. This output stream uses Event Extraction output grammar to write the EDRs to a file that is used by the pin_event_extract utility to extract settlement events from the BRM database for backout-only rerating. See "Backing Out the Balance Impacts for the Rejected TAP Files and Records".

- The ISC_OverrideSuspenseParams module overrides the suspense parameters to recycle the suspended EDRs to the TAP correction pipeline.

The detail EDR is then routed to the suspense batch output stream. The suspense batch output stream writes the EDRs to a batch file. This batch file contains the TAP file name, location of the file, RAP error code, and the records in the TAP file. You load this file into the BRM database by using Suspended Batch (SB) Loader.

Using Suspense Management Center, you can query the suspended batch file to analyze the errors and resubmit the batch for processing. When Pipeline Manager receives the resubmit request, DAT_ResubmitBatch routes the batch file to the TAP correction pipeline.

In the TAP correction pipeline, the input mapping file maps the batch file into the EDR container. Using your own custom iScript, you implement the logic to make the necessary corrections by modifying and updating the EDR contents.

After the corrections have been made, the output module uses TAP output grammar to write the EDR to an output file, which includes the original outcollect TAP file sequence number and the original RAP file sequence number.

The TAP correction pipeline then notifies the Event Handler by sending it the EVT_OUTPUT_FILE_READY event. Upon receiving this event notification, the Event Handler launches the move_outcollectTap.pl script to copy the TAP file into the common directory (where all network operator outcollect TAP files are stored until settlement events have been created) and to move the TAP file to the settlement pipeline input directory for creating settlement events. See "About Settling Roaming Charges".

For information on configuring the TAP correction pipeline, see "Configuring the TAP Correction Pipeline".

Error Correction for TAP Files with Severe Errors

TAP files with severe errors are processed by RAP processing pipeline as follows:

- The input module converts the call event detail records in the TAP file back to EDR format and maps the call event detail fields to staging fields in the EDR container by using RAP input grammar.

- The ISC_RAP_0105_InMap module maps the data in the staging fields to business fields in the EDR container. It uses the lookup information in the TAP Header Information file, and information in the RAP file to create header and trailer EDRs. For each call event detail record, it creates an instance of the detail EDR with the call event details.

- The ISC_DupRAPRecords module duplicates and sends a copy of the detail EDRs to the event extraction output stream. This output stream uses Event Extraction output grammar to write the EDRs to a file that is used by the pin_event_extract utility to extract settlement events from the BRM database for backout-only
About Processing Rejected Outcollect TAP Files and Records

The ISC_OverrideSuspenseParams module overrides the suspense parameters to recycle the suspended EDRs to the outcollect rating pipeline.

The detail EDRs are routed to the suspense output stream. The suspense output stream writes the EDRs to a suspense file. You load this file into the BRM database by using SE Loader.

Using Suspense Management Center, you can query the suspended EDRs and make the necessary corrections. After the corrections are made, you can recycle the EDRs for processing. When Pipeline Manager receives the recycle request, the DAT_Recycle module retrieves the suspended events from the BRM database and routes the events to the pre-recycle pipeline.

The pre-recycle pipeline converts the suspended events back to EDR format and sends the EDRs to the outcollect rating pipeline input directory.

Note: The outcollect rating pipeline input directory also contains new roaming EDRs sent from the splitter pipeline.

The outcollect rating pipeline rates the recycled EDRs and newly arriving EDRs and generates a new outcollect TAP file. See "How Visiting Subscribers’ Roaming CDRs Are Rated" for more information.

The outcollect rating pipeline notifies the Event Handler by sending it the EVT_OUTPUT_FILE_READY event. Upon receiving this event notification, the Event Handler launches the move_outcollectTap.pl script to copy the outcollect TAP file into the common directory (where all network operator outcollect TAP files are stored until settlement events have been created) and to move the original outcollect TAP file to the settlement pipeline input directory for creating settlement events. See "About Settling Roaming Charges" for more information.

Backing Out the Balance Impacts for the Rejected TAP Files and Records

The RAP processing pipeline creates an ASCII file that specifies the extraction criteria for extracting settlement events from the BRM database associated with the rejected outcollect TAP files and records.

For rejected TAP files, the ASCII file is created with a single record with the following information:

- Outcollect TAP file sequence number
- Network operator sending the TAP file
- Network operator receiving the TAP file

For rejected TAP records, an ASCII file is created that contains a record for each rejected TAP record. Each record contains the following information:

- Outcollect TAP file sequence number
- Network operator sending the TAP file
- Network operator receiving the TAP file
- MSISDN
- IMSI

Note: The outcollect rating pipeline input directory also contains new roaming EDRs sent from the splitter pipeline.
Call event start timestamp

To back out the settlement event balance impacts (applied to the roaming partner’s account when the outcollect TAP file was originally created), you manually run the Event Extraction Manager and specify the ASCII file in the input parameter. Event Extraction Manager uses the information in the ASCII file to extract the settlement events from the BRM database and copies the event data to an output file in the standard BRM input format.

The backout pipeline processes the Event Extraction output file and creates shadow events to negate the balance impacts of the settlement events. The output module writes the shadow events to an output file using RE Loader output grammar. You use RE Loader to load the shadow events into the BRM database.

If the backout pipeline is unable to process the Event Extraction output file, it suspends the entire file. Using Suspense Management Center, you can resubmit the file for processing.

For more information about Event Extraction Manager, see "pin_event_extract" in BRM Setting Up Pricing and Rating.

For information on configuring the backout pipeline, see "Configuring the Backout Pipeline".

Including Country Codes in TAP Output Files

BRM maps the EDR container field DETAIL.CALLED_COUNTRY_CODE into the CalledCountryCode field in the output TAP file. To ensure that the CalledCountryCode field has a valid value in cases where the country code is not present in the EDR, you specify a default country code in the CalledCountryCode registry entry of the TAP outcollect pipelines.

The value of this entry is a three-character country code, such as USA or GBR, that specifies the destination country code for an international call. For example:

ifw.Pipelines.OutCollectPipeline.CalledCountryCode = USA
Installing TAP Roaming Manager

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

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**Note:** TAP Roaming Manager is an optional feature that requires a separate license.

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**System Requirements**

TAP Roaming Manager is supported on the HP-UX IA64, Solaris, AIX, and Linux operating systems. For information on disk space requirements for these operating systems, see "Disk Space Requirements" in BRM Installation Guide.

**Software Requirements**

Before installing TAP Roaming Manager, you must install:

- Pipeline Manager. See "Installing Pipeline Manager" in BRM Installation Guide.
- Interconnect Roaming Manager. See "Installing InterConnect Manager".

**Installing TAP Roaming Manager**

To install TAP Roaming Manager:

1. If the Third-Party software package is not installed already, install it. See "Installing the Third-Party Software" in BRM Installation Guide.

2. Go to the directory where you installed the Third-Party package and source the `source.me` file:
   - Bash shell:
     ```bash
     source source.me.sh
     ```
   - C shell:
     ```bash
     source source.me.csh
     ```

3. Download the TAP Roaming Manager installation software to a temporary directory (`temp_dir`).
4. Go to temp_dir and enter the following command:

```
7.5.0_TAPRoamingmanager_platform_64_opt.bin -console
```

where platform is the operating system name.

**Note:** You can use the -console parameter to run the installation in command-line mode. To enable a graphical user interface (GUI) installation, install a GUI application such as X Windows and set the DISPLAY environment variable before you install the software.

5. Follow the instructions displayed during installation.

**Note:** If you do not specify an installation directory, TAP Roaming Manager is installed in the /opt/ifw directory.

---

**Uninstalling TAP Roaming Manager**

To uninstall TAP Roaming Manager, run the Pipeline_home/uninstaller/TAPRoamingmanager/uninstaller.bin.
This chapter describes how to set up roaming in Oracle Communications Billing and Revenue Management (BRM) to rate Transferred Account Procedure (TAP) roaming usage events.

**Setting Up Roaming for TAP Roaming Usage Events**

To set up roaming for incollect and outcollect processing, do the following:

1. Install supporting managers. See "Installing Supporting Managers".
2. Use Pricing Center to create network operator accounts in the Pipeline Manager database. When you create network operator accounts, you also define network models and interconnect products for rating roaming usage. See "About Setting Up Network Operator Accounts".
3. Use Customer Center to create roaming partner accounts in the BRM database for storing settlement events and balance impacts. See "Defining Roaming Partner Accounts in the BRM Database".
4. Create rate plans for rating roaming usage. See "Defining Rate Plans for Rating Roaming Usage".
5. Define configuration parameters that are used for settlement processing. See "Defining Configuration Parameters for Roaming".
6. Set up the default TAP currency. See "Setting Up the Default TAP Currency".
7. (Optional) Configure the roaming registry file to also support TAP 3.11. See "Setting Up TAP Roaming Manager to Support TAP 3.11".

By default, TAP Roaming Manager is configured to support TAP 3.12.

**Installing Supporting Managers**

Roaming incollect and outcollect processing for TAP roaming usage events requires Suspense Manager, to process suspended event detail records (EDRs); InterConnect Manager, to rate roaming usage; and Rated Event (RE) Loader, to load roaming usage events into the BRM database.

You must install and configure:

- Suspense Manager. See "Installing Suspense Manager" in *BRM Configuring Pipeline Rating and Discounting*.
- InterConnect Manager. See "Installing InterConnect Manager".
■ Rated Event Loader. See "Installing Rated Event Loader" in BRM Configuring Pipeline Rating and Discounting.

---

**Note:** Suspense Manager, InterConnect Manager, and RE Loader are not part of TAP Roaming Manager and requires separate licenses.

---

**Defining Roaming Partner Accounts in the BRM Database**

You use Customer Center to create roaming partner accounts in the BRM database for each roaming partner network operator, including yourself.

Roaming partner accounts are used to:

■ Store your roaming partner network operator’s contact and payment information.
■ Store your roaming partner’s subscribers’ roaming events.
■ Store roaming charges.
■ Store your roaming partner network operator’s Public Land Mobile Network (PLMN) ID as a service login.
■ Store the Special Drawing Rights (SDR) fraud limits in the corresponding /profile/acct_extrating object.

---

**Note:** Only one account can exist for a roaming partner network operator.

---

To create roaming partner accounts in the BRM database, do the following:

■ Create a roaming plan with incollect and outcollect products with separate balance groups to store roaming charges. See "Creating a Roaming Plan".
■ Create roaming partner accounts using the roaming plan. See "Creating Roaming Partner Accounts Using the Roaming Plan".

---

**Creating a Roaming Plan**

To create a roaming plan:

1. Create a product for incollect settlement called RoamingIncollect with the service /service/settlement/roaming/incollect.
2. Create another product for outcollect settlement called RoamingOutcollect with the service /service/settlement/roaming/outcollect.
3. Create a deal for incollect settlement called RoamingIncollectDeal and add the RoamingIncollect product to it.
4. Create another deal for outcollect settlement called RoamingOutcollectDeal and add the RoamingOutcollect product to it.
5. Create a roaming plan called RoamingPlan by adding the deals created in steps 3 and 4 to it.
6. Assign a balance group to the RoamingIncollect product.
7. Assign a different balance group to the RoamingOutcollect product.
Creating Roaming Partner Accounts Using the Roaming Plan
To create the roaming partner account:
1. Purchase the roaming plan.
2. Assign the balance group associated with RoamingIncollect to a bill unit.
3. Assign the balance group associated with RoamingOutcollect to a different bill unit.

Defining Rate Plans for Rating Roaming Usage
You use Pricing Center to create rate plans and price models that define the criteria used to determine the charge for rating roaming usage.
To create pipeline rate plans and price models, see "About Pipeline Rate Plans" in BRM Setting Up Pricing and Rating.
When you create the rate plan, you can choose to modify or replace the charge passed in the TAP records from your roaming partner network operator. You can increase the passed-in price by a percentage (for example, 15%) or by a fixed amount (for example, $1.00). You can also replace the passed-in price with an amount you enter. See "Using Passthrough Prices" in BRM Setting Up Pricing and Rating.

Defining Configuration Parameters for Roaming
Define the following configuration parameters:
1. Verify that the /item/settlement/roaming item type is defined in the /config/item_types storable object:

<table>
<thead>
<tr>
<th>PIN_FLD_TYPE</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIN_FLD_ITEM_TYPES</td>
<td>ARRAY [6] allocated 6, used 6</td>
</tr>
<tr>
<td>PIN_FLD_DESCR</td>
<td>STR [0] 'Roaming Settlement'</td>
</tr>
<tr>
<td>PIN_FLD_ITEM_SUB_TYPE</td>
<td>STR [0] ''</td>
</tr>
<tr>
<td>PIN_FLD_ITEM_TAG</td>
<td>STR [0] 'roaming_settlement'</td>
</tr>
<tr>
<td>PIN_FLD_ITEM_TAG</td>
<td>STR [0] '/item/settlement/roaming'</td>
</tr>
<tr>
<td>PIN_FLD_PRECREATE</td>
<td>INT [0] 1</td>
</tr>
<tr>
<td>PIN_FLD_TYPE</td>
<td>ENUM [0] 2</td>
</tr>
</tbody>
</table>

If the /item/settlement/roaming item type is not defined, load the BRM_Home\sys\data\pricing\example\config_item_types.xml file into the BRM database by running the load_config_item_types utility. For more information, see "load_config_item_types" in BRM Configuring and Running Billing.

Note: You can refer to the sample roaming settlement plan BRM_Home\PricingCenter\Sample_Price_Plans\RoamingSettlementPlan.ipl file for sample settlement products, deals, and plans.
For roaming to work correctly, the roaming incollect and outcollect products must be assigned to different balance groups.

Note: You can choose to create a separate bill unit for each service or create one bill unit for both services. If you create one bill unit, the incollect and outcollect roaming charges will be summed up in one bill. By creating separate bill units, the incollect and outcollect roaming charges will be in separate bills.
2. Verify that the `roaming_settlement` item tag is defined in the `/config/item_tags` storable object:

   0 PIN_FLD_ITEM_TAGS ARRAY [6] allocated 3, used 3
   1 PIN_FLD_EVENT_TYPE STR [0] "/event/delayed/session/telco/**"  
   1 PIN_FLD_ITEM_TAG STR [0] "roaming_settlement"  
   1 PIN_FLD_SERVICE_TYPE STR [0] "/service/settlement/roaming/**"  

   If the `roaming_settlement` item tag is not defined, load the `BRM_Homesys/data/pricing/example/config_item_tags.xml` file into the BRM database by running the `load_config_item_tags` utility. For more information, see "load_config_item_tags" in BRM Configuring and Running Billing.

3. Verify that the `/service/settlement/roaming/outcollect` and `/service/settlement/roaming/incollect` event types are defined in the `/config/event_map` storable object.

   0 PIN_FLD_EVENT_MAP ARRAY [10] allocated 2, used 2  
   1 PIN_FLD_PERMITTED STR [0] ""  
   /"service/settlement/roaming/outcollect"  
   1 PIN_FLD_EVENTS ARRAY [0] allocated 5, used 5  
   2 PIN_FLD_COUNT INT [0] 0  
   2 PIN_FLD_EVENT_DESCR STR [0] "Roaming Settlement Event"  
   2 PIN_FLD_EVENT_TYPE STR [0] "/event/delayed/session/telco/roaming"  
   2 PIN_FLD_INDICATOR INT [0] 0  
   2 PIN_FLD_UNIT ENUM [0] 0  
   0 PIN_FLD_EVENT_MAP ARRAY [11] allocated 2, used 2  
   1 PIN_FLD_PERMITTED STR [0] ""  
   /"service/settlement/roaming/incollect"  
   1 PIN_FLD_EVENTS ARRAY [0] allocated 5, used 5  
   2 PIN_FLD_COUNT INT [0] 0  
   2 PIN_FLD_EVENT_DESCR STR [0] "Roaming Settlement Event"  
   2 PIN_FLD_EVENT_TYPE STR [0] "/event/delayed/session/telco/roaming"  
   2 PIN_FLD_INDICATOR INT [0] 0  
   2 PIN_FLD_UNIT ENUM [0] 0  

   If the `/service/settlement/roaming/outcollect` and `/service/settlement/roaming/incollect` event types are not defined, edit the `pin_event_map` file and create the event mappings, and then run the `load_event_map` utility, which loads the event mappings into the BRM database. For more information, see "load_event_map" in BRM Setting Up Pricing and Rating.

4. Verify that the SDR currency resource is defined in the `/config/beid` storable object.

   If the SDR currency is not defined, use Resource Editor to define the currency.

5. Verify that the general ledger (G/L) ID used for tracking roaming charges (specified in the registry for ISC_ConsolidatedCP) is defined in the `/config/glid` storable object.

   If the G/L ID for roaming charges is not defined, edit the `pin_glid` file, and then run the `load_pin_glid` utility, which loads the G/L ID. For more information, see "load_pin_glid" in BRM Collecting General Ledger Data.

### Setting Up the Default TAP Currency

BRM roaming uses SDR as the default TAP currency. You can configure BRM to use a currency other than SDR as the default TAP currency.
To configure BRM to use a currency other than SDR as the default TAP currency:

2. Define the exchange rates for the new currency using Pricing Center. See the discussion of setting up currencies and exchange rates in the Pricing Center Help.
3. Configure the new currency as the default TAP currency. See "Configuring the Default TAP Currency".

Configuring the Default TAP Currency

To configure the default TAP currency:

1. Open the roaming registry file (Pipeline_Home/conf/roaming.reg), where Pipeline_Home is the directory in which you installed Pipeline Manager.
2. For all instances of the FCT_ExchangeRate module in the roaming registry, change the HomeCurrency registry entry from SDR to the new default TAP currency.
3. In the TAP input processing pipeline, set the TAPCurrency registry entry to the new default TAP currency.
4. Save and close the file.

---

**Note:** During TAP input file processing, if the TAP input file does not contain a currency in the TapCurrency field and if the TAPCurrency registry entry is set in the roaming registry file, the TAPCurrency value in the registry file is used as the default TAP currency. If the TAP input file does not contain a currency in the TapCurrency field and if the TAPCurrency registry entry is not set in the registry file, the default TAP currency is set to SDR.

---

Setting Up TAP Roaming Manager to Support TAP 3.11

The TAP 3.12 installation directory includes the roaming registry file (Pipeline_Home/conf/roaming.reg) that contains pipelines configured for processing TAP 3.12 files. To process both TAP 3.11 and TAP 3.12 files, you need to update the roaming registry file to contain similar pipeline sections configured for processing TAP 3.11 files.

For example, the pipelines section will contain two sections for the validation pipeline, one section named TAPInProcessingPipeline, for TAP 3.12 files, and another named TAPInProcessingPipeline_0311, for TAP 3.11 files. Each pipeline requires a separate input directory, and each pipeline requires a separate set of grammar files, mapping files, and iScripts.

To set up TAP Roaming Manager to support TAP 3.11:

1. Verify that duplicates of the specific files required to continue processing TAP 3.11 files were created at the start of the installation process.

   Table 6–1 lists the files that should have been duplicated at the start of the installation process. For more information, see the discussion on backing up TAP 3.11 files in BRM Patch Set Installation Guide.
Setting Up Roaming for TAP Roaming Usage Events

2. Open the `Pipeline_Home/conf/roaming.reg` file.

3. Duplicate the TAP 3.12 pipelines (listed in the left-hand column of Table 6–2) and update the duplicated pipelines to use TAP 3.11 (as shown in the right-hand column of Table 6–2) by doing the following:

### Table 6–1 Files Duplicated During Patch Set Installation

<table>
<thead>
<tr>
<th>TAP 3.12 File Name</th>
<th>TAP 3.11 File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAP_0105_AckOutGrammar.dsc</td>
<td>RAP_0105_AckOutGrammar_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_FatalReturn.dsc</td>
<td>RAP_0105_FatalReturn_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_InGrammar.dsc</td>
<td>RAP_0105_InGrammar_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_MissingReturn.dsc</td>
<td>RAP_0105_MissingReturn_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_OutGrammar.dsc</td>
<td>RAP_0105_OutGrammar_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_StopReturn.dsc</td>
<td>RAP_0105_StopReturn_0311.dsc</td>
</tr>
<tr>
<td>containerDesc.dsc</td>
<td>containerDesc_0311.dsc</td>
</tr>
</tbody>
</table>

### Table 6–2 Pipelines Requiring Configuration

<table>
<thead>
<tr>
<th>Pipeline Name and Data Provided for Use with TAP 3.12</th>
<th>Pipeline Name and Data To Be Created for Use with TAP 3.11</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAPCorrectionPipeline</td>
<td>TAPCorrectionPipeline_0311</td>
</tr>
<tr>
<td>RAPInProcessingPipeline</td>
<td>RAPInProcessingPipeline_0311</td>
</tr>
<tr>
<td>TAPOutCollectPipeline</td>
<td>TAPOutCollectPipeline_0311</td>
</tr>
<tr>
<td>TAPOutSettlementPipeline</td>
<td>TAPOutSettlementPipeline_0311</td>
</tr>
<tr>
<td>TAPInProcessingPipeline</td>
<td>TAPInProcessingPipeline_0311</td>
</tr>
<tr>
<td>StopRapGeneratorPipeline</td>
<td>StopRapGeneratorPipeline_0311</td>
</tr>
</tbody>
</table>

**Important:** The backup procedure during the installation used the extension `_0311` to rename the required TAP 3.11 files and to associate them with the TAP 3.11 version to which they belong.

The following steps use that `_0311` name extension to update the `roaming.reg` file with the registry configuration appropriate for the processing of TAP 3.11 roaming usage events.

If you chose a different naming structure for these files during the backup step, then, make sure that the `roaming.reg` file is updated to reflect that naming structure for proper processing of TAP 3.11 roaming usage events.

a. Find the section for each pipeline under Pipelines.

For example, the section for TAPInProcessingPipeline is:

```plaintext
TAPInProcessingPipeline
{
    Active = True
    ...  # END of Output
} # END TAPInProcessingPipeline
```
b. Copy this entire section and paste it immediately under the original section.

c. Rename the copied section to the name (appropriate for TAP 3.11) in the right-hand column of Table 6–2.

For example:

```
TAPInProcessingPipeline_0311
{
    Active = True
    ...
    ...
} # END of Output
} # END TAPInProcessingPipeline_0311
```

You should now have two sections for that pipeline, the TAP 3.12 section followed by the duplicate (renamed) pipeline section for TAP 3.11. For example:

```
TAPInProcessingPipeline
{
    Active = True
    ...
    ...
} # END of Output
} # END TAPInProcessingPipeline
TAPInProcessingPipeline_0311
{
    Active = True
    ...
    ...
} # END of Output
} # END TAPInProcessingPipeline_0311
```

d. The newly-created section for the TAP 3.11 pipeline contains TAP 3.12 iScript, grammar, and container description file names (because of the copying), so you must change the iScript, grammar, and container description file names for TAP 3.11 processing (using the entries in Table 6–3).

For example, change the `Grammar` registry entry for TAPInProcessingPipeline_0311 from:

```
Grammar = ./formatDesc/Formats/TAP3-NG/TAP_0312_InGrammar.dsc
```

to

```
Grammar = ./formatDesc/Formats/TAP3-NG/TAP_0311_InGrammar.dsc
```

This makes the `Grammar` registry entry in the TAPInProcessingPipeline_0311 section appropriate for processing TAP 3.11 roaming usage events:

```
TAPInProcessingPipeline_0311
{
    Active = True
    ...
    Grammar = ./formatDesc/Formats/TAP3-NG/TAP_0311_InGrammar.dsc
    ...
} # END of Output
} # END TAPInProcessingPipeline_0311
Table 6–3 lists file names you need to change in the TAP 3.11 pipeline to set up iScript, grammar, and container description files appropriate for TAP 3.11.

---

**Note:** Not all the file names are contained in a pipeline section. For example, neither the original nor the duplicate section for TAPCorrectionPipeline contains the ISC_TAP_0312_Validations iScript entry (which is used to validate TAP 3.12 input data).

---

### Table 6–3 Basic Configuration Data for Duplicated Pipelines

<table>
<thead>
<tr>
<th>TAP 3.12 File Name</th>
<th>TAP 3.11 File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAP_0312_OutGrammar.dsc</td>
<td>TAP_0311_OutGrammar.dsc</td>
</tr>
<tr>
<td>TAP_0312_InGrammar.dsc</td>
<td>TAP_0311_InGrammar.dsc</td>
</tr>
<tr>
<td>TAP_0312_Blocks.dsc</td>
<td>TAP_0311_Blocks.dsc</td>
</tr>
<tr>
<td>ISC_TAP_0312_Validations.isc</td>
<td>ISC_TAP_0311_Validations.isc</td>
</tr>
<tr>
<td>ISC_TAP_0312_InMap.isc</td>
<td>ISC_TAP_0311_InMap.isc</td>
</tr>
<tr>
<td>RAP_0105_AckOutGrammar.dsc</td>
<td>RAP_0105_AckOutGrammar_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_FatalReturn.dsc</td>
<td>RAP_0105_FatalReturn_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_InGrammar.dsc</td>
<td>RAP_0105_InGrammar_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_MissingReturn.dsc</td>
<td>RAP_0105_MissingReturn_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_OutGrammar.dsc</td>
<td>RAP_0105_OutGrammar_0311.dsc</td>
</tr>
<tr>
<td>RAP_0105_StopReturn.dsc</td>
<td>RAP_0105_StopReturn_0311.dsc</td>
</tr>
<tr>
<td>containerDesc.dsc</td>
<td>containerDesc_0311.dsc</td>
</tr>
</tbody>
</table>

---

e. Configure the entry for **InputPath** in the **InputStream** section for the newly-created pipeline, as appropriate for TAP 3.11.

Change the following:

```
InputPath = ./data/incollect/tapin/in
```

to

```
InputPath = ./data/incollect/tapin/in_0311
```

For example:

```plaintext
InputStream
{
    ModuleName = EXT_InFileManager
    Module
    {
        InputPath = ./data/incollect/tapin/in_0311

...}
```

f. Configure the entry for **DonePath** in the **InputStream** section for the newly-created pipeline, as appropriate for TAP 3.11.

Change the following:

```
DonePath = ./data/incollect/tapin/done
```

to

```
DonePath = ./data/incollect/tapin/done_0311
```
DonePath = ./data/incollect/tapin/done_0311

For example:
InputStream
{
    ModuleName = EXT_InFileManager
    Module
    {
        DonePath = ./data/incollect/tapin/done_0311
    }
    ...
}

g. Configure the entry for ErrorPath in the InputStream section for the newly-created pipeline, as appropriate for TAP 3.11.

Change the following:
ErrorPath = ./data/incollect/tapin/error

to
ErrorPath = ./data/incollect/tapin/error_0311

For example:
InputStream
{
    ModuleName = EXT_InFileManager
    Module
    {
        ErrorPath = ./data/incollect/tapin/error_0311
    }
    ...
}

Repeat these steps for the remaining pipelines listed in Table 6–2.

4. Save and close the file.

Verifying the Processing of Roaming Usage Events

To verify that TAP Roaming Manager processes roaming usage events correctly, check the following:

- The files are successfully processed and placed in the appropriate output processing directories.
- Error directories for errors
- Stream logs for errors

Improving System Performance when Rating Roaming Events

When you process TAP records and other service events (for example, GSM) in parallel, it can affect your system's performance. This occurs when TAP records are older than the GSM records. For accounts that have changed, the system has to reload old and new account data constantly which results in increased database access. You can improve system performance by creating a separate Pipeline Manager instance to process the TAP records separately.
This chapter describes how to configure Oracle Communications Billing and Revenue Management (BRM) Pipeline Manager for roaming incollect processing.

**Note:** The following pipeline configuration applies to rating TAP roaming usage events only.

See "About Processing Home Subscribers' Roaming Usage" for more information about roaming incollect processing.

### Setting Up Roaming Incollect Processing Pipelines

Configure the following pipelines to set up roaming incollect processing:

- Configuring the Validation Pipeline
- Configuring the Reprice Pipeline
- Configuring the Incollect Settlement Pipeline
- Configuring the Stop RAP Generator Pipeline

### Configuring the Validation Pipeline

Configure the validation pipeline by performing the following tasks:

- Configuring the Validation Pipeline EDRFactory Registry
- Configuring the Validation Pipeline DataDescription Registry Section
- Configuring Validation Pipeline Input Processing
- Configuring Validation Pipeline Function Modules
- Configuring Validation Pipeline Output Processing

**Note:** For an example of validation pipeline configuration, see `Pipeline_home/conf/roaming.reg`.

### Configuring the Validation Pipeline EDRFactory Registry

Set the **EDRFactor Description** entry to the TAP container description file as follows:

`Description = ./formatDesc/Formats/TAP3-NG/containerDesc.dsc`
Configuring the Validation Pipeline DataDescription Registry Section

Configure the validation pipeline DataDescription registry section by setting the stream formats, input mapping, and output mapping as follows:

```
DataDescription
{
  Standard
  {
    ModuleName = Standard
    Module
    {
      StreamFormats
      {
        Generic = ./formatDesc/Formats/TAP3-NG/GenericBlocks.dsc
        TAP = ./formatDesc/Formats/TAP3-NG/TAP_0312_Blocks.dsc
        RAP = ./formatDesc/Formats/TAP3-NG/RAP_0105_Blocks.dsc
        SOL42 = ./formatDesc/Formats/Solution42/SOL42_V670_REL.dsc
      }
      InputMapping
      {
      }
      OutputMapping
      {
        SOL42 = ./formatDesc/Formats/Solution42/SOL42_V670_REL_OutMap.dsc
      }
    }
  }
}
```

Configuring Validation Pipeline Input Processing

Configure input processing for the validation pipeline as follows:

1. (Optional) Configure a Batch Controller and a Batch Handler to send TAP files that you receive from the clearing house or your roaming partner to the input directory of the validation pipeline.

```
Note: You do not need to configure a Batch Controller and a Batch Handler if your mediation system is set up to send incoming TAP files directly to the validation pipeline.
```

For more information about configuring a Batch Controller, see "Controlling Batch Operations" in BRM System Administrator’s Guide.

2. Configure sequence checking of incoming TAP files.

```
a. Using Pricing Center, define a Sequence Checker with multiple sequences. Define each sequence by specifying a sequence key that is the same as the roaming partner ID. See the discussion of defining a sequence check in BRM Pricing Center Online Help for more information.

b. Edit the SequencerPool section of the pipeline registry.

  – Set the sequencer instance to the name of the Sequence Checker defined in step a above.

  – Set the SequencerType registry entry to Check.
```

See "Sequencer" in BRM Configuring Pipeline Rating and Discounting for more information.
c. Assign the Sequencer to the pipeline output controller.
   
   - Set the **Sequencer** registry entry in the pipeline output controller to the name of the Sequence Checker.
   
   See "Output Controller" in *BRM Configuring Pipeline Rating and Discounting* for more information.

   The following is a sample configuration for a Sequence Checker called SEQ_CHECK_TAPIN:

   ```plaintext
   SequencerPool {
     SEQ_CHECK_TAPIN {
       Source = Database Controller {
         SequencerType = Check
         ReuseGap = True
         SequenceLength = 5
         DatabaseConnection = ifw.DataPool.Login
       }
     }
   }
   ...
   ...
   ...
   ...
   ...
   Output {
     SequenceGeneration = Transaction
     Sequencer = SEQ_CHECK_TAPIN
   }
   ```

   See "Checking and Generating Sequence Numbers" in *BRM System Administrator’s Guide* for more information about configuring Sequencers.

3. Configure the INP_GenericStream input module, which maps TAP input data to staging fields in the EDR container using the TAP input grammar file.
   
   a. Set the **Grammar** entry to the name of the TAP input grammar description file:
      
      ```plaintext
      Grammar = ./formatDesc/Formats/TAP3-NG/TAP_0312_InGrammar.dsc
      ```
   
   b. Configure the **EXT_InFileManager** registry entry to specify information about the input file. See "EXT_InFileManager" in *BRM Configuring Pipeline Rating and Discounting* for more information.

**Configuring Validation Pipeline Function Modules**

Configure the registry for the following modules:

- **ISC_TAP_0312_Validations**, which validates the TAP input data. See the discussion of the ISC_TAP_0312_Validations iScript in *BRM Configuring Pipeline Rating and Discounting*.

- **ISC_TAP_0312_InMap**, which maps TAP data from staging fields to the business fields in the EDR container. See the discussion of the ISC_TAP_0312_InMap iScript in *BRM Configuring Pipeline Rating and Discounting*.

- **FCT_Reject**, which sends invalid TAP records to the reject stream.
- Set the **StreamMap** and **UseRejectStream** registry entries to the reject output stream.

See "FCT_Reject" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- UpdateTapInfo_Tapin, which stores information about incoming TAP files in the IFW_TAPINFO table used by the **StopRapGen** utility. See "UpdateTapInfo_Tapin" in *BRM Configuring Pipeline Rating and Discounting*.

### Configuring Validation Pipeline Output Processing

Configure output processing for the validation pipeline as follows:

1. Configure sequence generation for RAP files.
   a. Using Pricing Center, define a Sequence Generator. See the discussion of defining a Sequence Generator in *BRM Pricing Center Online Help*.
   b. Edit the **SequencerPool** section of the registry.
      - Set the **SequencerInstance** registry entry to the name of the Sequence Checker defined in step a above.
      - Set the **SequencerType** registry entry to **Generation**.

      See "Sequencer" in *BRM Configuring Pipeline Rating and Discounting* for more information.

      For more information about configuring Sequencers, see "Checking and Generating Sequence Numbers" in *BRM System Administrator’s Guide*.

2. Configure a RAP output stream to write invalid TAP files and records to RAP files.
   a. Set the **Grammar** registry entry for the OUT_GenericStream module to the name of the RAP output grammar description file:

      ```
      Grammar = ./formatDesc/Formats/TAP3-NG/RAP_0105_OutGrammar.dsc
      ```

   b. Set the **Sequencer** registry entry for OUT_GenericStream to the Sequence Generator defined in step 1a above.

3. Configure fatal RAP file generation by configuring the input module to write TAP files with a fatal error to a RAP file.
   a. Set the **RapOutStream** registry entry for the INP_GenericStream module to the RAP output stream.
   b. Set the **Sequencer** registry entry for INP_GenericStream to the Sequence Generator defined in step 1a above.

4. Configure another output stream to write valid event data records (EDRs) to an output file to be processed by the reprice and incollect settlement pipelines.
   a. Set the **Grammar** registry entry for the OUT_GenericStream module to the BRM SOL42 output grammar description file:

      ```
      Grammar=./FormatDesc/Formats/Solution42/SOL42_V670_REL_OutGrammar.dsc
      ```

   b. Configure the EXT_OutFileManager registry entry to specify output file information. See "EXT_OutFileManager" in *BRM Configuring Pipeline Rating and Discounting* for more information.

5. Configure Event Handler to send output files to the reprice and incollect settlement pipelines.
a. Add the **Events** subsection as shown below to the **EventHandler** registry:

```
EventHandler
{
    ModuleName = EVT
    Module
    {
        Events
        {
            {
                EVT_OUTPUT_FILE_READY = ./bin/move_incollect_roam.pl
            }
        }
    }
}
```

where:

- **TAPInProcessingPipeline** is the name of the validation pipeline.
- **TAPInProcessingOutput** is the output stream for writing valid EDRs.

See "Event Handler" in BRM Configuring Pipeline Rating and Discounting for more information.

b. Edit the **move_incollect_roam.pl** script.

Edit the following line to specify the input directory of the reprice pipeline:

```
my $COPY_DIR = "$ENV{IFW_HOME}/data/incollect/reprice/in";
```

Edit the following line to specify the input directory of the incollect settlement pipeline:

```
my $MOVE_DIR = "$ENV{IFW_HOME}/data/incollect/settlement/in";
```

### Configuring the Reprice Pipeline

Configure the reprice pipeline by performing the following tasks:

- Configuring the Reprice Pipeline DataDescription Registry Section.
- Configuring Reprice Pipeline Input Processing.
- Configuring Validation Pipeline Function Modules.
- Configuring Reprice Pipeline Output Processing.
- Configuring DAT_InterConnect.
- Configuring Rated Event Loader for the Reprice Pipeline.
- Configuring Suspense Manager for the Reprice Pipeline.

**Note:** For an example of reprice pipeline configuration, see `Pipeline_home/conf/roaming.reg`.

### Configuring the Reprice Pipeline DataDescription Registry Section

Configure the reprice pipeline **DataDescription** registry section by setting the stream formats, input mapping, and output mapping as follows:
Configuring Reprice Pipeline Input Processing
Configure input processing for the reprice pipeline as follows:

1. Configure the INP_GenericStream input module, which maps the contents of the validation pipeline output file into EDR container fields.
   a. Set the Grammar registry entry to the standard BRM input grammar description file:
      
      \[ \text{Grammar} = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InGrammar.dsc \]
   
   b. Configure the EXT_InFileManager registry entry to specify input file information. See “EXT_InFileManager” in BRM Configuring Pipeline Rating and Discounting for more information.

Configuring Reprice Pipeline Function Modules
Configure the registry for the following modules:

- ISC_ConsolidatedCP, which removes all non-00 impact category charge packets and sets the General Ledger (G/L) ID. See "ISC_ConsolidatedCP" in BRM Configuring Pipeline Rating and Discounting for more information.
  
  Use the GL_CODE entry to assign the G/L ID for the event balance impacts.

- FCT_ServiceCodeMap, which maps external service codes to internal service codes. See "FCT_ServiceCodeMap" in BRM Configuring Pipeline Rating and Discounting for more information.

- FCT_UsageClassMap, which maps external codes for supplementary services, such as call forwarding, to internal usage classes. See "FCT_UsageClassMap" in BRM Configuring Pipeline Rating and Discounting for more information.

- FCT_Account, which identifies the subscriber account that generated the event. See "FCT_Account" in BRM Configuring Pipeline Rating and Discounting for more information.
- **ISC_ApplyTax**, which checks whether incoming roaming charge tax amounts need to be passed on to the subscriber. See "Choosing Whether to Apply Taxes for Roaming" and "ISC_ApplyTax" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_Filter_Set**, which adds system products and discounts to the subscriber’s list of products. See "FCT_Filter_Set" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_CustomerRating**, which supplies rate plans for the FCT_MainRating module. See "FCT_CustomerRating" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_PreRating**, which calculates zones and creates impact categories.

- **FCT_USC_Map**, which performs usage scenario mappings. See "FCT_USC_Map" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_MainRating**, which performs the main rating functionality in the pipeline. You can rerate the call, do markup, passthrough, etc. See "FCT_MainRating" in *BRM Configuring Pipeline Rating and Discounting* for more information.
  
  - The total charge amount in the charge packets created by the input file should match the *wholesale_charged_amount* under the detail block.
  
  - Based on the rating product, the rating module will create an *ASS_CBD* with one CP.
  
  - **FCT_MainRating** works on the *ASS_CBD* rating and *wholesale_charged_amount* markup and updates the *chargeamount* field in the CP under *ASS_CBD* created by *CustomerRating*.

- **FCT_Rounding**, which performs rounding of the charge value calculated by rating. See "FCT_Rounding" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_ExchangeRate**, which converts the TAP currency (SDR) to the subscriber’s billing currency (for example, EURO). The exchange rate is determined based on the call time. See "FCT_ExchangeRate" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_DiscountAnalysis**, which performs discounting analysis functions. See "FCT_DiscountAnalysis" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_PreDiscount**, which determines the discount impact category.

- **FCT_Discount**, which calculates and applies discounts. See "FCT_Discount" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_Rounding**, which rounds the discount value calculated by discounting. See "FCT_Rounding" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_ApplayBalance**, which adds discounts to the EDR balance. See "FCT_ApplayBalance" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_ItemAssign**, which identifies an appropriate bill item to be assigned to the EDR. See "FCT_ItemAssign" in *BRM Configuring Pipeline Rating and Discounting* for more information.
FCT_BillingRecord, which creates the balance impact information from the charge amount provided in the EDR and associates this impact to the bill item. Set the following entries:

```
CurrencyType = B
ChargeBreakDownRecord = 980
```

See "FCT_BillingRecord" in *BRM Configuring Pipeline Rating and Discounting* for more information.

### Configuring Reprice Pipeline Output Processing

Configure output processing for the reprice pipeline as follows:

1. Configure routing of EDRs to separate output streams based on service type.
   
   a. For each service type, configure an output module to write rated EDRs to an output file. This file is loaded into the BRM database by Rated Event (RE) Loader.
      
      - Set the Grammar registry entry for OUT_GenericStream to the RE Loader output grammar description file:
        
        ```
        Grammar = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutGrammar.dsc
        ```
      
      - Configure the EXT_OutFileManager registry entry to specify output file information.
        
        See "EXT_OutFileManager" in *BRM Configuring Pipeline Rating and Discounting* for more information.

   b. Configure the IRL_EventTypeSplitting module to send EDRs to separate output streams based on service type. See "IRL_EventTypeSplitting" in *BRM Configuring Pipeline Rating and Discounting* for more information.

### Configuring DAT_InterConnect

The DAT_InterConnect module provides network operator configuration information that is accessed by the ISC_ApplyTax module.

Configure the DAT_InterConnect module in the DataPool registry section. When you configure DAT_InterConnect, you specify database connection information to the BRM database.

See "DAT_InterConnect" in *BRM Configuring Pipeline Rating and Discounting* for more information.

### Configuring Rated Event Loader for the Reprice Pipeline

You must configure RE Loader to load events rated by the reprice pipeline into the BRM database. When you configure RE Loader, you specify information about how to connect to the BRM database, the location of the output file created by the reprice pipeline, how to process the events in the file, and so forth.

For complete details on how to configure RE Loader, see "Configuring Rated Event Loader" in *BRM Configuring Pipeline Rating and Discounting*.

### Configuring Suspense Manager for the Reprice Pipeline

You must configure Suspense Manager pipeline components to process EDRs suspended by the reprice pipeline.
EDRs suspended by the reprice pipeline are processed by using the following Suspense Manager components:

- **FCT_PreSuspense**, which appends suspense-related information to the EDR. See "FCT_PreSuspense" in BRM Configuring Pipeline Rating and Discounting for more information.

- **FCT_Reject**, which sends suspended EDRs to the reject output stream. See "FCT_Reject" in BRM Configuring Pipeline Rating and Discounting for more information.

- **FCT_Suspense**, which adds suspense reason and suspense subreason codes to the EDRs. See "FCT_Suspense" in BRM Configuring Pipeline Rating and Discounting for more information.

- **Suspended Event (SE) Loader**, which loads suspended events from the reject output stream into the BRM database.

- **Suspense Management Center**, which is used to query and edit the suspended events. After making the necessary corrections, you submit the suspended events to be recycled. When suspended events are submitted to be recycled, Suspense Management Center publishes a notification event that is queued in the BRM database to notify Pipeline Manager that events are ready to be recycled.

- **DAT_Listener**, which dequeues the notification event from the BRM database and notifies the DAT_Recycle module. See "DAT_Listener" in BRM Configuring Pipeline Rating and Discounting for more information.

- **DAT_Recycle**, which creates a parameter file that allows the EXT_InEasyDB module to read suspended usage records associated with a recycle job. It also provides an interface for the INP_Recycle module to provide status updates about the EDR stream. See "DAT_Recycle" in BRM Configuring Pipeline Rating and Discounting for more information.

- **The pre-recycle pipeline**, which sends the EDRs to the reprice pipeline to be rated again.

For instructions on how to configure Suspense Manager, see "Configuring Suspense Manager" in BRM Configuring Pipeline Rating and Discounting.

### Configuring the Incollect Settlement Pipeline

Configure the incollect settlement pipeline by performing the following tasks:

- **Configuring the Incollect Settlement Pipeline DataDescription Registry Section**.
- **Configuring Incollect Settlement Pipeline Input Processing**.
- **Configuring Incollect Settlement Pipeline Function Modules**.
- **Configuring Incollect Settlement Pipeline Output Processing**.
- **Configuring Rated Event Loader for the Incollect Settlement Pipeline**.
- **Configuring Suspense Manager for the Incollect Settlement Pipeline**.

**Note:** For an example of incollect settlement pipeline configuration, see Pipeline_home/conf/roaming.reg.

### Configuring the Incollect Settlement Pipeline DataDescription Registry Section

Configure the incollect settlement pipeline DataDescription registry section by setting the stream formats, input mapping, and output mapping as follows:
DataDescription
{
    Standard
    {
        ModuleName = Standard
        Module
        {
            StreamFormats
            {
                SOL42_FORINPUT = ./formatDesc/Formats/Solution42/SOL42_V670_REL_FORINPUT.dsc
                EVENT_LOADER = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER.dsc
            }
            InputMapping
            {
                SOL42_FORINPUT = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InMap.dsc
            }
            OutputMapping
            {
                EVENT_LOADER = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutMap.dsc
            }
        }
    }
}

Configuring Incollect Settlement Pipeline Input Processing
Configure input processing for the incollect settlement pipeline as follows:

1. Configure the INP_GenericStream input module, which maps the output file from the validation pipeline into EDR container fields:
   a. Set the Grammar registry entry to the BRM SOL42 input grammar description file:
      
      Grammar = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InGrammar.dsc

2. Configure the EXT_InFileManager registry entry to specify input file information. See "EXT_InFileManager" in BRM Configuring Pipeline Rating and Discounting for more information.

Configuring Incollect Settlement Pipeline Function Modules
Configure the registry for the following modules:

- ISC_ConsolidatedCP, which removes all non-00 impact category charge packets and sets the G/L ID. See "ISC_ConsolidatedCP" in BRM Configuring Pipeline Rating and Discounting for more information.
  
  Use the GL_CODE entry to assign the G/L ID for incollect settlement event balance impacts.

- FCT_ServiceCodeMap, which maps external service codes to internal service codes. Set MapGroup as follows:
  
  MapGroup = INCOLLECT

  See "FCT_ServiceCodeMap" in BRM Configuring Pipeline Rating and Discounting for more information.

- FCT_Account, which determines the roaming partner account and associates the EDR with this account. See "FCT_Account" in BRM Configuring Pipeline Rating and Discounting for more information.
- **FCT_ExchangeRate**, which converts charge amount in the charge packets to the subscriber’s billing currency. See "FCT_ExchangeRate" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_ItemAssign**, which assigns the bill item associated with the roaming partner account’s incollect service to the EDR. See "FCT_ItemAssign" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **FCT_BillingRecord**, which creates the balance impact information from the charge amount provided in the EDR and associates this impact to the bill item. Set the following entries as follows:
  
  ```
  CurrencyType = B
  ChargeBreakDownRecord = 980
  ```

  See "FCT_BillingRecord" in *BRM Configuring Pipeline Rating and Discounting* for more information.

- **ISC_RollbackSettlement**, which rolls back transactions when an error occurs. See "ISC_RollbackSettlement" in *BRM Configuring Pipeline Rating and Discounting* for more information.

### Configuring Incollect Settlement Pipeline Output Processing

Configure output processing for the incollect settlement pipeline as follows:

1. Configure GPRS and GSM EDR splitting.
   a. Create a system brand called GSMR to associate with GSM EDRs; create a system brand called GPRSR to associate with GPRS EDRs. See the discussion of creating system brands in *BRM Pricing Center Online Help* for more information.
   b. Define splitting rules and associate the rules with the system brands. See the discussion of defining splitting types in *BRM Pricing Center Online Help* for more information.
   c. Configure the **FCT_EnhancedSplitting** module and use the **SystemBrands** entry to map the system brands to the GPRS and GSM output streams as follows:

   ```
   ModuleName = FCT_EnhancedSplitting
   Module
   
   [Active = True
    DataConnection = ifw.DataPool.Login
    DefaultOutput = GSMOutput
    SystemBrands
    {
     GSMR = GSMOutput
     GPRSR = GPRSOutput
    }
   ]
   ```

2. Configure an output stream to write GSM EDRs to an output file to be processed by RE Loader by configuring the **OUT_GenericStream** module as follows:
   a. Set **EventType** to `/event/delayed/session/telco/gsm/roaming`.
   b. Set the **Grammar** entry to the name of the RE Loader output grammar description file:

   ```
   Grammar = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutGrammar.dsc
   ```
3. Configure another output stream to write GPRS EDRs to an output file to be processed by RE Loader by configuring the OUT_GenericStream module as follows:
   a. Set EventType to /event/delayed/session/telco/gprs/roaming.
   b. Set the Grammar entry to the name of the RE Loader output grammar description file:
      \[
      \text{Grammar = ./formatDesc/Formats/Solution42/V670EVENT_LOADER_OutGrammar.dsc}
      \]
   c. Configure the EXT_OutFileManager registry entry to specify output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting for more information.

Configuring Rated Event Loader for the Incollect Settlement Pipeline

You must configure RE Loader to load settlement events into the BRM database. When you configure RE Loader, you specify information about how to connect to the BRM database, the location of the output files created by the incollect settlement pipeline, how to process the events in the output file, and so forth.

For complete details on how to configure RE Loader, see "Configuring Rated Event Loader" in BRM Configuring Pipeline Rating and Discounting.

Configuring Suspense Manager for the Incollect Settlement Pipeline

You must configure Suspense Manager pipeline components to process input files suspended by the incollect settlement pipeline.

Input files suspended by the incollect settlement pipeline are processed by using the following Suspense Manager components:

- FCT_BatchSuspense, which suspends the input file and creates a batch suspense file. See "FCT_BatchSuspense" in BRM Configuring Pipeline Rating and Discounting for more information.
- Suspended Batch (SB) Loader, which loads the batch suspense file into the BRM database.
- Suspense Management Center, which is used to query and edit the batch suspense file. After making the necessary corrections, you submit the batch suspense file to be recycled. When the file is submitted for recycling, Suspense Management Center publishes a notification event to notify Pipeline Manager that the batch suspense file is ready for recycling.
- DAT_Listener, which dequeues the notification event from the BRM database and notifies the DAT_ResubmitBatch module. See "DAT_Listener" in BRM Configuring Pipeline Rating and Discounting for more information.
- DAT_ResubmitBatch, which retrieves the suspended batch file from the BRM database and sends it to the incollect settlement pipeline for processing again. See "DAT_ResubmitBatch" in BRM Configuring Pipeline Rating and Discounting for more information.

For instructions on how to configure Suspense Manager, see "Configuring Suspense Manager" in BRM Configuring Pipeline Rating and Discounting.
Configuring the Stop RAP Generator Pipeline

Configure the Stop RAP Generator pipeline by performing the following tasks:

- Configuring the Stop RAP Generator Pipeline EDRFactory Registry
- Configuring the Stop RAP Generator Pipeline DataDescription Registry Section
- Configuring Input Processing for the Stop RAP Generator Pipeline
- Configuring the Stop RAP Generator Pipeline Function Modules
- Configuring Output Processing for the Stop RAP Generator Pipeline

**Note:** For an example of Stop RAP Generator pipeline configuration, see *Pipeline_home/conf/roaming.reg*.

Configuring the Stop RAP Generator Pipeline EDRFactory Registry

Configure the *EDRFactory Description* entry to the TAP container description file as follows:

```
Description = ./formatDesc/Formats/TAP3-NG/containerDesc.dsc
```

Configuring the Stop RAP Generator Pipeline DataDescription Registry Section

Configure the Stop RAP Generator pipeline *DataDescription* registry section by setting the stream formats, input mapping, and output mapping as follows:

```
DataDescription
{
    Standard
    {
        ModuleName = Standard Module
        {
            StreamFormats
            {
                Stop_RAP = ./formatDesc/Formats/TAP3-NG/StopRapInfo.dsc
                Generic = ./formatDesc/Formats/TAP3-NG/GenericBlocks.dsc
                TAP3 = ./formatDesc/Formats/TAP3-NG/TAP_0312_Blocks.dsc
                RAP = ./formatDesc/Formats/TAP3-NG/RAP_0105_Blocks.dsc
            }
            InputMapping
            {
                Mapping1 = ./iScriptLib/iScriptLib_Roaming/StopRapInfo_InMap.dsc
            }
        }
    }
}
```

Configuring Input Processing for the Stop RAP Generator Pipeline

Configure input processing for the Stop RAP Generator pipeline as follows:
1. Ensure that the input to this pipeline is the file generated by the `StopRapGen` utility. (The pathname for the output directory of the flat file generated by the `StopRapGen` utility is the input directory of the Stop RAP Generator pipeline.)

2. Configure the INP_GenericStream input module, which maps data from the file generated by the `StopRapGen` utility to staging fields in the EDR container using the grammar file.
   a. Set the `Grammar` registry entry to the name of the input grammar description file:
      
      ```bash
      Grammar = ./formatDesc/Formats/TAP3-NG/StopRapInfo_InGrammar.dsc
      ```

   b. Configure the `EXT_InFileManager` registry entry to specify information about the input file. See "EXT_InFileManager" in BRM Configuring Pipeline Rating and Discounting for more information.

Configuring the Stop RAP Generator Pipeline Function Modules

Configure the registry for the `UpdateTapInfo_StopRapout` iScript. This iScript updates the information about the Stop Return RAP files that have been generated in the BRM database. See "UpdateTapInfo_StopRapout" in BRM Configuring Pipeline Rating and Discounting for more information.

Configuring Output Processing for the Stop RAP Generator Pipeline

Configure output processing for the Stop RAP Generator pipeline as follows:

1. Set the `Grammar` registry entry for the OUT_GenericStream module to the name of the RAP output grammar description file:

```
Grammar = ./formatDesc/Formats/TAP3-NG/RAP_0105_OutGrammar.dsc
```

2. Set the `DeleteEmptyStream` registry entry to specify whether to delete empty output streams. The default is `True`. For example,

```
DeleteEmptyStream = False
```

3. Set the `Sequencer` registry entry for OUT_GenericStream to the Sequence Generator:

```
Sequencer = SEQ_GEN_RAPOUT
```

where `SEQ_GEN_RAPOUT` is the Sequencer used for the RAP output stream of the validation pipeline.

See "Configuring Validation Pipeline Output Processing" for more information.

4. Set the `StopRapStream` registry entry to `True`.

```
StopRapStream = True
```

5. Configure the `EXT_OutFileManager` registry entry to specify output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting.
This chapter describes how to configure Oracle Communications Billing and Revenue Management (BRM) Pipeline Manager for roaming outcollect processing.

**Note:** The following pipeline configuration applies to rating TAP roaming usage events only.

For more information about roaming outcollect processing, see "About Processing Visiting Subscribers’ Roaming Usage".

### Setting Up Roaming Outcollect Processing Pipelines

Configure the following pipelines to set up roaming outcollect processing:

- Configuring the Splitter Pipeline
- Configuring the Outcollect Rating Pipeline
- Configuring the Outcollect Settlement Pipeline
- Configuring the RAP Processing Pipeline
- Configuring the TAP Correction Pipeline
- Configuring the Backout Pipeline

### Configuring the Splitter Pipeline

Configure the splitter pipeline by performing the following tasks:

- Configuring the Splitter Pipeline DataDescription Registry Section
- Configuring the Splitter Pipeline Input Processing
- Configuring the Splitter Pipeline Function Modules
- Configuring the Splitter Pipeline Output Processing

**Note:** For an example of splitter pipeline configuration, see *Pipeline_home/conf/roaming.reg*. 
Configuring the Splitter Pipeline DataDescription Registry Section

Configure the splitter pipeline DataDescription registry section by setting the stream formats, input mapping, and output mapping as follows:

```json
DataDescription
{
    Standard
    {
        ModuleName = Standard
        Module
        {
            StreamFormats
            {
                SOL42_FORINPUT = ./formatDesc/Formats/Solution42/SOL42_V670_REL_FORINPUT.dsc
                SOL42 = ./formatDesc/Formats/Solution42/SOL42_V670_REL.dsc
            }
            InputMapping
            {
                SOL42_FORINPUT = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InMap.dsc
            }
            OutputMapping
            {
                SOL42 = ./formatDesc/Formats/Solution42/SOL42_V670_REL_OutMap.dsc
            }
        }
    }
}
```

Configuring the Splitter Pipeline Input Processing

Configure input processing for the splitter pipeline as follows:

1. (Optional) Configure a Batch Controller and a Batch Handler to send call data records (CDRs) from your mediation system to the input directory of the splitting pipeline.

   For more information about configuring a Batch Controller, see "Controlling Batch Operations" in BRM System Administrator’s Guide.

2. Configure the INP_GenericStream input module to map CDR fields to event data record (EDR) container fields:
   a. Set the Grammar registry entry to the standard BRM input grammar description file:

   ```
   Grammar = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InGrammar.dsc
   ```
   b. Configure the EXT_InFileManager registry entry to specify information about the input file. See "EXT_InFileManager" in BRM Configuring Pipeline Rating and Discounting.
Setting Up Roaming Outcollect Processing Pipelines

**Note:** In the default `Pipeline_home/conf/roaming.reg` registry file, the input format is the standard BRM input grammar. If you are using a different input format, you will need to modify the input grammar.

For example:

```
Grammar = ./formatDesc/Formats/Solution42/yourInputGrammarFile.dsc
```

See "Configuring EDR Input Processing" in *BRM Configuring Pipeline Rating and Discounting*.

---

**Configuring the Splitter Pipeline Function Modules**

The splitter pipeline uses the FCT_EnhancedSplitting module to split EDRs into home and roaming EDRs. See "Configuring splitter pipeline input processing".

**Configuring the Splitter Pipeline Output Processing**

Configure output processing for the splitter pipeline as follows:

1. Configure routing home and roaming EDRs to different output streams as follows:
   
   a. Create a system brand called **HOME** to associate with home EDRs and a system brand called **ROAM** to associate with roaming EDRs. See the discussion of creating system brands in BRM Pricing Center Online Help.
   
   b. Define splitting rules and associate the rules with the system brands. See the discussion of defining splitting types in BRM Pricing Center Online Help.
   
   c. Configure FCT_EnhancedSplitting and use the **SystemBrand** entry to map the system brands to the home and roaming EDR output streams as follows:

   ```
   ModuleName = FCT_EnhancedSplitting
   Module {
     Active             = True
     DataConnection     = ifw.DataPool.Login
     DefaultOutput      = RoamOutput
     SystemBrands {
       HOME              = HomeOutput
       ROAM              = RoamOutput
     }
   }
   ```

   The **DefaultOutput** entry specifies the default output stream for EDRs that do not match the splitting rules.

2. Configure an output stream to write home EDRs to an output file to be processed by the normal rating pipeline.

   a. Set the **Grammar** registry entry of the OUT_GenericStream module to the standard BRM output grammar description file:

   ```
   Grammar = ./FormatDesc/Solution42/SOL42_V670_REL_OutGrammar.dsc
   ```

   b. Configure **EXT_OutFileManager** to specify information about the output file. See "EXT_OutFileManager" in *BRM Configuring Pipeline Rating and Discounting*.
3. Configure another output stream to write roaming EDRs to an output file to be processed by the outcollect rating pipeline.

   a. Set the Grammar registry entry of the OUT_GenericStream module to the standard BRM output grammar description file:

      Grammar=./FormatDesc/Solution42/SOL42_V670_REL_OutGrammar.dsc

   b. Configure EXT_OutFileManager to specify information about the output file. See “EXT_OutFileManager” in BRM Configuring Pipeline Rating and Discounting.

Configuring the Outcollect Rating Pipeline

Configure the outcollect rating pipeline by performing the following tasks:

- Configuring the Outcollect Rating Pipeline DataDescription Registry Section
- Configuring the Outcollect Rating Pipeline Input Processing
- Configuring the Outcollect Rating Pipeline Function Modules
- Configuring the Outcollect Rating Pipeline Output Processing
- Configuring the DAT_InterConnect Module
- Configuring Suspense Manager for the Outcollect Rating Pipeline

---

**Note:** For an example of outcollect rating pipeline configuration, see Pipeline_home/conf/roaming.reg.

---

Configuring the Outcollect Rating Pipeline DataDescription Registry Section

Configure the Outcollect rating pipeline DataDescription registry section by setting the stream formats, input mapping and output mapping as follows:

```
DataDescription
{
  Standard
  {
    ModuleName = Standard
    Module
    {
      StreamFormats
      {
        SOL42 = ./formatDesc/Formats/Solution42/SOL42_V670_REL_FORINPUT.dsc
        Generic = ./formatDesc/Formats/TAP3-NG/GenericBlocks.dsc
        TAP = ./formatDesc/Formats/TAP3-NG/TAP_0312_Blocks.dsc
      }
      InputMapping
      {
        SOL42 = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InMap.dsc
      }
      OutputMapping
      {
      }
    }
  }
}
```
Configuring the Outcollect Rating Pipeline Input Processing

Configure input processing for the outcollect rating pipeline as follows:

1. Configure the input stream.
   a. Set the Grammar registry entry for the INP_GenericStream module to the standard BRM input grammar description file:

   
   ```
   Grammar = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InGrammar.dsc
   ```

   b. Configure EXT_InFileManager to specify information about the output file.

   **Note:** By default, the outcollect rating pipeline retrieves the roaming EDRs from the output directory of the splitter pipeline. Set **OutputPath, OutputPrefix, and OutputSuffix** to be the same as the splitter pipeline’s output directory for roaming EDRs if you are implementing the default behavior.

Configuring the Outcollect Rating Pipeline Function Modules

Configure the registry entries for the following modules:

- DAT_InterConnect, which provides network operator data for FCT_CarrierRating. See "DAT_InterConnect" in **BRM Configuring Pipeline Rating and Discounting**.

- FCT_CarrierIcRating, which adds roaming data to EDRs for rating by the FCT_PreRating and FCT_MainRating modules. See "FCT_CarrierIcRating" in **BRM Configuring Pipeline Rating and Discounting**.

- FCT_PreRating, which calculates zones and creates impact categories. See "FCT_PreRating" in **BRM Configuring Pipeline Rating and Discounting**.

- FCT_MainRating, which performs the main rating functionality in a pipeline. See "FCT_MainRating" in **BRM Configuring Pipeline Rating and Discounting**.

- FCT_Rounding, which performs rounding for rating and discounting. See "FCT_Rounding" in **BRM Configuring Pipeline Rating and Discounting**.

- FCT_ExchangeRate, which converts the charge amount to SDR currency. Use the **HomeCurrency** entry to set currency to SDR as follows:

   ```
   HomeCurrency = SDR
   ```

   See "FCT_ExchangeRate" in **BRM Configuring Pipeline Rating and Discounting**.

- ISC_MiscOutCollect, which adds BASIC_SERVICE and SUPPLEMENTARY_SERVICE blocks to the EDR container for GSM services. See "ISC_MiscOutcollect" in **BRM Configuring Pipeline Rating and Discounting**.

Configuring the Outcollect Rating Pipeline Output Processing

Configure output processing for the outcollect rating pipeline as follows:

1. Configure outcollect TAP file generation for each roaming partner.

   During outcollect processing, roaming EDRs are identified by roaming partner and routed to the output streams unique for each partner. This enables the EDRs for one roaming partner to be isolated from the EDRs for another partner. To support this, do the following:

   a. Create a system brand for each roaming partner. See the discussion of creating system brands in **BRM Pricing Center Online Help**.
b. Define splitting rules for each roaming partner. See the discussion of defining splitting types in BRM Pricing Center Online Help.

c. Configure FCT_EnhancedSplitting to route the rated EDRs to the corresponding network operator output stream using system brands.

---

**Note:** You can use the Instances module to configure multiple system brands for FCT_EnhancedSplitting to route EDRs to multiple output streams. For more information, see "About Configuring Multiple Instances of Sequencers, Output Streams, or System Brands" in *BRM System Administrator’s Guide*.

---

If FCT_EnhancedSplitting is unable to route the EDR using the splitting rules, it sends it to the default output which is mapped to the suspense output stream.

In the following sample registry, OPR01 and OPR02 system brands are used to route EDRs to different output streams:

```plaintext
ModuleName = FCT_EnhancedSplitting
Module {
  Active      = True
  DataConnection = ifw.DataPool.Login
  DefaultOutput = SuspenseCreateOutput
  SystemBrands {
    OPR01 = OPR01Output
    OPR02 = OPR02Output
  }
}
```

---

2. Configure sequence generation for outcollect TAP files.

a. Using Pricing Center, define a sequence generator for each roaming partner by entering a name and a unique sequence key. For more information, see the discussion of defining a sequence generation in BRM Pricing Center Online Help.

b. Configure each Sequencer by editing the **SequencerPool** section of the registry.

---

**Note:** You can use the Instances module to configure multiple sequencers for multiple roaming partners. For more information, see "About Configuring Multiple Instances of Sequencers, Output Streams, or System Brands" in *BRM System Administrator’s Guide*.

---

c. Set the **SequencerInstance** registry entry to the name of the sequence generator defined in step a above.

d. Set the **SequencerType** registry entry to **Generation**.

The following sample configuration shows two Sequence Generators for NetworkOperator01 and NetworkOperator02.

```plaintext
SequencerPool
```
3. Configure an output stream for each roaming partner.

For each roaming partner, configure the OUT_GenericStream module registry entries as follows:

```plaintext
[SEQ_GEN_TAPOUT_NetworkOperator01
{
    Source = Database
    Controller
    {
        SequencerType = Generation
        ReuseGap = True
        SequenceLength = 5
        DatabaseConnection = ifw.DataPool.Login
    }
}
}

[SEQ_GEN_TAPOUT_NetworkOperator02
{
    Source = Database
    Controller
    {
        SequencerType = Generation
        ReuseGap = True
        SequenceLength = 5
        DatabaseConnection = ifw.DataPool.Login
    }
}
}
```

For more information about configuring sequencers, see "Checking and Generating Sequence Numbers" in *BRM System Administrator's Guide*.

Note: You can use the Instances module to configure multiple output streams for multiple roaming partners. For more information, see "About Configuring Multiple Instances of Sequencers, Output Streams, or System Brands" in *BRM System Administrator's Guide*.

a. Set the Grammar registry entry to the TAP Output grammar description file:

```
Grammar = ./formatDesc/Formats/TAP3-NG/TAP_0312_OutGrammar.dsc
```

b. Set Sequencer to the name of the Sequence Generator for generating sequence number for this roaming partner.

c. Set Sender to the network operator ID sending the outcollect TAP file.

d. Set Recipient to the roaming partner receiving the outcollect TAP file.

e. Configure EXT_OutFileManager to specify the output file information. See "EXT_OutFileManager" in *BRM Configuring Pipeline Rating and Discounting*.

The following example shows output stream configurations for NetworkOperator01 and NetworkOperator02:

```plaintext
NetworkOperator01Output
{
    ModuleName  = OUT_GenericStream
    ...
    Module
```
4. Configure Event Handler to copy outcollect TAP files to a common directory and to move the original outcollect TAP files to the outcollect settlement pipeline input directory.

a. For each network operator output stream configured in the outcollect rating pipeline, add the following to the `Events` subsection of the EventHandler registry:

```
EVT_OUTPUT_FILE_READY = ./bin/move_outcollectTap.pl
```
The following example shows Event Handler configuration for NetworkOperator01Output and NetworkOperator02Output.

```plaintext
EventHandler
{
    ModuleName = EVT
    Module
    {
        Events
        {
            {
                EVT_OUTPUT_FILE_READY = ./bin/move_outcollectTap.pl
            }
            {
                EVT_OUTPUT_FILE_READY = ./bin/move_outcollectTap.pl
            }
        }
    }
}
```

For more information, see "Event Handler" in BRM Configuring Pipeline Rating and Discounting.

b. Edit `move_outcollectTap.pl`.

Edit the following line to specify the common directory to which the outcollect TAP files will be copied:

```plaintext
my $COPY_DIR = "$ENV{IFW_HOME}/data/outcollect/tapout/common";
```

Edit this line to specify the input directory of the outcollect settlement pipeline.

```plaintext
my $MOVE_DIR = "$ENV{IFW_HOME}/data/outcollect/settlement/in";
```

**Configuring the DAT_InterConnect Module**

The DAT_InterConnect module provides network operator configuration information that is accessed by the FCT_CarrierICRating module.

Configure the DAT_InterConnect module in the DataPool registry section. When you configure DAT_InterConnect, you specify the database connection information to the BRM database.

For more information, see "DAT_InterConnect" in BRM Configuring Pipeline Rating and Discounting.

**Configuring Suspense Manager for the Outcollect Rating Pipeline**

You must configure Suspense Manager pipeline components to process EDRs suspended by the outcollect rating pipeline.

EDRs suspended by the outcollect rating pipeline are processed by using the following Suspense Manager components:

- FCT_PreSuspense, which appends suspense-related information to the EDR. See "FCT_PreSuspense" in BRM Configuring Pipeline Rating and Discounting.
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- **FCT_Reject**, which sends suspended EDRs to the reject output stream. See "FCT_Reject" in *BRM Configuring Pipeline Rating and Discounting*.
- **FCT_Suspense**, which routes EDRs from SuspenseCreateOutput to SuspenseUpdateOutput during recycling. See "FCT_Suspense" in *BRM Configuring Pipeline Rating and Discounting*.
- Suspended Event (SE) Loader, which loads suspended events from the reject output stream into the BRM database.
- Suspense Management Center, which is used to query and edit the suspended events. After making the necessary corrections, you submit the suspended events to be recycled. When suspended events are submitted to be recycled, Suspense Management Center publishes a notification event that is queued in the BRM database to notify Pipeline Manager that events are ready to be recycled.
- **DAT_Listener**, which dequeues the notification event from the BRM database and notifies the DAT_Recycle module. See "DAT_Listener" in *BRM Configuring Pipeline Rating and Discounting*.
- **DAT_Recycle**, which creates a parameter file that allows the EXT_InEasyDB module to read suspended usage records associated with a recycle job. It also provides an interface for the INP_Recycle module to provide status updates about the EDR stream. See "DAT_Recycle" in *BRM Configuring Pipeline Rating and Discounting*.
- Pre-recycle pipeline, which sends the EDRs to the Outcollect rating pipeline to be rated again.

For instructions on how to configure Suspense Manager, see "Configuring Suspense Manager" in *BRM Configuring Pipeline Rating and Discounting*.

### Configuring the Outcollect Settlement Pipeline

Configure the outcollect settlement pipeline by performing the following tasks:

- Configuring the Outcollect Settlement Pipeline EDRFactory Registry
- Configuring the Outcollect Settlement Pipeline DataDescription Registry Section
- Configuring the Outcollect Settlement Pipeline Input Processing
- Configuring the Outcollect Settlement Pipeline Function Modules
- Configuring the Outcollect Settlement Pipeline Output Processing
- Configuring Rated Event Loader to Load Settlement Events into the BRM Database
- Configuring Suspense Manager for the Outcollect Settlement Pipeline

**Note:** For an example of outcollect settlement pipeline configuration, see `Pipeline_home/conf/roaming.reg`.

### Configuring the Outcollect Settlement Pipeline EDRFactory Registry

Set the **EDRFactory Description** entry to the TAP container description file as follows:

```
Description = ./formatDesc/Formats/TAP3-NG/containerDesc.dsc
```
Configuring the Outcollect Settlement Pipeline DataDescription Registry Section

Configure the outcollect settlement pipeline DataDescription registry section by setting the stream formats, input mapping and output mapping as follows:

DataDescription
{
    Standard
    {
        ModuleName = Standard
        Module
        {
            StreamFormats
            {
                Generic = ./formatDesc/Formats/TAP3-NG/GenericBlocks.dsc
                TAP = ./formatDesc/Formats/TAP3-NG/TAP_0312_Blocks.dsc
                EVENT_LOADER = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER.dsc
                TapHeaderInfo = ./formatDesc/Formats/TapHeaderInfo/TapHeaderInfo.dsc
            }
            InputMapping
            {
            }
            OutputMapping
            {
                EVENT_LOADER = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutMap.dsc
                TapHeaderInfo = ./formatDesc/Formats/TapHeaderInfo/TapHeaderInfo_OutMap.dsc
            }
        }
    }
}

Configuring the Outcollect Settlement Pipeline Input Processing

Configure input processing for the outcollect settlement pipeline as follows:

1. Configure the INP_GenericStream input module to map outcollect TAP files into EDR containers.
   a. Set the Grammar registry entry to the name of the TAP input grammar description file:
      Grammar = ./formatDesc/Formats/TAP3-NG/TAP_0312_InGrammar.dsc
   b. Configure EXT_InFileManager to specify input file information. See "EXT_InFileManager" in BRM Configuring Pipeline Rating and Discounting.

Configuring the Outcollect Settlement Pipeline Function Modules

Configure the registry for the following modules:

- ISC_TAP_0312_InMap, which maps TAP data into the EDR container fields. See the discussion of the ISC_TAP_0312_InMap iScript in BRM Configuring Pipeline Rating and Discounting.
- ISC_ConsolidatedCP, which removes all non-00 impact category charge packets and sets the G/L ID. See "ISC_ConsolidatedCP" in BRM Configuring Pipeline Rating and Discounting.

Use the GL_CODE entry to assign the G/L ID for outcollect settlement event balance impacts.
- FCT_ServiceCodeMap, which maps external service codes to internal service codes. Set **MapGroup** as follows:
  
  ```
  MapGroup = OUTCOLLECT
  ```

  See "FCT_ServiceCodeMap" in BRM Configuring Pipeline Rating and Discounting.

- FCT_Account, which determines the roaming partner account and associates the EDR with this account. See "FCT_Account" in BRM Configuring Pipeline Rating and Discounting.

- FCT_ExchangeRate, which converts charge amounts in the charge packets to the SDR currency. See “FCT_ExchangeRate” in BRM Configuring Pipeline Rating and Discounting.

- FCT_ItemAssign, which assigns the bill item associated with the roaming partner account’s outcollect service to the EDR. See “FCT_ItemAssign” in BRM Configuring Pipeline Rating and Discounting.

- FCT_BillingRecord, which creates the balance impact information from the charge amount provided in the EDR and associates this impact to the bill item. Set the following entries as follows:
  
  ```
  CurrencyType = B
  ChargeBreakDownRecord = 980
  ```

  See “FCT_BillingRecord” in BRM Configuring Pipeline Rating and Discounting.

- ISC_RollbackSettlement, which rolls back transactions when an error occurs. See “ISC_RollbackSettlement” in BRM Configuring Pipeline Rating and Discounting.

### Configuring the Outcollect Settlement Pipeline Output Processing

Configure output processing for the outcollect settlement pipeline as follows:

1. Configure GPRS and GSM EDR splitting.
   a. Create a system brand called **GSMR** to associate with GSM EDRs, and a system brand called **GPRSR** to associate with GPRS EDRs. See the discussion of creating system brands in BRM Pricing Center Online Help.
   b. Define splitting rules for GPRS and GSM EDRs. See the discussion of defining splitting types in BRM Pricing Center Online Help.
   c. Configure FCT_EnhancedSplitting and use the **SystemBrand** entry to map the system brands to the GPRS and GSM output streams as follows:

   ```
   ModuleName = FCT_EnhancedSplitting
   Module
   {
     Active = True
     DataConnection = ifw.DataPool.Login
     DefaultOutput = GSMOutput
     SystemBrands
     {
       GSMR = GSMOutput
       GPRSR = GPRSOutput
     }
   }
   ```

2. Configure an output stream to write GSM EDRs to an output file to be processed by Rated Event (RE) Loader by configuring the OUT_GenericStream module.
   a. Set **EventType** to `/event/delayed/session/telco/gsm/roaming`.
b. Set the **Grammar** registry entry to the RE Loader output grammar description file:

```
Grammar = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutGrammar.dsc
```

c. Configure **EXT_OutFileManager** to specify output file information. See "EXT_OutFileManager" in *BRM Configuring Pipeline Rating and Discounting*.

3. Configure another output stream to write GPRS EDRs to an output file to be processed by RE Loader by configuring the OUT_GenericStream module.

a. Set **EventType** to /event/delayed/session/telco/gprs/roaming.

b. Set the **Grammar** registry entry to the RE Loader output grammar description file:

```
Grammar = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutGrammar.dsc
```

c. Configure **EXT_OutFileManager** to specify output file information. See "EXT_OutFileManager" in *BRM Configuring Pipeline Rating and Discounting*.

4. Configure Event Handler to move outcollect TAP files from the common directory to another directory, from which they are sent to roaming partners.

a. Add the **Events** subsection, as shown below, to the **EventHandler** registry:

```
EventHandler
{
 ModuleName = EVT
 Module
 {
  Events
   {
     {
        EVT_OUTPUT_FILE_READY = ./bin/move_TapSent.pl
     }
   }
 }
}
```

where:

- **TAPOutSettlementPipeline** is the name of the outcollect settlement pipeline.
- **GSMOutput** is the name of the output stream for GSM events.

For more information, see "Event Handler" in *BRM Configuring Pipeline Rating and Discounting*.

b. Edit the **move_TapSent.pl** script:

```
Edit the following line to specify the common directory where the outcollect TAP files are stored.

```
$IN_DIR = "$ENV{IFW_HOME}/data/outcollect/tapout/common";
```

Edit this line to specify the directory where the outcollect TAP files will be moved to from the common directory (this is the directory from which outcollect TAP files can be sent to your roaming partner):

```
$MOVE_DIR = "$ENV{IFW_HOME}/data/outcollect/tapout/sent";
```
5. Configure the OUT_GenericStream module to write the TAP header information to an output file to be used by the RAP processing pipeline.
   a. Set the Grammar registry entry as follows:
      
      Grammar = ./formatDesc/Formats/TapHeaderInfo/TapHeaderInfo_OutGrammar.dsc

   b. Configure EXT_OutFileManager to specify output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting.

**Configuring Rated Event Loader to Load Settlement Events into the BRM Database**

You must configure RE Loader to load settlement events into the BRM database. When you configure RE Loader, you specify information about how to connect to the BRM database, the location of the output files created by the outcollect settlement pipeline, how to process the events in the output file, and so forth.

For complete details on how to configure RE Loader, see "Configuring Rated Event Loader" in BRM Configuring Pipeline Rating and Discounting.

**Configuring Suspense Manager for the Outcollect Settlement Pipeline**

You must configure Suspense Manager pipeline components to process TAP files suspended by the outcollect settlement pipeline.

TAP files suspended by the outcollect settlement pipeline are processed by using the following Suspense Manager components:

- FCT_BatchSuspense, which suspends the TAP files and creates a batch suspense file. See "FCT_BatchSuspense" in BRM Configuring Pipeline Rating and Discounting.
- Suspended Batch (SB) Loader, which loads the batch suspense file into the BRM database.
- Suspense Management Center, which is used to query and edit the batch suspense file. After making the necessary corrections, you submit the batch suspense file to be recycled. When the file is submitted for recycling, Suspense Management Center publishes a notification event to notify Pipeline Manager that the batch suspense file is ready for recycling.
- DAT_Listener, which dequeues the notification event from the BRM database and notifies the DAT_ResubmitBatch module. See "DAT_Listener" in BRM Configuring Pipeline Rating and Discounting.
- DAT_ResubmitBatch, which retrieves the suspended batch file from the BRM database and sends it to the outcollect settlement pipeline for processing again. See "DAT_ResubmitBatch" in BRM Configuring Pipeline Rating and Discounting.

For instructions on how to configure Suspense Manager, see "Configuring Suspense Manager" in BRM Configuring Pipeline Rating and Discounting.

**Configuring the RAP Processing Pipeline**

Configure the RAP processing pipeline by performing the following tasks:

- Configuring the RAP Processing Pipeline EDRFactory Registry
- Configuring the RAP Processing Pipeline DataDescription Registry Section
- Configuring the RAP Processing Pipeline Input Processing
- Configuring the RAP Processing Pipeline Function Modules
- Configuring the RAP Processing Pipeline Output Processing
Configuring the RAP Processing Pipeline EDRFactory Registry

Set the **EDRFactory Description** entry to the TAP container description file as follows:

```plaintext
Description = ./formatDesc/Formats/TAP3-NG/containerDesc.dsc
```

Configuring the RAP Processing Pipeline DataDescription Registry Section

Configure the RAP processing pipeline **DataDescription** registry section by setting the stream formats, input mapping and output mapping as follows:

```plaintext
DataDescription {
    Standard {
        ModuleName = Standard Module {
            StreamFormats {
                Generic = ./formatDesc/Formats/TAP3-NG/GenericBlocks.dsc
                RAP = ./formatDesc/Formats/TAP3-NG/RAP_0105_Blocks.dsc
                SUSPENSE_BATCH_RECORD = ./formatDesc/Formats/SBL/SuspenseBatchRecord.dsc
                EET = ./formatDesc/Formats/EET/EET.dsc
            } InputMapping {
            } OutputMapping {
                SUSPENSE_BATCH_RECORD = ./formatDesc/Formats/SBL/SuspenseBatchRecord_OutMap.dsc
                EET = ./formatDesc/Formats/EET/EET_OutMap.dsc
            }
        }
    }
}
```

Configuring the RAP Processing Pipeline Input Processing

Configure the INP_GenericStream input module to map RAP files into EDR containers.

Configure input processing for the RAP processing pipeline as follows:

1. Set the **Grammar** registry entry to RAP input grammar description file:

```plaintext
Grammar = ./formatDesc/Formats/TAP3-NG/RAP_0105_InGrammar.dsc
```

2. Set the following entries to specify information about the TAP Header Information file:

   - Set **TapHeaderInfoFilePrefix** to the file prefix. For example:
     ```plaintext
     TapHeaderInfoFilePrefix = test_
     ```

---

**Note:** For an example of the RAP processing pipeline configuration, see `Pipeline_home/conf/roaming.reg`.
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- Set TapHeaderInfoFileSuffix to the file suffix. For example:
  TapHeaderInfoFileSuffix = .thi
- Set TapHeaderInfoFieldSep to the field separator used in the file. For example:
  TapHeaderInfoFieldSep = ;
- Set TapHeaderInfoFilePath to the path where the file is stored. For example:
  TapHeaderInfoFilePath = ./data/outcollect/settlement/out/tapheaderinfo

3. Configure EXT_InFileManager to specify input file information. See "EXT_InFileManager" in BRM Configuring Pipeline Rating and Discounting.

Configuring the RAP Processing Pipeline Function Modules

Configure the registry for the following modules:

- ISC_RAP_0105_InMap, which maps TAP data in the RAP file into the EDR container fields. See "ISC_RAP_0105_InMap" in BRM Configuring Pipeline Rating and Discounting.

- ISC_DupRAPRecords, which duplicates the EDR. For a fatal RAP file, it sends the duplicate EDR to the suspense batch record output stream. For a severe RAP file, it sends the duplicate EDR to the suspense output stream. See "ISC_DupRAPRecords" in BRM Configuring Pipeline Rating and Discounting.

- ISC.OverrideSuspenseParams, which overrides the suspense parameters. See "ISC.OverrideSuspenseParams" in BRM Configuring Pipeline Rating and Discounting.

Configuring the RAP Processing Pipeline Output Processing

Configure output processing for the RAP processing pipeline as follows:

1. Configure the OUT_GenericStream module to generate the RAP Acknowledgment file.
   a. Set the Grammar registry entry to RAP Acknowledgment output grammar description file:
      Grammar = ./formatDesc/Formats/TAP3-NG/RAP_0105_AckOutGrammar.dsc
   b. Set DeleteEmptyStream to False.
   c. Configure EXT_OutFileManager to specify output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting.

2. Configure an output stream to generate output files to be processed by Event Extraction Manager by configuring the OUT_GenericStream module as follows:
   a. Set EventType to /event_extract.
   b. Set the Grammar registry entry to the name of the RE Loader output grammar description file:
      Grammar = ./formatDesc/Formats/EET/EET_OutGrammar.dsc
   c. Configure EXT_OutFileManager to specify output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting.

3. Configure another output stream to generate suspense batch record files by configuring the OUT_GenericStream module as follows:
a. Set `EventType` to `/suspended_batch/rarin`.

b. Set the `Grammar` registry entry to the suspense batch record output grammar description file:
   
   \[ \text{Grammar} = ./\text{formatDesc/Formats/SL/SuspenseBatchRecord\_OutGrammar.dsc} \]

c. Configure `EXT\_OutFileManager` to specify output file information. See "EXT\_OutFileManager" in *BRM Configuring Pipeline Rating and Discounting*.

### Configuring Suspense Manager for the RAP Processing Pipeline

You must configure Suspense Manager pipeline components to process TAP files and records suspended by the RAP processing pipeline.

EDRs suspended by the RAP processing pipeline are processed by using the following Suspense Manager components:

- **FCT\_PreSuspense**, which appends suspense-related information to all EDRs. See "FCT\_PreSuspense" in *BRM Configuring Pipeline Rating and Discounting*.
- **FCT\_Reject**, which sends suspended files to the reject output stream. See "FCT\_Reject" in *BRM Configuring Pipeline Rating and Discounting*.
- **FCT\_Suspense**, which routes EDRs from SuspenseCreateOutput to SuspenseUpdateOutput during recycling. See "FCT\_Suspense" in *BRM Configuring Pipeline Rating and Discounting*.
- **Suspended Event (SE) Loader**, which loads suspended events from the reject output stream into the BRM database.
- **Suspended Batch (SB) Loader**, which loads suspended batch files into the BRM database.
- **Suspense Management Center**, which is used to query and edit the suspended events. After making the necessary corrections, you submit the suspended events to be recycled. When suspended events are submitted to be recycled, Suspense Management Center publishes a notification event that is queued in the BRM database to notify Pipeline Manager that events are ready to be recycled.
- **DAT\_Listener**, which dequeues the notification event from the BRM database and notifies the DAT\_Recycle module.
- **DAT\_Recycle**, which creates a parameter file that allows the EXT\_InEasyDB module to read suspended usage records associated with a recycle job. It also provides an interface for the INP\_Recycle module to provide status updates about the EDR stream.
- **Pre-recycle pipeline**, which sends the EDRs to the outcollect rating pipeline.

For instructions on how to configure Suspense Manager, see "Configuring Suspense Manager" in *BRM Configuring Pipeline Rating and Discounting*.

### Configuring Event Extraction Manager to Create the Backout File

Event Extraction Manager creates the backout file used by the backout pipeline.

To configure Event Extraction Manager, see "Using Event Extraction Manager" in *BRM Setting Up Pricing and Rating*.

### Configuring the TAP Correction Pipeline

Configure the TAP correction pipeline by performing the following tasks:
Setting Up Roaming Outcollect Processing Pipelines

- Configuring the TAP Correction Pipeline EDRFactory Registry
- Configuring the TAP Correction Pipeline DataDescription Registry Section
- Configuring the TAP Correction Pipeline Input Processing
- Configure the TAP Correction Pipeline Function Modules
- Configuring the TAP Correction Pipeline Output Processing

---

**Note:** For an example of TAP correction pipeline configuration, see `Pipeline_home/conf/roaming.reg`.

---

### Configuring the TAP Correction Pipeline EDRFactory Registry

Set the **EDRFactory Description** entry to the TAP container description file as follows:

```plaintext
Description = ./formatDesc/Formats/TAP3-NG/containerDesc.dsc
```

### Configuring the TAP Correction Pipeline DataDescription Registry Section

Configure the TAP correction pipeline **DataDescription** registry section by setting the stream formats, input mapping and output mapping as follows:

```plaintext
DataDescription
{
    Standard
    {
        ModuleName = Standard Module
        {
            StreamFormats
            {
                Generic = ./formatDesc/Formats/TAP3-NG/GenericBlocks.dsc
                TAP = ./formatDesc/Formats/TAP3-NG/TAP_0312_Blocks.dsc
            }
            InputMapping
            {
            }
            OutputMapping
            {
            }
        }
    }
}
```

### Configuring the TAP Correction Pipeline Input Processing

Configure input processing for the TAP correction pipeline as follows:

1. Configure the INP_GenericStream input module to map TAP files into EDR containers.
   a. Set the **Grammar** registry entry to the name of the TAP input grammar description file:
      ```plaintext
      Grammar = ./formatDesc/Formats/TAP3-NG/TAP_0312_InGrammar.dsc
      ```
   b. Configure **EXT_InFileManager** to specify input file information. See "EXT_InFileManager" in *BRM Configuring Pipeline Rating and Discounting*.
Configure the TAP Correction Pipeline Function Modules

Configure the registry for the following modules:

1. ISC_TAP_0312_InMap, which maps TAP data into the EDR container fields. See the discussion of the ISC_TAP_0312_InMap iScript in BRM Configuring Pipeline Rating and Discounting.

2. Configure your custom iScript to make corrections to the TAP file.

Configuring the TAP Correction Pipeline Output Processing

Configure output processing for the TAP correction pipeline as follows:

1. Configure the OUT_GenericStream output module to map the EDR to the TAP files.
   a. Set the Grammar registry entry to TAP output grammar description file:
      Grammar = ./formatDesc/Formats/TAP3-NG/TAP_0312_OutGrammar.dsc
   b. Configure EXT_OutFileManager to specify output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting.

2. Configure Event Handler to send TAP files to the outcollect settlement pipeline.
   a. Set the Events subsection in theEventHandler section as follows:
      EventHandler
      {
        ModuleName = EVT
        Module
        {
          Events
          {
            {
              EVT_OUTPUT_FILE_READY = ./bin/move_outcollectTap.pl
            }
          }
        }
      }
      where:
      TAPCorrectionPipeline is the name of the TAP correction pipeline.
      TAPOutput is the name of the TAP correction pipeline output stream.
   b. Edit the move_outcollectTap.pl script:
      Edit the following line to specify the common directory where to copy the TAP files:
      my $COPY_DIR = "$ENV{IFW_HOME}/data/outcollect/tapout/common";
      Edit the following line to specify the input directory of the outcollect settlement pipeline:
      my $MOVE_DIR = "$ENV{IFW_HOME}/data/outcollect/settlement/in";

Configuring the Backout Pipeline

Configure the backout pipeline by performing the following tasks:
Setting Up Roaming Outcollect Processing Pipelines

- Configuring the Backout Pipeline DataDescription Registry Section
- Configuring the Backout Pipeline Input Processing
- Configuring the Backout Pipeline Output Processing
- Configuring Suspense Manager for the Backout Pipeline

**Note:** For an example of backout pipeline configuration, see Pipeline_home/conf/roaming.reg.

### Configuring the Backout Pipeline DataDescription Registry Section

Configure the backout pipeline `DataDescription` registry section by setting the stream formats, input mapping and output mapping as follows:

```plaintext
DataDescription
{
  Standard
  {
    ModuleName = Standard
    Module
    {
      StreamFormats
      {
        SOL42_FORINPUT = ./formatDesc/Formats/Solution42/SOL42_V670_REL_FORINPUT.dsc
        EVENT_LOADER = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER.dsc
      }
      InputMapping
      {
        SOL42_FORINPUT = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InMap.dsc
      }
      OutputMapping
      {
        EVENT_LOADER = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutMap.dsc
      }
    }
  }
}
```

### Configuring the Backout Pipeline Input Processing

Configure input processing for the backout pipeline as follows:

1. Configure INP_GenericStream module to map RAP files into EDR containers.
   a. Set the `Grammar` registry entry to RAP input grammar description file.
      ```plaintext
      Grammar = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InGrammar_BACKOUT.dsc
      ```
   b. Configure `EXT_InFileManager` to specify input file information. See "EXT_InFileManager" in BRM Configuring Pipeline Rating and Discounting.

### Configuring the Backout Pipeline Output Processing

Configure output processing for the backout pipeline as follows:

1. Configure GPRS and GSM EDR splitting.
Note: If you previously configured GPRS and GSM EDR splitting, you can use the existing system brands and splitting rules. You can skip steps a and b below.

a. Create a system brand called GSMR for GSM EDRs and a system brand called GPRSR for GPRS EDRs. See the discussion of creating system brands in BRM Pricing Center Online Help.

b. Define splitting rules for GPRS and GSM EDRs. See the discussion of defining splitting types in BRM Pricing Center Online Help.

c. Configure FCT_EnhancedSplitting and use the SystemBrand entry to map the system brands to the GPRS and GSM output streams. For an example configuration, see "Configuring the Outcollect Rating Pipeline Input Processing".

2. Configure an output stream to write GSM EDRs to an output file to be processed by RE Loader by configuring OUT_GenericStream as follows:
   a. Set EventType to /event/delayed/session/telco/gsm/roaming.
   b. Set the Grammar registry entry to the RE Loader output grammar description file:
      Grammar = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutGrammar.dsc
   c. Configure EXT_OutFileManager to specify output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting.

3. Configure another output stream to write GPRS EDRs to an output file to be processed by RE Loader by configuring OUT_GenericStream as follows:
   a. Set EventType to /event/delayed/session/telco/gprs/roaming.
   b. Set the Grammar registry entry to the RE Loader output grammar description file:
      Grammar = ./formatDesc/Formats/Solution42/V670_EVENT_LOADER_OutGrammar.dsc
   c. Configure EXT_OutFileManager to specify output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting.

Configuring Suspense Manager for the Backout Pipeline

It is possible that the backout pipeline is unable to process the Event Extraction Manager output file. When this occurs, the backout pipeline suspends the entire file. To handle suspension in the pipeline, configure the following Suspense Manager pipeline components:

- FCT_PreSuspense, which appends suspense-related information to all EDRs. See "FCT_PreSuspense" in BRM Configuring Pipeline Rating and Discounting.
- FCT_Reject, which sends suspended files to the reject output stream. See "FCT_Reject" in BRM Configuring Pipeline Rating and Discounting.
- FCT_Suspense, which routes EDRs from SuspenseCreateOutput to SuspenseUpdateOutput during recycling. See "FCT_Suspense" in BRM Configuring Pipeline Rating and Discounting.

For instructions on how to configure Suspense Manager, see "Configuring Suspense Manager" in BRM Configuring Pipeline Rating and Discounting.
This chapter describes RAP-to-EDR mapping used by Oracle Communications Billing and Revenue Management (BRM) TAP Roaming Manager when processing RAP input files.

For more information about RAP file processing, see "About Handling Rejected TAP Files".

Mapping of RAP Fields to EDR Fields

When processing incoming RAP files, TAP Roaming Manager copies the data in the RAP file into EDR container fields.

Table 9–1 lists the RAP field and the corresponding EDR field in the EDR container where the RAP field data is copied.

<table>
<thead>
<tr>
<th>RAP field</th>
<th>EDR field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sender</td>
<td>HEADER.SENDER</td>
<td>The Public Mobile Network (PMN) sending the data.</td>
</tr>
<tr>
<td>Recipient</td>
<td>HEADER.RECIPIENT</td>
<td>The PMN receiving the data sent by the Sender.</td>
</tr>
<tr>
<td>RapFileSequenceNumber</td>
<td>HEADER.RAP_FILE_SEQ_NO</td>
<td>A unique reference that identifies each RAP data interchange sent by one PMN</td>
</tr>
<tr>
<td></td>
<td>HEADER.CREATION_TIMESTAMP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HEADER.UTC_TIME_OFFSET</td>
<td></td>
</tr>
<tr>
<td>RapFileCreationTimeStamp</td>
<td>HEADER.TRANSMISSION_DATE</td>
<td>The date and time the RAP file was created.</td>
</tr>
<tr>
<td>RapFileAvailable Timestamp</td>
<td>HEADER.RELEASE_DATE</td>
<td>The date and time the RAP file was made available to the Recipient.</td>
</tr>
<tr>
<td>SpecificationVersionNumber</td>
<td>HEADER.SPECIFICATION_VERSION_NUMBER</td>
<td>The specification version number of the TAP file being exchanged between the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VPMN and HPMN.</td>
</tr>
<tr>
<td>ReleaseVersion</td>
<td>HEADER.RELEASE_VERSION</td>
<td>The release version within the Specification Version Number of the TAP file</td>
</tr>
<tr>
<td>RapSpecificVersionNumber</td>
<td>HEADER.RAP_SPECIFICATION_VERSION_NUMBER</td>
<td>-</td>
</tr>
<tr>
<td>RapReleaseVersion</td>
<td>HEADER.RAP_RELEASE_VERSION</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 9–1 (Cont.) Mapping of RAP Fields to EDR Fields

<table>
<thead>
<tr>
<th>RAP field</th>
<th>EDR field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ReturnCountDetail</td>
<td>TRAILER.TAP_TOTAL_NUMBER_OF_RECORDS</td>
<td>-</td>
</tr>
<tr>
<td>FileSequenceNumber</td>
<td>DETAIL.ASS_ROAMING_EXT.TAP_FILE_SEQ_NO</td>
<td>A unique reference which identifies the erroneous TAP file.</td>
</tr>
<tr>
<td>PathItemId</td>
<td>DETAIL.ASS_TAP3_ERR.TAP3_ERROR_APPLICATION_TAG</td>
<td>Tag Id refers to Application Tag Number as defined in the ASN.1 definition in TD.57.</td>
</tr>
<tr>
<td>PathItemLevel</td>
<td>DETAIL.ASS_TAP3_ERR.TAP3_ERROR_DEPTH</td>
<td>-</td>
</tr>
<tr>
<td>ErrorCode</td>
<td>DETAIL.ASS_TAP3_ERR.TAP3_ERROR_CODE</td>
<td>Code associated with the error found for a particular field.</td>
</tr>
<tr>
<td>StartMissingSequenceNumber</td>
<td>DETAIL.ASS_ROAMING_EXT.START_MISSING_SEQ_NUM</td>
<td>The first sequence number of the series of missing TAP files.</td>
</tr>
<tr>
<td>EndMissingSequenceNumber</td>
<td>DETAIL.ASS_ROAMING_EXT.END_MISSING_SEQ_NUM</td>
<td>The end sequence number of the series of missing TAP files.</td>
</tr>
<tr>
<td>TotalTaxRefund</td>
<td>TRAILER.ASS_ROAMING_EXT.TOTAL_TAX_REFUND</td>
<td>-</td>
</tr>
<tr>
<td>FileTypeIndicator</td>
<td>HEADER.DATA_TYPE_INDICATOR</td>
<td>The type of data contained within the erroneous TAP file.</td>
</tr>
<tr>
<td>OperatorSpecInformation</td>
<td>DETAIL.OPERATOR_SPECIFIC_INFO HEADER.OPERATOR_SPECIFIC_INFO TRAILER.OPERATOR_SPECIFIC_INFO</td>
<td>Information that has been bilaterally agreed upon between the Sender and Recipient.</td>
</tr>
<tr>
<td>ItemOccurrence</td>
<td>DETAIL.ASS_ROAMING_EXT.ASS_RAP_EXT.ITEM_OCCURRENCE</td>
<td>The occurrence of the path item at the specified level.</td>
</tr>
<tr>
<td>ItemOffset</td>
<td>DETAIL.ASS_ROAMING_EXT.ITEM_OFFSET</td>
<td>The Offset in bytes from the beginning of the file to the start of the item in error, beginning with an offset of zero.</td>
</tr>
<tr>
<td>ReturnDetailsCount</td>
<td>TRAILER.ASS_ROAMING_EXT.RETURN_DETAILS_COUNT</td>
<td>Number of returned details in the RAP file.</td>
</tr>
<tr>
<td>TotalDiscountRefund</td>
<td>TRAILER.ASS_ROAMING_EXT.TOTAL_DISCOUNT_REFUND</td>
<td>-</td>
</tr>
<tr>
<td>RAP field</td>
<td>EDR field</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>GuaranteedBitRate</td>
<td>DETAIL_ASS_ROAMING_EXT.GUARANTEED_BIT_RATE</td>
<td>-</td>
</tr>
<tr>
<td>MaximumBitRate</td>
<td>DETAIL_ASS_ROAMING_EXT.MAXIMUM_BIT_RATE</td>
<td>-</td>
</tr>
<tr>
<td>HSCSDIndicator</td>
<td>DETAIL_ASS_ROAMING_EXT.HSCSD_INDICATOR</td>
<td>-</td>
</tr>
<tr>
<td>SMSOriginator</td>
<td>DETAIL_ASS_ROAMING_EXT.SMS_ORIGINATOR</td>
<td>-</td>
</tr>
<tr>
<td>SMSDestinationNumber</td>
<td>DETAIL_ASS_ROAMING_EXT.SMS_DESTINATION_NUMBER</td>
<td>-</td>
</tr>
<tr>
<td>DiscountableAmount</td>
<td>DETAIL_ASS_ROAMING_EXT.DISCOUNTABLE_AMOUNT</td>
<td>-</td>
</tr>
<tr>
<td>DiscountCode</td>
<td>DETAIL_ASS_ROAMING_EXT.DISCOUNT_CODE</td>
<td>-</td>
</tr>
<tr>
<td>NetworkAccessIdentifier</td>
<td>DETAIL_ASS_ROAMING_EXT.NETWORKACCESS_IDENTIFIER</td>
<td>-</td>
</tr>
<tr>
<td>IMSSignallingContext</td>
<td>DETAIL_ASS_ROAMING_EXT.ISM_SIGNALLING_CONTEXT</td>
<td>-</td>
</tr>
<tr>
<td>Imsi</td>
<td>DETAIL_ASS_ROAMING_EXT.IMSI</td>
<td>-</td>
</tr>
<tr>
<td>HomeBid</td>
<td>DETAIL_ASS_ROAMING_EXT.HOME_BID</td>
<td>-</td>
</tr>
<tr>
<td>HomeLocationDescription</td>
<td>DETAIL_ASS_ROAMING_EXT.HOMELOCATION_DESCRIPTION</td>
<td>-</td>
</tr>
<tr>
<td>Min</td>
<td>DETAIL_ASS_ROAMING_EXT.MOBILE_ID_NUMBER</td>
<td>-</td>
</tr>
<tr>
<td>Mdn</td>
<td>DETAIL_ASS_ROAMING_EXT.MOBILE_DIR_NUMBER</td>
<td>-</td>
</tr>
<tr>
<td>TotalAdvisedCharge</td>
<td>DETAIL_ASS_ROAMING_EXT.TOTAL_ADvised_CHARGE</td>
<td>-</td>
</tr>
<tr>
<td>TotalAdvisedChargeRefund</td>
<td>DETAIL_ASS_ROAMING_EXT.TOTAL_ADvised_CHARGE_REFUND</td>
<td>-</td>
</tr>
<tr>
<td>TotalCommission</td>
<td>DETAIL_ASS_ROAMING_EXT.TOTAL_COMMISSION</td>
<td>-</td>
</tr>
<tr>
<td>TotalCommissionRefund</td>
<td>DETAIL_ASS_ROAMING_EXT.TOTAL_COMMISSION_REFUND</td>
<td>-</td>
</tr>
</tbody>
</table>
This chapter describes the mapping of fields from TAP file to the EDR container that Oracle Communications Billing and Revenue Management (BRM) uses when processing TAP input files and the mapping of fields from EDR container to TAP file used for generating TAP output files.

Before reading this document, you should be familiar with the following topics in the BRM documentation:

■ “About Pipeline Rating” in BRM Configuring Pipeline Rating and Discounting
■ “BRM Rating EDR Container Description” in BRM Configuring Pipeline Rating and Discounting

For TAP specifications, see [http://www.gsma.com/](http://www.gsma.com/)

### TAP-to-EDR Mapping

When processing incoming TAP files, BRM copies input data from TAP fields into EDR container fields. The table below lists the TAP fields and the corresponding EDR field(s) where the data from the TAP field is stored.

Some of the fields in the TAP file can map to multiple fields in the EDR container description file. For example, both the ACTUAL_DELIVERY_TIMESTAMP and ACT_DELIVERY_UTC_TIME_OFFSET fields in the Associated Content Extension Record of the EDR container description file store the data from the Actual Delivery Timestamp field in the TAP file.

For some other TAP fields, placement of the field within the TAP file determines where to copy the field’s data in the EDR container description file. For example, depending on the context within the TAP file, Location Identifier can be mapped to the LOCATION_LIST.IDENTIFIER field in either Associated Location Extension Record or Associated Content Extension Record of the EDR container description file as shown in Table 10–1.
<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Point Name NI</td>
<td>GPRS Destination Camel Group:</td>
<td>Access Point Name NI and Access Point Name OI are mapped to a single EDR field as concatenated and comma-separated items.</td>
</tr>
<tr>
<td></td>
<td>• DETAIL.ASS_CAMEL_EXT.DEST_GPRS_APN_ADDRESS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GPRS Destination, other cases:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• DETAIL.ASS_GPRS_EXT.APN_ADDRESS</td>
<td></td>
</tr>
<tr>
<td>Access Point Name OI</td>
<td>GPRS Destination Camel Group:</td>
<td>Access Point Name NI and Access Point Name OI are mapped to a single EDR field as concatenated and comma-separated items.</td>
</tr>
<tr>
<td></td>
<td>• DETAIL.ASS_CAMEL_EXT.DEST_GPRS_APN_ADDRESS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GPRS Destination, other cases:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• DETAIL.ASS_GPRS_EXT.APN_ADDRESS</td>
<td></td>
</tr>
<tr>
<td>Action Code</td>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET.ACTION_CODE</td>
<td>No comment</td>
</tr>
<tr>
<td>Actual Delivery</td>
<td>DETAIL.ASS_CONT_EXT.ACTUAL_DELIVERY_TIMESTAMP</td>
<td>The timestamp part of this item is mapped to DETAIL.ASS_CONT_EXT.ACTUAL_DELIVERY_TIMESTAMP and the UTC offset part is mapped to DETAIL.ASS_CONT_EXT.ACT_DELIVERY.UTC_TIME_OFFSET.</td>
</tr>
<tr>
<td>Timestamp</td>
<td>and DETAIL.ASS_CONT_EXT.ACT_DELIVERY_UTC_TIME_OFFSET</td>
<td></td>
</tr>
<tr>
<td>Advised Charge</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.ADVISED_CHARGE</td>
<td>No comment</td>
</tr>
<tr>
<td>Advised Charge</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.ADVISED_CHARGE_CURRENCY</td>
<td>No comment</td>
</tr>
<tr>
<td>Currency</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.ADVISED_CHARGE_CURRENCY</td>
<td>No comment</td>
</tr>
<tr>
<td>Age Of Location</td>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.AGE_OF_LOCATION</td>
<td>No comment</td>
</tr>
<tr>
<td>Air Interface User Rate</td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.AIUR and DETAIL.ASS_GSMW_EXT.BS_PACKET.AIUR_REQUESTED</td>
<td>No comment</td>
</tr>
<tr>
<td>Requested</td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.AIUR and DETAIL.ASS_GSMW_EXT.BS_PACKET.AIUR_REQUESTED</td>
<td>No comment</td>
</tr>
<tr>
<td>Basic HSCSD Parameters</td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Basic Service Used</td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET</td>
<td>This is a block</td>
</tr>
<tr>
<td>Bearer Service Code</td>
<td>DETAIL.BASIC_SERVICE</td>
<td>No comment</td>
</tr>
<tr>
<td>Call Event Details</td>
<td>TRAILER.TAP_TOTAL_NUMBER_OF_RECORDS</td>
<td>No comment</td>
</tr>
<tr>
<td>Count</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Call Event Start</td>
<td>DETAIL.CHARGING_START_TIMESTAMP and DETAIL.UTC_TIME_OFFSET</td>
<td>The timestamp part of this item is mapped to DETAIL.CHARGING_START_TIMESTAMP and the UTC offset part is mapped to DETAIL.UTC_TIME_OFFSET.</td>
</tr>
<tr>
<td>Timestamp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Call Reference</td>
<td>DETAIL.ASS_LOCN_EXT.CALL_REFERENCE</td>
<td>For Location Services group, Call Reference is saved in the EDR field.</td>
</tr>
</tbody>
</table>
Call Type Level 1 and Call Type Level 2 are mapped to the EDR field as concatenated comma-separated items.

Call Type Level 1 and Call Type Level 2 are mapped to the EDR field as concatenated comma-separated items.

No comment.

The called number is the representation of the number dialled by the subscriber.

Destination Group.

Destination Group.

No comment.

No comment.

The charge for the CAMEL invocation after discounts have been deducted.

No comment.

All Camel Modification fields present in Camel Modification List are mapped to the EDR field as concatenated comma-separated items.

No comment.

No comment.

No comment.

This is a block.

If the TAP field value is less than 10, it is prefixed with 0.

Present within groups:

- GPRS Network Location
- Network Location

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Type Level 1</td>
<td>DETAIL.CONNECT_TYPE</td>
<td>Call Type Level 1 and Call Type Level 2 are mapped to the EDR field as concatenated comma-separated items.</td>
</tr>
<tr>
<td>Call Type Level 2</td>
<td>DETAIL.CONNECT_TYPE</td>
<td>Call Type Level 1 and Call Type Level 2 are mapped to the EDR field as concatenated comma-separated items.</td>
</tr>
<tr>
<td>Call Type Level 3</td>
<td>DETAIL.CONNECT_SUB_TYPE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Called Country Code</td>
<td>DETAIL.CALLED_COUNTRY_CODE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Called Number</td>
<td>DETAIL.B_NUMBER &amp; DETAIL.INTERN_B_NUMBER_ZONE &amp; DETAIL.ASS_GSMW_EXT.DIALED_DIGITS</td>
<td>The called number is the representation of the number dialled by the subscriber.</td>
</tr>
<tr>
<td>Called Place</td>
<td>DETAIL.DESCRIPTION</td>
<td>Destination Group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The TAP fields Called Place and Called Region are mapped to the EDR field as concatenated comma-separated items.</td>
</tr>
<tr>
<td>Called Region</td>
<td>DETAIL.DESCRIPTION</td>
<td>Destination Group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The TAP fields Called Place and Called Region are mapped to the EDR field as concatenated comma-separated items.</td>
</tr>
<tr>
<td>Camel Call Reference</td>
<td>DETAIL.ASS_CAMEL_EXT.CAMEL_REFERENCE_NUMBER</td>
<td>No comment.</td>
</tr>
<tr>
<td>CAMEL Destination Number</td>
<td>DETAIL.ASS_CAMEL_EXT.DEST_GSMW_NUMBER_ORIGINAL</td>
<td>No comment.</td>
</tr>
<tr>
<td>Camel Invocation Fee</td>
<td>DETAIL.ASS_CAMEL_EXT.SERVER_TYPE_OF_NUMBER</td>
<td>The charge for the CAMEL invocation after discounts have been deducted.</td>
</tr>
<tr>
<td>Camel Initiated CF Indicator</td>
<td>DETAIL.ASS_CAMEL_EXT.CAMEL_INITIATED_CF_INDICATOR</td>
<td>No comment.</td>
</tr>
<tr>
<td>Camel Modification</td>
<td>DETAIL.ASS_CAMEL_EXT.CAMELModification_LIST</td>
<td>All Camel Modification fields present in Camel Modification List are mapped to the EDR field as concatenated comma-separated items.</td>
</tr>
<tr>
<td>Camel Server Address</td>
<td>DETAIL.ASS_CAMEL_EXT.SERVER_ADDRESS</td>
<td>No comment.</td>
</tr>
<tr>
<td>CAMEL Service Key</td>
<td>DETAIL.ASS_CAMEL_EXT.SERVICE_KEY</td>
<td>No comment.</td>
</tr>
<tr>
<td>CAMEL Service Level</td>
<td>DETAIL.ASS_CAMEL_EXT.SERVICE_LEVEL</td>
<td>No comment.</td>
</tr>
<tr>
<td>CAMEL Service Used</td>
<td>DETAIL.ASS_CAMEL_EXT</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Cause For Termination</td>
<td>DETAIL.CALL_COMPLETION_INDICATOR</td>
<td>If the TAP field value is less than 10, it is prefixed with 0.</td>
</tr>
<tr>
<td>Cell Identity</td>
<td>GPRS Network Location:</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>• DETAIL.ASS_GPRS_EXT.CELL_ID</td>
<td>• GPRS Network Location</td>
</tr>
<tr>
<td></td>
<td>• DETAIL.ASS_GSMW_EXT.CELL_ID</td>
<td>• Network Location</td>
</tr>
</tbody>
</table>
### Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel Coding Acceptable</td>
<td>DETAIL_ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.CHANNEL_CODING_OK_LIST</td>
<td>All channel coding fields present in Channel Coding Acceptable List are mapped to the EDR field as concatenated comma-separated items.</td>
</tr>
<tr>
<td>Channel Coding Used</td>
<td>HSCSD Parameter Modification:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.CHANNEL_CODING_USED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Basic HSCSD Parameters:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.CHANNEL_CODING_USED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Channel Coding Acceptable List:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.CHANNEL_CODING_OK_LIST</td>
<td></td>
</tr>
<tr>
<td>Charge</td>
<td>DETAIL_ASS_CBD.CP.CHARGED_AMOUNT_VALUE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Charge Refund Indicator</td>
<td>DETAIL_ASS_CONT_EXT.SERVICE_USED_LIST.CHARGE_REFUND_INDICATOR</td>
<td>No comment.</td>
</tr>
<tr>
<td>Charge Type</td>
<td>Taxation:</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_CBD.TP.CHARGE_TYPE</td>
<td>■ Taxation, when the associated Tax Rate Code references a tax applied to a specific Charge Type.</td>
</tr>
<tr>
<td></td>
<td>Charge Detail:</td>
<td>■ Charge Detail</td>
</tr>
<tr>
<td></td>
<td>■ TRAILER.TOTAL_CHARGE_VALUE_LIST.CHARGE_TYPE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_CBD.CP.IMPACT_CATEGORY</td>
<td></td>
</tr>
<tr>
<td>Chargeable Units</td>
<td>DETAIL_ASS_CBD.CP.CHARGEABLE_QUANTITY_VALUE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Charged Party Equipment</td>
<td>DETAIL_ASS_CONT_EXT.CHARGED_PARTY_INFO.EQUIPMENT</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Charged Party Home</td>
<td>DETAIL_ASS_CONT_EXT.CHARGED_PARTY_INFO.HOMEID_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Identification</td>
<td>DETAIL_ASS_CONT_EXT.CHARGED_PARTY_INFO.ID_LIST.TYPE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Charged Party ID Type</td>
<td>DETAIL_ASS_CONT_EXT.CHARGED_PARTY_INFO.ID_LIST.TYPE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Charged Party Information</td>
<td>DETAIL_ASS_CONT_EXT.CHARGED_PARTY_INFO.ID_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Charged Party Identifier</td>
<td>DETAIL_ASS_CONT_EXT.CHARGED_PARTY_INFO.ID_LIST.IDENTIFIER</td>
<td>No comment.</td>
</tr>
<tr>
<td>Charged Party Information</td>
<td>DETAIL_ASS_CONT_EXT.CHARGED_PARTY_INFO</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Charged Party Location</td>
<td>DETAIL_ASS_CONT_EXT.CHARGED_PARTY_INFO.LOCATION_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Charged Party Status</td>
<td>DETAIL.USAGE_DIRECTION</td>
<td>No comment.</td>
</tr>
<tr>
<td>TAP Field</td>
<td>EDR Field</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Charged Units</td>
<td>DETAIL_ASS_CBD.CPROUNDED_QUANTITY_VALUE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Charging Characteristics</td>
<td>DETAIL.USAGE_CLASS</td>
<td>No comment.</td>
</tr>
<tr>
<td>Charging ID</td>
<td>DETAIL_ASS_GPRS_EXT.CHARGING_ID</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
### Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging Timestamp</td>
<td>Supplementary Service Used:</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GSMW_EXT.SS_PACKET.CHARGING_START_TIMESTAMP</td>
<td>- Supplementary Service Used. The timestamp is mandatory and occurs within Supplementary Service Event.</td>
</tr>
<tr>
<td></td>
<td>and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GSMW_EXT.SS_PACKET.UTC_TIME_OFFSET</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Location Service Usage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.SERVICE_USED.CHARGING_START_TIMESTAMP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.SERVICE_USED.UTC_TIME_OFFSET</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Basic Service Used:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GSMW_EXT.BS_PACKET.CHARGING_START_TIMESTAMP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GSMW_EXT.BS_PACKET.UTC_TIME_OFFSET</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GPRS Call (Record type MSS, SCU, and VAS):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.CHARGING_START_TIMESTAMP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.UTC_TIME_OFFSET</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GPRS Service Usage Block:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.GS_PACKET.CHARGING_START_TIMESTAMP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.GS_PACKET.UTC_TIME_OFFSET</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GPRS Service Used Block:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.SERVICE_USED.CHARGING_START_TIMESTAMP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.SERVICE_USED.UTC_TIME_OFFSET</td>
<td></td>
</tr>
</tbody>
</table>
### Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLIR Status Indicator</td>
<td>Call Originator and SCU Basic Information:</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.USAGE_CLASS</td>
<td>■ Call Originator where available.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_ROAMING_EXT.CLIR_INDICATOR</td>
<td>■ SCU Basic Information where available and the Charged Party Status indicates a terminating short message.</td>
</tr>
<tr>
<td></td>
<td>Third Party Information:</td>
<td>■ Third Party Information where available.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_GSMW_EXT.SS_PACKET.CLIR_INDICATOR</td>
<td></td>
</tr>
<tr>
<td>Commission</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.COMMISSION</td>
<td>No comment.</td>
</tr>
<tr>
<td>Completion Timestamp</td>
<td>DETAIL.CHARGING_END_TIMESTAMP</td>
<td>No comment.</td>
</tr>
<tr>
<td>Content Charging Point</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.CONTENT_CHARGING_POINT</td>
<td>No comment.</td>
</tr>
<tr>
<td>Content Provider</td>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.PROVIDER_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Content Provider ID Type</td>
<td>LCS SP Identification:</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LOCN_EXT.LCSSP_INFO.ID_LIST.TYPE</td>
<td>■ LCS SP Identification</td>
</tr>
<tr>
<td></td>
<td>Content Provider:</td>
<td>■ Content Provider</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.PROVIDER_LIST.TYPE</td>
<td></td>
</tr>
<tr>
<td>Content Provider Identifier</td>
<td>LCS SP Identification:</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LOCN_EXT.LCSSP_INFO.ID_LIST.IDENTIFIER</td>
<td>■ LCS SP Identification</td>
</tr>
<tr>
<td></td>
<td>Content Provider:</td>
<td>■ Content Provider</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.PROVIDER_LIST.IDENTIFIER</td>
<td></td>
</tr>
<tr>
<td>Content Provider Name</td>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.PROVIDER_NAME</td>
<td>No comment.</td>
</tr>
<tr>
<td>Content Service Used</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Content Transaction Code</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.CONTENT_TRANSACTION_CODE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Content Transaction Type</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.CONTENT_TRANSACTION_TYPE</td>
<td>No comment.</td>
</tr>
<tr>
<td>CSE Information</td>
<td>DETAIL.ASS_CAMEL_EXT.CSE_INFORMATION</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
### Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer ID Type</td>
<td>Tracking Customer Identification: DETAIL.ASS_LOCN_EXT:TRACKING_CUST_INFO.ID_LIST.TYPE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tracked Customer Identification: DETAIL.ASS_LOCN_EXT:TRACKED_CUST_INFO.ID_LIST.TYPE</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Tracking Customer Identification</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Tracked Customer Identification</td>
</tr>
<tr>
<td>Customer Identifier</td>
<td>Tracking Customer Identification: DETAIL.ASS_LOCN_EXT:TRACKING_CUST_INFO.ID_LIST.IDENTIFIER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tracked Customer Identification: DETAIL.ASS_LOCN_EXT:TRACKED_CUST_INFO.ID_LIST.IDENTIFIER</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Tracking Customer Identification</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Tracked Customer Identification</td>
</tr>
<tr>
<td>Data Volume Incoming</td>
<td>GPRS Service Used: DETAIL.ASS_GPRS_EXT.GS_PACKET.VOLUME_RECEIVED</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>DETAIL.VOLUME_RECEIVED</td>
<td>■ GPRS Service Used. Mandatory.</td>
</tr>
<tr>
<td></td>
<td>Content Service Used: DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.DATA_VOLUME_INCOMING</td>
<td>■ Content Service Used when available.</td>
</tr>
<tr>
<td>Data Volume Outgoing</td>
<td>GPRS Service Used: DETAIL.ASS_GPRS_EXT.GS_PACKET.VOLUME_SENT</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>DETAIL.VOLUME_SENT</td>
<td>■ GPRS Service Used. Mandatory.</td>
</tr>
<tr>
<td></td>
<td>Content Service Used: DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.DATA_VOLUME_OUTGOING</td>
<td>■ Content Service Used when available.</td>
</tr>
<tr>
<td>Day Category</td>
<td>DETAIL.ASS_CBD.CP.DAY_CODE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Default Call Handling Indicator</td>
<td>DETAIL.ASS_CAMEL_EXT.DEFAULT_CALL_HANDLING_INDICATOR</td>
<td>No comment.</td>
</tr>
<tr>
<td>Deposit Timestamp</td>
<td>DETAIL.CHARGING.START_TIMESTAMP DETAIL.UTC_TIME_OFFSET</td>
<td>The timestamp part of this item is mapped to DETAIL.CHARGING.START_TIMESTAMP and the UTC offset part is mapped to DETAIL.UTC_TIME_OFFSET.</td>
</tr>
<tr>
<td>Destination Network</td>
<td>DETAIL.DESTINATION_NETWORK</td>
<td>No comment.</td>
</tr>
<tr>
<td>Dialed Digits</td>
<td>DETAIL.ASS_GSMW_EXT.DIALED_DIGITS DETAIL.C_NUMBER</td>
<td>No comment.</td>
</tr>
<tr>
<td>Discountable Amount</td>
<td>DETAIL.ASS_ROAMING_EXT.DISCOUNTABLE_AMOUNT</td>
<td>The actual part of the Charge/Tax/CAMEL Invocation Fee to which the Discount Value and Discount Rate (Code) relate.</td>
</tr>
<tr>
<td>Discount Code</td>
<td>DETAIL.ASS_CBD.CP.GRANTED_DISCOUNT_AMOUNT_VALUE</td>
<td>No comment.</td>
</tr>
<tr>
<td><strong>TAP Field</strong></td>
<td><strong>EDR Field</strong></td>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Discount Value</td>
<td>DETAIL.ASS_CBC.CP.GRANTED_DISCOUNT_AMOUNT_VALUE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Distance Charge Band Code</td>
<td>DETAIL.ZONE_DESCRIPTION</td>
<td>No comment.</td>
</tr>
<tr>
<td>Dual Bearer Service Code</td>
<td>DETAIL.ASS_GSMW_EXT.BASIC_DUAL_SERVICE</td>
<td>The TAP field is prefixed with 1 and stored in the EDR field.</td>
</tr>
<tr>
<td>Dual Teleservice Code</td>
<td>DETAIL.ASS_GSMW_EXT.BASIC_DUAL_SERVICE</td>
<td>The TAP field is prefixed with 0 and stored in the EDR field.</td>
</tr>
<tr>
<td>Earliest Call Timestamp</td>
<td>TRAILER.FIRST_START_TIMESTAMP TRAILER.FIRST_CHARGING_UTC_TIME_OFFSET</td>
<td>The timestamp part of this item is mapped to TRAILER.FIRST_START_TIMESTAMP and the UTC offset part is mapped to TRAILER.FIRST_CHARGING_UTC_TIME_OFFSET.</td>
</tr>
</tbody>
</table>
| Equipment ID                  | Charged Party Equipment:                                                      | Mandatory within groups:  
                                                                 |  
                                                                 |  
                                                                 |  
                                                                 |  
                                                                 |                                                                 |
|                               | • DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.EQUIPMENT.IDENTIFIER                 |                                                                                                 |
|                               | Tracking Customer Equipment:                                                 |                                                                                                 |
|                               | • DETAIL.ASS_LOCN_EXT.TRACKING_CUST_INFO.EQUIPMENT.IDENTIFIER                 |                                                                                                 |
|                               | Tracked Customer Equipment:                                                 |                                                                                                 |
|                               | • DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.EQUIPMENT.IDENTIFIER                  |                                                                                                 |
| Equipment ID Type             | Charged Party Equipment:                                                      | Mandatory within groups:  
                                                                 |  
                                                                 |  
                                                                 |  
                                                                 |  
                                                                 |                                                                 |
|                               | • DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.EQUIPMENT.TYPE                       |                                                                                                 |
|                               | Tracking Customer Equipment:                                                 |                                                                                                 |
|                               | • DETAIL.ASS_LOCN_EXT.TRACKING_CUST_INFO.EQUIPMENT.TYPE                       |                                                                                                 |
|                               | Tracked Customer Equipment:                                                 |                                                                                                 |
|                               | • DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.EQUIPMENT.TYPE                       |                                                                                                 |
| ESN                           | DETAIL.ASS_GSMW_EXT.DEVICE_NUMBER                                            | No comment.                                                                                       |
| Exchange Rate Code            | DETAIL.ASS_CBC.CP.EXCHANGE_RATE                                               | No comment.                                                                                       |
| File Available Timestamp      | HEADER.TRANSMISSION_DATE                                                      | No comment.                                                                                       |
| File Creation Timestamp       | HEADER.CREATION_TIMESTAMP HEADER.UTC_TIME_OFFSET                              | The timestamp part of this item is mapped to HEADER.CREATION_TIMESTAMP and the UTC offset part is mapped to HEADER.UTC_TIME_OFFSET. |
### Table 10–1  (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>File Sequence Number</td>
<td>HEADER.SEQUENCE_NUMBER</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>HEADER.ORIGIN_SEQUENCE_NUMBER</td>
<td></td>
</tr>
<tr>
<td>File Type Indicator</td>
<td>HEADER.DATA_TYPE_INDICATOR</td>
<td>No comment.</td>
</tr>
<tr>
<td>Fixed Network User Rate</td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.FNUR</td>
<td>No comment.</td>
</tr>
<tr>
<td>Fnur</td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.FNUR</td>
<td>No comment.</td>
</tr>
<tr>
<td>Fraud Monitor Indicator</td>
<td>DETAIL.FRAUD_MONITOR_INDICATOR</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
| Geographical Location      | DETAIL.GEOGRAPHICAL_LOCATION                        | The EDR field contains comma-separated tag-value pairs that indicate the geographical location of the serving network, serving BID, serving location description, longitude, and latitude. The tag values of the corresponding fields are as follows:  
  ■ ServingNetwork: 1  
  ■ ServingBID: 2  
  ■ ServingLocationDescription: 3  
  ■ Longitude: 4  
  ■ Latitude: 5  
  Example 1: If the TAP field values are as follows:  
  ■ ServingNetwork: AIRTEL  
  ■ ServingBID: AIRBID  
  ■ ServingLocationDescription: Bangalore  
  ■ Longitude: 111  
  ■ Latitude: 103  
  The value of DETAIL.GEOGRAPHICAL_LOCATION would be: 1,AIRTEL, 2,AIRBID, 3,Bangalore, 4,111,5,103  
  Example 2: If the TAP field values are as follows:  
  ■ ServingNetwork: AIRTEL  
  ■ ServingBID: AIRBID  
  ■ Latitude: 103  
  The value of DETAIL.GEOGRAPHICAL_LOCATION would be: 1,AIRTEL, 2,AIRBID, 5,103 |
| Guaranteed Bit Rate        | DETAIL.ASS_ROAMING_EXT.GUARANTEED_BIT_RATE          | Describes the bitrate the UMTS bearer service must guarantee to the user or application for circuit switched UMTS. |
### Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GPRS Destination</strong></td>
<td>GPRS Basic Call Information:</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_GPRS_EXT.APNADDRESS</td>
<td>■ GPRS Basic Call Information. Mandatory.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_GPRS_EXT.PDP_REMOTE_ADDRESS</td>
<td>■ CAMEL Service Used where GPRS Destination has been modified by the CAMEL server.</td>
</tr>
<tr>
<td>CAMEL Service Used:</td>
<td>DETAIL.ASS_CAMEL_EXT.DEST_GPRS_APN_ADDRESS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_CAMEL_EXT.DEST_GPRS_PDP_REMOTE_ADDRESS</td>
<td></td>
</tr>
<tr>
<td><strong>Home Bid</strong></td>
<td>DETAIL.ASS_ROAMING_EXT.HOME_BID</td>
<td>The Home BID (Billing Identifier) is a code identifying the home market area of the Chargeable Subscriber.</td>
</tr>
<tr>
<td><strong>Home ID Type</strong></td>
<td>Charged Party Home Identification:</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.HOMEID_LIST.TYPE</td>
<td>■ Charged Party Home Identification</td>
</tr>
<tr>
<td></td>
<td>Tracking Customer Home ID:</td>
<td>■ Tracking Customer Home ID</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LOCN_EXT.TRACKING_CUST_INFO.HOME_ID_LIST.TYPE</td>
<td>■ Tracked Customer Home ID</td>
</tr>
<tr>
<td></td>
<td>Tracked Customer Home ID:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.HOME_ID_LIST.TYPE</td>
<td></td>
</tr>
<tr>
<td><strong>Home Identifier</strong></td>
<td>Charged Party Home Identification:</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.HOMEID_LIST.IDENTIFIER</td>
<td>■ Charged Party Home Identification</td>
</tr>
<tr>
<td></td>
<td>Tracking Customer Home ID:</td>
<td>■ Tracking Customer Home ID</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LOCN_EXT.TRACKING_CUST_INFO.HOME_ID_LIST.IDENTIFIER</td>
<td>■ Tracked Customer Home ID</td>
</tr>
<tr>
<td></td>
<td>Tracked Customer Home ID:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.HOME_ID_LIST.IDENTIFIER</td>
<td></td>
</tr>
<tr>
<td><strong>Home Location Description</strong></td>
<td>DETAIL.ASS_ROAMING_EXT.HOMELOCATION_DESCRIPTION</td>
<td>A text description giving the home market area of the Chargeable Subscriber.</td>
</tr>
<tr>
<td><strong>Horizontal Accuracy Delivered</strong></td>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.H_ACCURACY_DELIVERED</td>
<td>No comment.</td>
</tr>
<tr>
<td><strong>Horizontal Accuracy Requested</strong></td>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.H_ACCURACY_REQUESTED</td>
<td>No comment.</td>
</tr>
<tr>
<td><strong>HSCSD Indicator</strong></td>
<td>DETAIL.ASS_ROAMING_EXT.HSCSD_INDICATOR</td>
<td>This indicator, set by the VPMN and passed to the Recipient, indicates that HSCSD has been used.</td>
</tr>
</tbody>
</table>
Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSCSD Parameter Modification</td>
<td>DETAIL_ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO PACKET.PM_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>IMEI</td>
<td>■ DETAIL_ASS_GSMW_EXT.DEVICE_NUMBER</td>
<td>Present within the group:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GPRS_EXT.DEVICE_NUMBER</td>
<td>■ Equipment Identifier where available. Is not present when the terminal equipment is not involved in the call.</td>
</tr>
<tr>
<td></td>
<td>GPRS: ■ DETAIL_ASS_GPRS_EXT.DEVICE_NUMBER</td>
<td></td>
</tr>
<tr>
<td>IMSI</td>
<td>■ DETAIL_ASS_GSMW_EXT.PORT_NUMBER</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GPRS_EXT.PORT_NUMBER</td>
<td>■ Chargeable Subscriber when MIN is not present. Mandatory.</td>
</tr>
<tr>
<td></td>
<td>GPRS: ■ DETAIL_ASS_GPRS_EXT.PORT_NUMBER</td>
<td>■ GSM Chargeable Subscriber when available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Must be present for WLAN usage when IMSI is used for identifying the chargeable user.</td>
</tr>
<tr>
<td>Initiating Party</td>
<td>DETAIL_ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.INITIATING_PARTY</td>
<td>No comment.</td>
</tr>
<tr>
<td>Internet Service Provider</td>
<td>DETAIL_ASS_CONT_EXT.SERVING_PARTIES_INFO.ISP_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>ISP ID Type</td>
<td>LCS SP Information:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_LOCN_EXT.LCSSP_INFO.ISP_LIST.TYPE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serving Parties Information:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_CONT_EXT.SERVING_PARTIES_INFO.ISP_LIST.TYPE</td>
<td></td>
</tr>
<tr>
<td>ISP Identifier</td>
<td>LCS SP Information:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_LOCN_EXT.LCSSP_INFO.ISP_LIST.IDENTIFIER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serving Parties Information:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_CONT_EXT.SERVING_PARTIES_INFO.ISP_LIST.IDENTIFIER</td>
<td></td>
</tr>
<tr>
<td>Latest Call Timestamp</td>
<td>TRAILER.LAST_START_TIMESTAMP TRAILER.LAST_CHARGING_UTC_TIME_OFFSET</td>
<td>The timestamp part of this item is mapped to TRAILER.LAST_START_TIMESTAMP and the UTC offset part is mapped to TRAILER.LAST_CHARGING_UTC_TIME_OFFSET.</td>
</tr>
<tr>
<td>LCS Request Timestamp</td>
<td>DETAIL_ASS_LOCN_EXT.SERVICE_USAGE.LCS_REQUEST_TIMESTAMP DETAIL_ASS_LOCN_EXT.SERVICE_USAGE.LCS_REQ_UTC_OFFSET</td>
<td>The timestamp part of this item is mapped to DETAIL_ASS_LOCN_EXT.SERVICE_USAGE.LCS_REQUEST_TIMESTAMP and the UTC offset part is mapped to DETAIL_ASS_LOCN_EXT.SERVICE_USAGE.LCS_REQ_UTC_OFFSET.</td>
</tr>
<tr>
<td>LCS SP Identification</td>
<td>DETAIL_ASS_LOCN_EXT.LCSSP_INFO.ID_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>LCS SP Information</td>
<td>DETAIL_ASS_LOCN_EXT.LCSSP_INFO</td>
<td>This is a block.</td>
</tr>
<tr>
<td>TAP Field</td>
<td>EDR Field</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>LCS Transaction Status</td>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.LCS_TRANS_STATUS</td>
<td>No comment.</td>
</tr>
<tr>
<td>Local Currency</td>
<td>DETAIL.Wholesale_Charged_Amount_Currency</td>
<td>No comment.</td>
</tr>
<tr>
<td>Location Area Code</td>
<td>GPRS Network Location:</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_GPRS_EXT.LOCATION_AREA_INDICATOR</td>
<td>GPRS Network Location</td>
</tr>
<tr>
<td></td>
<td>Network Location:</td>
<td>Network Location</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_GSMW_EXT.LOCATION_AREA_INDICATOR</td>
<td>except where not supported by the network or the call does not terminate at the equipment.</td>
</tr>
<tr>
<td>Location ID Type</td>
<td>Charged Party Location:</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.LOCATION_LIST.TYPE</td>
<td>Charged Party Location</td>
</tr>
<tr>
<td></td>
<td>Tracked Customer Location:</td>
<td>Tracked Customer Location</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.LOCATION_LIST.TYPE</td>
<td>Tracking Customer Location</td>
</tr>
<tr>
<td></td>
<td>Tracking Customer Location:</td>
<td>Tracking Customer Location</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_LOCN_EXT.TRACKING_CUST_INFO.LOCATION_LIST.TYPE</td>
<td></td>
</tr>
<tr>
<td>Location Identifier</td>
<td>Charged Party Location:</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.LOCATION_LIST.IDENTIFIER</td>
<td>Charged Party Location</td>
</tr>
<tr>
<td></td>
<td>Tracked Customer Location:</td>
<td>Tracked Customer Location</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.LOCATION_LIST.IDENTIFIER</td>
<td>Tracking Customer Location</td>
</tr>
<tr>
<td></td>
<td>Tracking Customer Location:</td>
<td>Tracking Customer Location</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_LOCN_EXT.TRACKING_CUST_INFO.LOCATION_LIST.IDENTIFIER</td>
<td></td>
</tr>
<tr>
<td>Location Service Usage</td>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Maximum Bit Rate</td>
<td>DETAIL.ASS_ROAMING_EXT.MAXIMUM_BIT_RATE</td>
<td>The maximum bit rate available for circuit switched UMTS.</td>
</tr>
<tr>
<td>Mdn</td>
<td>DETAIL.ASS_ROAMING_EXT.MOBILE_DIR_NUMBER</td>
<td>Mobile Directory Number.</td>
</tr>
<tr>
<td>Message Description Code</td>
<td>-</td>
<td>Message Description Code is not mapped to any EDR field. The DETAIL.DESCRIPTION field in the SCU Charge Type group contains description text with Message Description Code.</td>
</tr>
<tr>
<td>TAP Field</td>
<td>EDR Field</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Message Status</td>
<td>DETAIL_CALL_COMPLETION_INDICATOR</td>
<td>If the TAP field value is less than 10, it is prefixed with 0.</td>
</tr>
<tr>
<td>Message Type</td>
<td>DETAIL_QOS_USED</td>
<td>No comment.</td>
</tr>
<tr>
<td>Min</td>
<td>DETAIL_ASS_ROAMING_EXT_MOBILE_ID_NUMBER</td>
<td>Mobile Identification Number is an item which uniquely identifies the subscriber who has used the network.</td>
</tr>
<tr>
<td>Modification</td>
<td>DETAIL_ASS_GSMW_EXT_BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.MODIFICATION_TIMESTAMP and DETAIL_ASS_GSMW_EXT_BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.UTC_TIME_OFFSET</td>
<td>The timestamp part of this item is mapped to DETAIL_ASS_GSMW_EXT_BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.MODIFICATION_TIMESTAMP and the UTC offset part is mapped to DETAIL_ASS_GSMW_EXT_BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.UTC_TIME_OFFSET.</td>
</tr>
<tr>
<td>Timestamp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSISDN</td>
<td>The TAP field is mapped to the following fields:</td>
<td>The EDR field is always prefixed with International Access Code.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.A_NUMBER</td>
<td>Present within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.INTERN.A_NUMBER.ZONE</td>
<td>■ Chargeable Subscriber or GPRS</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GSMW_EXT.A_NUMBER_USER</td>
<td>Chargeable Subscriber when IMSI is present. Should be associated with IMSI.</td>
</tr>
<tr>
<td></td>
<td>GPRS:</td>
<td>■ GSM Chargeable Subscriber when available.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GPRS_EXT.A_NUMBER_USER</td>
<td>■ Present when expected in accordance with roaming agreement.</td>
</tr>
<tr>
<td></td>
<td>SCU:</td>
<td>■ Present for WLAN network usage where the full IMSI or Network Access Identifier are not available.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GSMW_EXT.DIALED_DIGITS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MTC:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL_ASS_GSMW_EXT.DIALED_DIGITS</td>
<td></td>
</tr>
<tr>
<td>Network Access</td>
<td>DETAIL_ASS_ROAMING_EXTNETWORKACCESS_IDENTIFIER</td>
<td>The Network Access Identifier (NAI) is a username identifying a unique customer when generating WLAN CDRs.</td>
</tr>
<tr>
<td>Identifier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network ID Type</td>
<td>Serving Parties Information:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_CONT_EXT.SERVING_</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ PARTIES_INFO.NETWORK_LIST.TYPE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LCS SP Information:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LOCN_EXT.LCSSP_INFO.NETWORK_LIST.TYPE</td>
<td></td>
</tr>
</tbody>
</table>

Table 10–1  (Cont.) TAP-to-EDR Mapping
## Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Identifier</td>
<td>Serving Parties Information:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_CONT_EXT.SERVING_</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ PARTIES_INFO.NETWORK_LIST.IDENTIFIER</td>
<td></td>
</tr>
<tr>
<td>LCS SP Information:</td>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.NETWORK_LIST.IDENTIFIER</td>
<td></td>
</tr>
<tr>
<td>Network Init. PDP Context</td>
<td>DETAIL.ASS_GPRS_EXT.NETWORK_INITIATED_PDP</td>
<td>No comment.</td>
</tr>
<tr>
<td>Network Type</td>
<td>DETAIL.SOURCE_NETWORK_TYPE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Number Of Channels</td>
<td>Basic HSCSD Parameters:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.NUMBER_OF_CHANNELS</td>
<td></td>
</tr>
<tr>
<td>HSCSD Parameter Modification:</td>
<td>■ DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.MAX_NUMBER_OF_CHANNELS</td>
<td></td>
</tr>
<tr>
<td>Number Of Channels Used</td>
<td>Basic HSCSD Parameters:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO PACKET.NUMBER_OF_CHANNELS_USED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.NUMBER_OF_UNITS HSCSD Parameter Modification:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.NUMBER_OF_CHANNELS_USED</td>
<td></td>
</tr>
<tr>
<td>Object Type</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.OBJECT_TYPE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Operator Spec Information</td>
<td>DETAIL.OPERATOR_SPECIFIC_INFO [if Record type is record_GPRS]</td>
<td>This is an optional repeating field which contains operator specific information.</td>
</tr>
<tr>
<td></td>
<td>HEADER.OPERATOR_SPECIFIC_INFO [record_Header]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TRAILER.OPERATOR_SPECIFIC_INFO [record_Trailer]</td>
<td></td>
</tr>
<tr>
<td>Order Placed Timestamp</td>
<td>DETAIL.ASS_CONT_EXT.ORDER_PLACED_TIMESTAMP</td>
<td>The timestamp part of this item is mapped to DETAIL.ASS_CONT_EXT.ORDER_PLACED_TIMESTAMP and the UTC offset part is mapped to DETAIL.ASS_CONT_EXT.ORDER_PLACED_UTC_TIME_OFFSET.</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_CONT_EXT.ORDER_PLACED_UTC_TIME_OFFSET</td>
<td></td>
</tr>
<tr>
<td>Originating Network</td>
<td>DETAIL.SOURCE_NETWORK</td>
<td>No comment.</td>
</tr>
<tr>
<td>Paid Indicator</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.PAID_INDICATOR</td>
<td>A flag which shows that the Charged Party has paid for the service.</td>
</tr>
</tbody>
</table>
### Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial Type Indicator</td>
<td>DETAIL.LONG_DURATION_INDICATOR</td>
<td>No comment.</td>
</tr>
<tr>
<td>Payment Method</td>
<td>DETAIL.ASS_CONT_EXTSERVICE_USED_LIST.PAYMENT_METHOD</td>
<td>No comment.</td>
</tr>
<tr>
<td>PDP Address</td>
<td>DETAIL.ASS_GPRS_EXT.PDP_ADDRESS</td>
<td>No comment.</td>
</tr>
<tr>
<td>PDP Context Start Timestamp</td>
<td>DETAIL.ASS_GPRS_EXT.PDP_CONTEXT_START_TIMESTAMP</td>
<td>The timestamp part of this item is mapped to DETAIL.ASS_GPRS_EXT.PDP_CONTEXT_START_TIMESTAMP and the UTC offset part is mapped to DETAIL.ASS_GPRS_EXT.PDP.UTC_TIME_OFFSET.</td>
</tr>
<tr>
<td>Positioning Method</td>
<td>DETAIL.ASS_LOCN_EXTSERVICE_USAGE.POSITIONING_METHOD</td>
<td>No comment.</td>
</tr>
<tr>
<td>Priority Code</td>
<td>DETAIL.QOS_REQUESTED</td>
<td>No comment.</td>
</tr>
<tr>
<td>QoS Delay</td>
<td>QoS Requested:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.QOS_REQUESTED_DELAY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.GS_PACKET.QOS_REQUESTED_DELAY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>QoS Used:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.QOS_USED_DELAY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.GS_PACKET.QOS_USED_DELAY</td>
<td></td>
</tr>
<tr>
<td>QoS Mean Throughput</td>
<td>QoS Requested:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.QOS_REQUESTED_MEAN_THROUGHPUT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.GS_PACKET.QOS_REQUESTED_MEAN_THROUGHPUT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>QoS Used:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.QOS_USED_MEAN_THROUGHPUT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- DETAIL.ASS_GPRS_EXT.GS_PACKET.QOS_USED_MEAN_THROUGHPUT</td>
<td></td>
</tr>
</tbody>
</table>
### Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>QoS Peak Throughput</td>
<td>Detail.ASS_GPRS_EXT.QOS_REQUESTED_PEAK_THROUGHPUT</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>Detail.ASS_GPRS_EXT.GS_PACKET.QOS_REQUESTED_PEAK_THROUGHPUT</td>
<td></td>
</tr>
<tr>
<td>QoS Used</td>
<td>Detail.ASS_GPRS_EXT.QOS_USED_PEAK_THROUGHPUT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detail.ASS_GPRS_EXT.GS_PACKET.QOS_USED_PEAK_THROUGHPUT</td>
<td></td>
</tr>
<tr>
<td>QoS Precedence</td>
<td>Detail.ASS_GPRS_EXT.QOS_REQUESTED_PRECEDENCE</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>Detail.ASS_GPRS_EXT.GS_PACKET.QOS_REQUESTED_PRECEDENCE</td>
<td></td>
</tr>
<tr>
<td>QoS Used</td>
<td>Detail.ASS_GPRS_EXT.QOS_USED_PRECEDENCE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detail.ASS_GPRS_EXT.GS_PACKET.QOS_USED_PRECEDENCE</td>
<td></td>
</tr>
<tr>
<td>QoS Reliability</td>
<td>Detail.ASS_GPRS_EXT.QOS_REQUESTED_RELIABILITY</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>Detail.ASS_GPRS_EXT.GS_PACKET.QOS_REQUESTED_RELIABILITY</td>
<td></td>
</tr>
<tr>
<td>QoS Used</td>
<td>Detail.ASS_GPRS_EXT.QOS_USED_RELIABILITY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detail.ASS_GPRS_EXT.GS_PACKET.QOS_USED_RELIABILITY</td>
<td></td>
</tr>
<tr>
<td>Radio Channel Requested</td>
<td>DETAIL.QOS_REQUESTED</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.QOS_REQUESTED</td>
<td></td>
</tr>
<tr>
<td>Radio Channel Used</td>
<td>DETAIL.QOS_USED</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.QOS_USED</td>
<td></td>
</tr>
<tr>
<td>RAP File Sequence Number</td>
<td>Call Event Details:</td>
<td>Must be present within groups:</td>
</tr>
<tr>
<td></td>
<td>DETAIL.RAP.FILE_SEQ_NO</td>
<td>Notification</td>
</tr>
<tr>
<td></td>
<td>Batch Control Information and Notification:</td>
<td>Batch Control Information</td>
</tr>
<tr>
<td></td>
<td>HEADER.RAP_FILE_SEQ_NO</td>
<td></td>
</tr>
<tr>
<td>TAP Field</td>
<td>EDR Field</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Recipient</td>
<td>HEADER.RECIPIENT</td>
<td>No comment.</td>
</tr>
<tr>
<td>Recording Entity Code</td>
<td>Service Center Usage:</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_GSMW_EXT.ORIGINATING_SWITCH_</td>
<td>■ Recording Entity Information</td>
</tr>
<tr>
<td></td>
<td>IDENTIFICATION</td>
<td>■ Location Service</td>
</tr>
<tr>
<td></td>
<td>Location Service:</td>
<td>■ Network Location</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LOCN_EXT.REC_ENTITY_CODE</td>
<td>■ Service Center Usage where it must be of type ‘Service Center’</td>
</tr>
<tr>
<td></td>
<td>Mandatory within groups:</td>
<td>In the case of GPRS network usage, two or more occurrences must be</td>
</tr>
<tr>
<td></td>
<td></td>
<td>present within GPRS Network Location. One occurrence must be of type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘GGSN’ (see Recording Entity Type) and all other occurrences must be of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>type ‘SGSN’.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In the case of WLAN network usage, one occurrence must be present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>identifying the WLAN billing information recording entity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Network Location:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recording Entity Code is used to get corresponding Recording Entity ID.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recording Entity Code is not stored in any EDR field.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rec Entity Code Information:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recording Entity Code is used to get corresponding Recording Entity ID.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recording Entity Code is not stored in any EDR field.</td>
</tr>
<tr>
<td>Release Version Number</td>
<td>HEADER.RELEASE_VERSION</td>
<td>No comment.</td>
</tr>
<tr>
<td>Requested Delivery</td>
<td>DETAIL.ASS_CONT_EXT.REQUESTED_DELIVERY_TIMESTAMP</td>
<td>The timestamp part of this item is mapped to DETAIL.ASS_CONT_EXT.REQUESTED_</td>
</tr>
<tr>
<td>Timestamp</td>
<td>DETAIL.ASS_CONT_EXT.REQ_DELIVERY_UTC_TIME_OFFSET</td>
<td>DELIVERY_TIMESTAMP, and the UTC offset part is mapped to DETAIL.ASS_CONT_</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXT.REQ_DELIVERY_UTC_TIME_OFFSET.</td>
</tr>
<tr>
<td>Requested Destination</td>
<td>Requested Number:</td>
<td>The original destination to which the customer requested to be connected.</td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LTE_EXT.REQUESTEDNUMBER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requested Public User ID:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ DETAIL.ASS_LTE_EXT.REQUESTEDPUBLICUSERID</td>
<td></td>
</tr>
<tr>
<td>Response Time</td>
<td>DETAIL.ASS_LOCN_EXTSERVICE_USAGE.RESPONSE_TIME</td>
<td>No comment.</td>
</tr>
<tr>
<td>Response Time Category</td>
<td>DETAIL.ASS_LOCN_EXTSERVICE_USAGE.RESPONSE_TIME_CATEGORY</td>
<td>No comment.</td>
</tr>
<tr>
<td>Sender</td>
<td>HEADER.SENDER</td>
<td>No comment.</td>
</tr>
<tr>
<td>Serving Bid</td>
<td>DETAIL.GEOGRAPHICAL_LOCATION</td>
<td>The Serving BID (Billing Identifier) is a code associated with a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>geographical area.</td>
</tr>
<tr>
<td>Serving Location</td>
<td>DETAIL.GEOGRAPHICAL_LOCATION</td>
<td>A text description giving the geographical location of the terminal</td>
</tr>
<tr>
<td>Description</td>
<td></td>
<td>equipment.</td>
</tr>
</tbody>
</table>
Table 10–1  (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Network</td>
<td>Serving Network:</td>
<td>Serving Network is stored in DETAIL.GEOGRAPHICAL_LOCATION along with other concatenated comma-separated tag-value pairs from Geographical Location.</td>
</tr>
<tr>
<td>▪ DETAIL.ASS_GSMW_EXT.SERVINGNETWORK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ NETWORK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographical Location:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ DETAIL.GEOGRAPHICAL_LOCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serving Parties Information</td>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO</td>
<td>This is a block.</td>
</tr>
<tr>
<td>SIM Toolkit Indicator</td>
<td>DETAIL.DISCOUNT_KEY</td>
<td>No comment.</td>
</tr>
<tr>
<td>SMS Destination Number</td>
<td>DETAIL.ASS_ROAMING_EXT.SMS_DESTINATION_NUMBER</td>
<td>The SMS Destination Number item contains the actual destination (intended recipient) of the SMS text message.</td>
</tr>
<tr>
<td>SMS Originator</td>
<td>DETAIL.ASS_ROAMING_EXT.SMS_ORIGINATOR</td>
<td>The SMS Originator holds the identification of the actual sender of the SMS</td>
</tr>
<tr>
<td>Specification Version Number</td>
<td>HEADER.SPECIFICATION_VERSION_NUMBER</td>
<td>No comment.</td>
</tr>
<tr>
<td>Speech Version Requested</td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET SPEECH_VERSION_REQUESTED</td>
<td>No comment.</td>
</tr>
<tr>
<td>Speech Version Used</td>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET SPEECH_VERSION_USED</td>
<td>No comment.</td>
</tr>
<tr>
<td>Supplementary Service Code</td>
<td>DETAIL.ASS_GSMW_EXT.SS PACKET SS EVENT</td>
<td>No comment.</td>
</tr>
<tr>
<td>Supplementary Service Parameters</td>
<td>DETAIL.ASS_GSMW_EXT.SS PACKET SS_PARAMETERS</td>
<td>No comment.</td>
</tr>
<tr>
<td>Supplementary Service Used</td>
<td>DETAIL.ASS_GSMW_EXT.SS PACKET</td>
<td>This is a block.</td>
</tr>
<tr>
<td>TAP Decimal Places</td>
<td>HEADER.TAP_DECIMAL_PLACES</td>
<td>No comment.</td>
</tr>
<tr>
<td>Tax Information</td>
<td>DETAIL.ASS_CBD.TP</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tax Rate Code</td>
<td>DETAIL.ASS_CBD.TP.TAX_CODE</td>
<td>Mandatory within groups:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Taxation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Tax Information</td>
</tr>
<tr>
<td>Tax Value</td>
<td>DETAIL.WHOLESALE_CHARGED_TAX_VALUE DETAIL.ASS_CBD.TPTAX_VALUE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Taxable Amount</td>
<td>DETAIL.ASS_CBD.TPTAXABLE_AMOUNT DETAIL.ASS_CBD.TPTAXABLE_AMOUNT</td>
<td>No comment.</td>
</tr>
<tr>
<td>TeleService Code</td>
<td>DETAIL.BASIC_SERVICE DETAIL.ASS_GSMW_EXT.BS_PACKET.BASIC_SERVICE</td>
<td>The EDR fields are prefixed with 0.</td>
</tr>
<tr>
<td>Third Party Number</td>
<td>DETAIL.C_NUMBER DETAIL.ASS_GSMW_EXT.SS PACKET THIRD_PARTY_NUMBER</td>
<td>Present within the Third Party Information group where available.</td>
</tr>
</tbody>
</table>
Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Band</td>
<td>DETAIL.ASS_CBD_CP.TIME_INTERVAL_CODE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Total Advised Charge</td>
<td>TRAILER.ASS_ROAMING_EXT.TOTAL ADVISEDCHARGE</td>
<td>The sum of all the advised charges associated with the corresponding currency excluding those representing a refund.</td>
</tr>
<tr>
<td>Total Advised Charge Refund</td>
<td>TRAILER.ASS_ROAMING_EXT.TOTAL ADVISEDCHARGE_REFUND</td>
<td>The sum of all the advised charges associated with the corresponding currency representing a refund.</td>
</tr>
<tr>
<td>Total Commission</td>
<td>TRAILER.ASS_ROAMING_EXT.TOTAL_COMMISSION</td>
<td>The sum of all the commissions associated with the corresponding currency excluding those representing a refund.</td>
</tr>
<tr>
<td>Total Commission Refund</td>
<td>TRAILER.ASS_ROAMING_EXT.TOTAL_COMMISSION_REFUND</td>
<td>The sum of all the commissions associated with the corresponding currency representing a refund.</td>
</tr>
<tr>
<td>Total Discount Refund</td>
<td>TRAILER.ASS_ROAMING_EXT.TOTAL_DISCOUNT_REFUND</td>
<td>The sum of the Discount Values plus each application of a Fixed Discount Value contained in the batch representing a refund.</td>
</tr>
<tr>
<td>Total Tax Refund</td>
<td>TRAILER.ASS_ROAMING_EXT.TOTAL_TAX_REFUND</td>
<td>The sum of the Tax Values contained in the batch representing a refund.</td>
</tr>
<tr>
<td>Total Transaction Duration</td>
<td>Total Transaction Duration: DETAIL.ASS_CONT_EXT.TOTAL_TRANSACTION DURATION&lt;br&gt; Total Call Event Duration: DETAIL.TOTAL_CALL_EVENT_DURATION</td>
<td>No comment.</td>
</tr>
<tr>
<td>Total Call Event Duration</td>
<td>Total Call Event Duration: DETAIL.TOTAL_CALL_EVENT_DURATION</td>
<td>No comment.</td>
</tr>
<tr>
<td>Total Charge</td>
<td>TRAILER.TOTAL_CHARGE_VALUE_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Total Charge Refund</td>
<td>TRAILER.TOTAL_CHARGE_VALUE_LIST.TOTAL_CHARGE_REFUND</td>
<td>No comment.</td>
</tr>
<tr>
<td>Total Data Volume</td>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.TOTAL_DATA_VOLUME</td>
<td>No comment.</td>
</tr>
<tr>
<td>Total Discount Value</td>
<td>TRAILER.TAP_TOTAL_DISCOUNT_VALUE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Total Tax Value</td>
<td>TRAILER.TAP_TOTAL_TAX_VALUE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Tracked Customer Equipment</td>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.EQUIPMENT</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracked Customer Home Id</td>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.HOME_ID_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracked Customer Identification</td>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.ID_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracked Customer Information</td>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO</td>
<td>This is a block.</td>
</tr>
</tbody>
</table>
Table 10–1 (Cont.) TAP-to-EDR Mapping

<table>
<thead>
<tr>
<th>TAP Field</th>
<th>EDR Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracked Customer Location</td>
<td>DETAIL_ASS_LOCN_EXT.TRACKED_CUST_INFO.LOCATION_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracking Customer Equipment</td>
<td>DETAIL_ASS_LOCN_EXT.TRACKING_CUST_INFO.EQUIPMENT</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracking Customer Home Id</td>
<td>DETAIL_ASS_LOCN_EXT.TRACKING_CUST_INFO.HOME_ID_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracking Customer Identification</td>
<td>DETAIL_ASS_LOCN_EXT.TRACKING_CUST_INFO.ID_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracking Customer Information</td>
<td>DETAIL_ASS_LOCN.Ext.TRACKING_CUST_INFO</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracking Customer Location</td>
<td>DETAIL_ASS_LOCN_EXT.TRACKING_CUST_INFO.LOCATION_LIST</td>
<td>This is a block.</td>
</tr>
<tr>
<td>Tracking Frequency</td>
<td>DETAIL_ASS_LOCN_EXT.SERVICE_USAGE.REQ_TRACKING_FREQUENCY</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>DETAIL_ASS_LOCN_EXT.SERVICE_USAGE.DEL_TRACKING_FREQUENCY</td>
<td></td>
</tr>
<tr>
<td>Tracking Period</td>
<td>DETAIL_ASS_LOCN_EXT.SERVICE_USAGE.TRACKING_PERIOD</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>DETAIL_ASS_LOCN_EXT.SERVICE_USAGE.DEL_TRACKING_PERIOD</td>
<td></td>
</tr>
<tr>
<td>Transaction Authorization Code</td>
<td>DETAIL_ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_AUTH_CODE</td>
<td>No comment.</td>
</tr>
<tr>
<td>Transaction Description Suppression</td>
<td>DETAIL_ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_DESCRIPTION_SUPP</td>
<td>No comment.</td>
</tr>
<tr>
<td>Transaction Detail Description</td>
<td>DETAIL_ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_DETAIL_DESCRIPTION</td>
<td>No comment.</td>
</tr>
<tr>
<td>Transaction Identifier</td>
<td>DETAIL_ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_IDENTIFIER</td>
<td>No comment.</td>
</tr>
<tr>
<td>Transaction Short Description</td>
<td>DETAIL_ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_SHORT_DESCRIPTION</td>
<td>No comment.</td>
</tr>
<tr>
<td>Transaction Status</td>
<td>DETAIL_ASS_CONT_EXT.TRANSACTION_STATUS</td>
<td>No comment.</td>
</tr>
<tr>
<td>Transfer Cut Off Timestamp</td>
<td>HEADER.TRANSFER_CUTOFF_TIMESTAMP</td>
<td>No comment.</td>
</tr>
<tr>
<td>Transparency Indicator</td>
<td>DETAIL_ASS_GSMW_EXT.BS_PACKET.TRANSPARENCY_INDICATOR</td>
<td>No comment.</td>
</tr>
<tr>
<td>TAP Field</td>
<td>EDR Field</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| UMTS Quality Of Service Requested | DETAIL_ASS_GPRS_EXT.GS_PACKET.UMTS_QOS_REQUESTED | The EDR field contains comma-separated tag-value pairs mapped from UMTS Quality Of Service Requested. The tag values of the corresponding fields are as follows:  
  - QosTrafficClassKey: 1  
  - QosMaxBitRateUpLnKey: 2  
  - QosMaxBitRateDownLnKey: 3  
  - QosGuaranteedBitRateDownLnKey: 4  
  - QosGuaranteedBitRateUpLnKey: 5  
  - QosAllocRetenPriorityKey: 6 |
| UMTS Quality Of Service Used  | DETAIL_ASS_GPRS_EXT.GS_PACKET.UMTS_QOS_USED    | The EDR field contains comma-separated tag-value pairs mapped from UMTS Quality Of Service Used. The tag values of the corresponding fields are as follows:  
  - QosTrafficClassKey: 1  
  - QosMaxBitRateUpLnKey: 2  
  - QosMaxBitRateDownLnKey: 3  
  - QosGuaranteedBitRateDownLnKey: 4  
  - QosGuaranteedBitRateUpLnKey: 5  
  - QosAllocRetenPriorityKey: 6 |
| User Protocol Indicator      | DETAIL_ASS_GSMW_EXT.BS_PACKET.USER_PROTOCOL_INDICATOR | No comment.                                                                                                                                |
| UTC Time Offset              | File Creation Timestamp:  
  - HEADER.UTC_TIME_OFFSET  
  Earliest Call Timestamp:  
  - TRAILER.FIRST_CHARGING_UTC_TIME_OFFSET  
  Latest Call Timestamp:  
  - TRAILER.LAST_CHARGING_UTC_TIME_OFFSET | Mandatory within items:  
  - File Creation Timestamp  
  - Earliest Call Timestamp  
  - Latest Call Timestamp  
  Mandatory within UTC Time Offset Information. |
When generating output TAP files, BRM maps EDR container fields to the fields in TAP output files. Table 10–2 lists the EDR and TAP field mappings that BRM uses when producing the output files.

Note: Some of the fields in the EDR container file, such as DETAIL.UTC_TIME_OFFSET, can provide data to different fields in the output TAP file.
### Table 10–2 (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.CAMEL.MODIFICATION.LIST</td>
<td>Camel Modification</td>
<td>Comma-separated list.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.CAMELREFERENCE.NUMBER</td>
<td>Camel Call Reference</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.CSE.INFORMATION</td>
<td>CSE Information</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CAMEL.EXT.DEFAULT_CALL.HANDLING.INDICATOR</td>
<td>Default Call Handling Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.DEST.GPRS_APN_ADDRESS</td>
<td>GPRS Destination</td>
<td>The EDR field contains concatenated and comma-separated values of Access Point Name NI and Access Point Name OI.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.DEST.GPRS_PDP_REMOTE_ADDRESS</td>
<td>Remote Pdp Address List</td>
<td>Comma-separated list.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.DEST.GSMW_NUMBER</td>
<td>Camel Destination Number</td>
<td>International Access Code prefixes the EDR field.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.RECORD_NUMBER</td>
<td>Tax Information List</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.SERVER_TYPE_OF_NUMBER</td>
<td>Camel Invocation Fee</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.DEST.GSMW_NUMBER.ORIGINAL</td>
<td>Camel Destination Number</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.MSC.ADDRESS</td>
<td>Camel Msc Address</td>
<td>International Access Code prefixes the EDR field.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.SERVER.ADDRESS</td>
<td>Camel Server Address</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.SERVICE_KEY</td>
<td>CAMEL Service Key</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS.CAMEL.EXT.SERVICE_LEVEL</td>
<td>CAMEL Service Level</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CBD.CP.CHARGEABLE.QUANTITY.VALUE</td>
<td>Chargeable Units</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CBD.CP.CHARGED.AMOUNT.VALUE</td>
<td>Charge</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CBD.CP.CHARGING.START_TIMESTAMP</td>
<td>Charging Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CBD.CP.DAY_CODE</td>
<td>Day Category</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CBD.CP.EXCHANGE.RATE</td>
<td>Exchange Rate Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CBD.CP.GRANTED.DISCOUNT.AMOUNT.VALUE</td>
<td>Discount Value</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CBD.CP.GRANTED.DISCOUNT.CODE</td>
<td>Discount Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CBD.CP.IMPACT.CATEGORY</td>
<td>Charge Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>EDR Field</td>
<td>TAP Field</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>DETAIL.ASS_CBCD_CP.PRODUCTCODE_USED</td>
<td>VAS:</td>
<td>In Charge Detail Group, values that are mapped to the EDR field depend on the service type: VAS or Camel.</td>
</tr>
<tr>
<td></td>
<td>■ VasShortDesc for the corresponding VAS Code</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ Camel:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ Hard coded to CAMEL</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_CBCD_CP.ROUNDED_QUANTITY_VALUE</td>
<td>Charged Units</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CBCD_CP.TIME_INTERVAL_CODE</td>
<td>Time Band</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CBCD_TP</td>
<td>Tax Information</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CBCD_TP.CHARGE_TYPE</td>
<td>Charge Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CBCD_TP.TAX_CODE</td>
<td>Tax Rate Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CBCD_TP.TAX_VALUE</td>
<td>Tax Value</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CBCD_TP.TAXABLE_AMOUNT</td>
<td>Taxable Amount</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.ACTUAL_DELIVERY_TIMESTAMP</td>
<td>Actual Delivery</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.ACTUAL_DELIVERY.UTC_TIME_OFFSET</td>
<td>Timestamp</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO</td>
<td>Charged Party</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.EQUIPMENT</td>
<td>Charged Party Equipment</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.EQUIPMENT.IDENTIFIER</td>
<td>Charged Party Equipment:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.EQUIPMENT.TYPE</td>
<td>Charged Party Equipment:</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.HOMEID_LIST</td>
<td>Charged Party Home Identification</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.HOMEID_LIST.IDENTIFIER</td>
<td>Charged Party Home Identification:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.HOMEID_LIST.TYPE</td>
<td>Charged Party Home Identification:</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.ID_LIST</td>
<td>Charged Party Identification</td>
<td>This is a block.</td>
</tr>
<tr>
<td>EDR Field</td>
<td>TAP Field</td>
<td>Comments</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.ID_LIST.IDENTIFIER</td>
<td>Charged Party Identifier</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.ID_LIST.TYPE</td>
<td>Charged Party ID Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.LOCATION_LIST</td>
<td>Charged Party Location</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.LOCATION_LIST.IDENTIFIER</td>
<td>Charged Party Location:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.CHARGED_PARTY_INFO.LOCATION_LIST.IDTYPE</td>
<td>Charged Party Location:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.ORDER_PLACED_TIMESTAMP</td>
<td>Order Placed Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.RECORD_NUMBER</td>
<td>Keeps the number of records of content Transaction.</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.REQUESTED_DELIVERY_TIMESTAMP</td>
<td>Requested Delivery Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST</td>
<td>Content Service Used</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.ADVISED_CHARGE</td>
<td>Advised Charge</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.ADVISED_CHARGE.CURRENCY</td>
<td>Advised Charge Currency</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.CHARGE_REFUND_INDICATOR</td>
<td>Charge Refund Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.COMMISSION</td>
<td>Commission</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.CONTENT_CHARGING_POINT</td>
<td>Content Charging Point</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.CONTENT_TRANSACTION_CODE</td>
<td>Content Transaction Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.CONTENT_TRANSACTION_TYPE</td>
<td>Content Transaction Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>EDR Field</td>
<td>TAP Field</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.DATA_VOLUME_INCOMING</td>
<td>Data Volume Incoming</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.DATA_VOLUME_OUTGOING</td>
<td>Data Volume Outgoing</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.OBJECT_TYPE</td>
<td>Object Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.PAID_INDICATOR</td>
<td>Paid Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.PAYMENT_METHOD</td>
<td>Payment Method</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.TOTAL_DATA_VOLUME</td>
<td>Total Data Volume</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_AUTH_CODE</td>
<td>Transaction Authorization Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_DESCRIPTION_SUPP</td>
<td>Transaction Description Suppression</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_DETAIL_DESCRIPTION</td>
<td>Transaction Detail Description</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVICE_USED_LIST.TRANSACTION_IDENTIFIER</td>
<td>Transaction Identifier</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO</td>
<td>Serving Parties Information</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.ISP_LIST</td>
<td>Internet Service Provider</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.ISP_LIST.IDENTIFIER</td>
<td>ISP Identifier</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.ISP_LIST.TYPE</td>
<td>ISP ID Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.NETWORK_LIST</td>
<td>Network</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.NETWORK_LIST.IDENTIFIER</td>
<td>Serving Parties Info Block:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.NETWORK_LIST.TYPE</td>
<td>Serving Parties Info Block:</td>
<td>No comment.</td>
</tr>
</tbody>
</table>

**Table 10–2 (Cont.) EDR-to-TAP Mapping**
<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.PROVIDER_LIST</td>
<td>Content Provider</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.PROVIDER_LIST.IDENTIFIER</td>
<td>Content Provider Block:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ Content Provider Identifier</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.PROVIDER_LIST.TYPE</td>
<td>Content Provider Block:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ Content Provider Id Type</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.SERVING_PARTIES_INFO.PROVIDER_NAME</td>
<td>Content Provider Name</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.TOTAL_TRANSACTION_DURATION</td>
<td>Total Transaction Duration</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_CONT_EXT.TRANSACTION_STATUS</td>
<td>Transaction Status</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.A_NUMBER_USER</td>
<td>MSISDN</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.APN_ADDRESS</td>
<td>GPRS Destination Group:</td>
<td>The EDR field contains concatenated and comma-separated values of Access Point Name NI and Access Point Name OI.</td>
</tr>
<tr>
<td></td>
<td>■ Access Point Name NI, if Camel option is not set.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ Access Point Name OI, if Camel option is not set.</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.CELL_ID</td>
<td>Cell Identity</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.CHARGING_ID</td>
<td>Charging ID</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.DEVICE_NUMBER</td>
<td>IMEI</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GGSN_ADDRESS</td>
<td>Recording Entity ID</td>
<td>Rec Entity Code Element Group. Recording Entity Code is used to get corresponding Recording Entity ID. The obtained Recording Entity ID is stored in the EDR field.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS_PACKET</td>
<td>GPRS Service Used</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS_PACKET.CHARGING_START_TIMESTAMP</td>
<td>Charging Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS_PACKET.UTC_TIME_OFFSET</td>
<td>QoS Requested:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS_PACKET.QOS_REQUESTED_DELAY</td>
<td>■ QoS Delay</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS_PACKET.QOS_REQUESTED_MEAN_THROUGHPUT</td>
<td>QoS Requested:</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>■ QoS Mean Throughput</td>
<td></td>
</tr>
<tr>
<td>EDR Field</td>
<td>TAP Field</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS_PACKET.QOS_REQUESTED_PEAK_THROUGHPUT</td>
<td>QoS Requested:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.QOS_REQUESTED_PRECEDENCE</td>
<td>QoS Requested:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.QOS_REQUESTED_RELIABILITY</td>
<td>QoS Requested:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.QOS_USED_DELAY</td>
<td>QoS Used:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.QOS_USED_MEAN_THROUGHPUT</td>
<td>QoS Used:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.QOS_USED_PEAK_THROUGHPUT</td>
<td>QoS Used:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.QOS_USED_PRECEDENCE</td>
<td>QoS Used:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.QOS_USED_RELIABILITY</td>
<td>QoS Used:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.UMTS_QOS_REQUESTED</td>
<td>UMTS Quality Of Service Requested</td>
<td>The EDR field is mapped into concatenated and comma-separated tag-value pairs in UMTS Quality Of Service Requested. The tag values of the corresponding fields are as follows:</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.UMTS_QOS_USED</td>
<td>UMTS Quality Of Service Used</td>
<td>The EDR field is mapped into concatenated and comma-separated tag-value pairs in UMTS Quality Of Service Used. The tag values of the corresponding fields are as follows:</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS PACKET.UTC_TIME_OFFSET</td>
<td>Charging Timestamp</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
### Table 10–2 (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS_PACKET.VOLUME_RECEIVED</td>
<td>Data Volume Incoming</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.GS_PACKET.VOLUME_SENT</td>
<td>Data Volume Outgoing</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.LOCATION_AREA_INDICATOR</td>
<td>Location Area Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.NETWORK_INITIATED_PDP</td>
<td>Network Initiated PDP Context</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.ORIGINATING_SWITCH_IDENTIFICATION</td>
<td>Recording Entity ID</td>
<td>Rec Entity Code Element. Recording Entity Code is used to get corresponding Recording Entity ID. The Recording Entity ID is stored in the EDR field.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.PDP_ADDRESS</td>
<td>PDP Address</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.PDP_CONTEXT_START_TIMESTAMP</td>
<td>PDP Context Start Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.PORT_NUMBER</td>
<td>IMSI</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.SERVICE_USED_CHARGING_START_TIMESTAMP</td>
<td>GGPRS Service Used Block:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.SERVICE_USED_UPT_TIME_OFFSET</td>
<td>■ Charging Timestamp</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.SGSN_ADDRESS</td>
<td>Recording Entity ID</td>
<td>Rec Entity Code Element. Recording Entity Code is used to get corresponding Recording Entity ID. The Recording Entity ID is stored in the EDR field.</td>
</tr>
<tr>
<td>DETAIL.ASS_GPRS_EXT.SGSN_INFO_LIST.SGSN_ADDRESS</td>
<td>Recording Entity ID</td>
<td>Rec Entity Code Element. The Recording Entity code is used to get corresponding Recording Entity ID. The Recording Entity ID is stored in the EDR field.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.A_NUMBER_USER</td>
<td>■ MSISDN</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.A_NUMBER_USER</td>
<td>■ Third Party Number</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BASIC_DUAL_SERVICE</td>
<td>■ Dual Teleservice Code</td>
<td>The EDR field is prefixed with 0.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BASIC_DUAL_SERVICE</td>
<td>■ Dual Bearer Service Code</td>
<td>The EDR field is prefixed with 1.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET</td>
<td>■ Basic Service</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET</td>
<td>■ Basic Service Used</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.AIUR_REQUESTED</td>
<td>Air Interface User Rate</td>
<td>No comment.</td>
</tr>
<tr>
<td>EDR Field</td>
<td>TAP Field</td>
<td>Comments</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.CHARGING_START_TIMESTAMP</td>
<td>Charging Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.UTC_TIME_OFFSET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.FNUR</td>
<td>Fixed Network User Rate</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.CHANNEL_CODING_OK_LIST</td>
<td>Channel Coding Acceptable</td>
<td>The EDR field is mapped as a comma-separated list of channel coding.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.CHANNEL_CODING_USED</td>
<td>Channel Coding Used</td>
<td>The EDR field is mapped as a comma-separated list of channel coding.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.NUMBER_OF_CHANNELS</td>
<td>Number Of Channels</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.NUMBER_OF_CHANNELS_USED</td>
<td>Number Of Channels Used</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST</td>
<td>Basic HSCSD Parameters</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.HSCSD_PARAMETER</td>
<td>HSCSD Parameter Modification</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.AIUR</td>
<td>Air Interface User Rate</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.CHANNEL_CODING_USED</td>
<td>Channel Coding Used</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.INITIATING_PARTY</td>
<td>Initiating Party</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.MAX_NUMBER_OF_CHANNELS</td>
<td>Number Of Channels</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.MODIFICATION_TIMESTAMP</td>
<td>Modification Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.UTC_TIME_OFFSET</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 10–2  (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.HSCSD_INFO_PACKET.PM_LIST.NUMBER_OF_CHANNELS_USED</td>
<td>Number Of Channels Used</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.QOS_REQUESTED</td>
<td>Radio Channel Requested</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.QOS_USED</td>
<td>Radio Channel Used</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.SPEECH_VERSION_REQUESTED</td>
<td>Speech Version Requested</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.SPEECH_VERSION_USED</td>
<td>Speech Version Used</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.TRANSPARENCY_INDICATOR</td>
<td>Transparency Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.BS_PACKET.USER_PROTOCOL_INDICATOR</td>
<td>User Protocol Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.CELL_ID</td>
<td>Cell Identity</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.DEVICE_NUMBER</td>
<td>IMEI or ESN</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.DIALED_DIGITS</td>
<td>• Dialled Digits</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>• MSISDN, in MTC and SCU groups</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.LOCATION_AREA_INDICATOR</td>
<td>Location Area Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.MS_CLASS_MARK</td>
<td>Mobile Station Classmark</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.NUMBER_OF_SS_PACKETS</td>
<td>• Number of Supplementary Service Used blocks</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.ORIGINATING_SWITCH_IDENTIFICATION</td>
<td>• Location Information</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>• Recording Entity ID</td>
<td></td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.PORT_NUMBER</td>
<td>IMSI</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SERVING_NETWORK</td>
<td>Serving Network</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET</td>
<td>Supplementary Service Used</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET.ACTION_CODE</td>
<td>Supplementary Service Action Code</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
### Table 10–2 (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET_BASIC_SERVICE_CODE_LIST</td>
<td>Basic Service Code SS</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET_CLIR_INDICATOR</td>
<td>CLIR Status Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET_SS_EVENT</td>
<td>Supplementary Service Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET_SS_PARAMETERS</td>
<td>Supplementary Service Parameters</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET_THIRD_PARTY_NUMBER</td>
<td>Third Party Number</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_GSMW_EXT.SS_PACKET.UTC_TIME_OFFSET</td>
<td>UTC Time Offset</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.CALL_REFERENCE</td>
<td>Call Reference</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO</td>
<td>LCS SP Information</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.ID_LIST</td>
<td>LCS SP Identification</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.ID_LIST.IDENTIFIER</td>
<td>LCS SP Identification:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.ID_LIST.TYPE</td>
<td>LCS SP Identification:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.ISP_LIST</td>
<td>Internet Service Provider</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.ISP_LIST.IDENTIFIER</td>
<td>LCS SP Information:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.ISP_LIST.TYPE</td>
<td>LCS SP Information:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.NETWORK_LIST.IDENTIFIER</td>
<td>LCS SP Information:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.LCSSP_INFO.NETWORK_LIST.TYPE</td>
<td>LCS SP Information:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.REC_ENTITY_CODE</td>
<td>Location Service:</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE</td>
<td>Location Service Usage</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.AGE_OF_LOCATION</td>
<td>Age Of Location</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.DEL_TRACKING_FREQUENCY</td>
<td>Tracking Frequency</td>
<td>No comment.</td>
</tr>
<tr>
<td>EDR Field</td>
<td>TAP Field</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.DEL_TRACKING_PERIOD</td>
<td>Tracking Period</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.H_ACCURACY_DELIVERED</td>
<td>Horizontal Accuracy Delivered</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.H_ACCURACY_REQUESTED</td>
<td>Horizontal Accuracy Requested</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.LCS_REQUEST_TIMESTAMP</td>
<td>LCS Request Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.UTC_TIME_OFFSET</td>
<td>LCS Transaction Status</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.POSITIONING_METHOD</td>
<td>Positioning Method</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.REQ_TRACKING_FREQUENCY</td>
<td>Tracking Frequency</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.RESPONSE_TIME</td>
<td>Response Time</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.RESPONSE_TIMECATEGORY</td>
<td>Response Time Category</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.TRACKING_PERIOD</td>
<td>Tracking Period</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.V_ACCURACY_DELIVERED</td>
<td>Vertical Accuracy Delivered</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.SERVICE_USAGE.V_ACCURACY_REQUESTED</td>
<td>Vertical Accuracy Requested</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO</td>
<td>Tracked Customer Information</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.EQUIPMENT</td>
<td>Tracked Customer Equipment</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.EQUIPMENT.IDENTIFIER</td>
<td>Tracked Customer Equipment: ■ Equipment Id</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.EQUIPMENT.TYPE</td>
<td>Tracked Customer Equipment: ■ Equipment ID Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.HOME_ID_LIST</td>
<td>Tracked Customer Home Id</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN_EXT.TRACKED_CUST_INFO.HOME_ID_LIST.IDENTIFIER</td>
<td>Tracked Customer Home Id: ■ Home Identifier</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
Table 10–2 (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKED_CUST_INFO.HOME_ID_LIST.TYPE</td>
<td>Tracked Customer Home Id: ■ HomeIDType</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKED_CUST_INFO.ID_LIST</td>
<td>Tracked Customer Identification</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKED_CUST_INFO.ID_LIST.IDENTIFIER</td>
<td>Tracked Customer Identification: ■ Customer Identifier</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKED_CUST_INFO.ID_LIST.TYPE</td>
<td>Tracked Customer Identification: ■ Customer ID Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKED_CUST_INFO.LOCATION_LIST</td>
<td>Tracked Customer Location</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKED_CUST_INFO.LOCATION_LIST.IDENTIFIER</td>
<td>Tracked Customer Location: ■ Location Identifier</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKED_CUST_INFO.LOCATION_LIST.TYPE</td>
<td>Tracked Customer Location: ■ Location ID Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO</td>
<td>Tracking Customer Information</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.EQUIPMENT</td>
<td>Tracking Customer Equipment</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.EQUIPMENT.IDENTIFIER</td>
<td>Tracking Customer Equipment: ■ Equipment ID</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.EQUIPMENT.TYPE</td>
<td>Tracking Customer Equipment: ■ Equipment ID Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.HOME_ID_LIST</td>
<td>Tracking Customer Home ID</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.HOME_ID_LIST.IDENTIFIER</td>
<td>Tracking Customer Home Id: ■ Home Identifier</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.HOME_ID_LIST.TYPE</td>
<td>Tracking Customer Home ID: ■ Home ID Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.ID_LIST</td>
<td>Tracking Customer Identification</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.ID_LIST.IDENTIFIER</td>
<td>Tracking Customer Identification: ■ Customer Identifier</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
### Table 10–2 (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
</table>
| DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.ID_LIST.TYPE | Tracking Customer Identification:  
- Customer ID Type | No comment. |
| DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.LOCATION_LIST | Tracking Customer Location | This is a block. |
| DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.LOCATION_LIST.IDENTIFIER | Tracking Customer Location:  
- Location Identifier | No comment. |
| DETAIL.ASS_LOCN._EXT.TRACKING_CUST_INFO.LOCATION_LIST.TYPE | Tracking Customer Location:  
- Location ID Type | No comment. |
| DETAIL.ASS_LTE_EXT.REQUESTEDNUMBER | Requested Destination:  
- Requested Number | The EDR value is populated only for the Mobile Session (MO Voice Over LTE) events. |
| DETAIL.ASS_LTE_EXT.REQUESTEDPUBLICUSERID | Requested Destination:  
- Requested Public User ID | The EDR value is populated only for the Mobile Session (MO Voice Over LTE) events. |
| DETAIL.ASS_ROAMING_EXT.CLR_INDICATOR | CLIR Indicator | No comment. |
| DETAIL.ASS_ROAMING_EXT.GUARANTEED_BIT_RATE | Guaranteed Bit Rate | No comment. |
| DETAIL.ASS_ROAMING_EXT.HSCSD_INDICATOR | HSCSD Indicator | No comment. |
| DETAIL.ASS_ROAMING_EXT.MAXIMUM_BIT_RATE | Maximum Bit Rate | No comment. |
| DETAIL.ASS_ROAMING_EXT.MOBILE_DIR_NUMBER | Mobile Directory Number | No comment. |
| DETAIL.ASS_ROAMING_EXT.MOBILE_ID_NUMBER | Mobile ID Number | No comment. |
| DETAIL.ASS_ROAMING_EXT.NETWORKACCESS_IDENTIFIER | Network Access Identifier | No comment. |
| DETAIL.ASS_ROAMING_EXT.RAP_FILE_SEQ_NO | File Sequence Number | No comment. |
| DETAIL.ASS_ROAMING_EXT.SMS_DESTINATION_NUMBER | SMS Destination Number | No comment. |
| DETAIL.ASS_ROAMING_EXT.SMS_ORIGINATOR | SMS Originator | No comment. |
| DETAIL.ASS_ROAMING_EXT.HOME_BID | Home Bid | No comment. |
| DETAIL.ASS_ROAMING_EXT.HOMELOCATION_DESCRIPTION | Home Location Description | No comment. |
| DETAIL.ASS_ROAMING_EXT.ISM_SIGNALLING_CONTEXT | ISM Signalling Context | No comment. |
### Table 10–2  (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.ASS_VAS_EXT</td>
<td>Value Added Service Used</td>
<td>This is a block.</td>
</tr>
<tr>
<td>DETAIL.ASS_VAS_EXT.UTC_TIME_OFFSET</td>
<td>UTC Time Offset</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_VAS_EXT.VAS_CODE</td>
<td>VAS Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_VAS_EXT.VAS_DESC</td>
<td>VAS Description</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ASS_VAS_EXT.VAS_SHORT_DESC</td>
<td>VAS Short Description</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.B_NUMBER</td>
<td>Called Number</td>
<td>International Access Code prefixes the EDR field.</td>
</tr>
<tr>
<td>DETAIL.B_NUMBER</td>
<td>Calling Number</td>
<td></td>
</tr>
<tr>
<td>DETAIL.B_NUMBER</td>
<td>Non Charged Number</td>
<td></td>
</tr>
<tr>
<td>DETAIL.BASIC_SERVICE</td>
<td>TeleService Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.BASIC_SERVICE</td>
<td>Bearer Service Code</td>
<td></td>
</tr>
<tr>
<td>DETAIL.C_NUMBER</td>
<td>Third Party Number</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.C_NUMBER</td>
<td>Dialed Digits</td>
<td></td>
</tr>
<tr>
<td>DETAIL.CALL_COMPLETION_INDICATOR</td>
<td>Cause For Termination</td>
<td>The EDR field is mapped to different TAP fields:</td>
</tr>
<tr>
<td>DETAIL.CALL_COMPLETION_INDICATOR</td>
<td>Message Status</td>
<td>■ Service Center Usage Group, The EDR field is mapped to Message Status. If the value is less than 10, it is prefixed with 0.</td>
</tr>
<tr>
<td>DETAIL.CALLED_COUNTRY_CODE</td>
<td>Called Country Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CHARGING_END_TIMESTAMP</td>
<td>Completion Timestamp</td>
<td>When the EDR is mapped to Completion Timestamp, the DETAIL.UTC_TIME_OFFSET part is not stored.</td>
</tr>
<tr>
<td>DETAIL.CHARGING_END_TIMESTAMP</td>
<td>Call Event Start Time Stamp</td>
<td></td>
</tr>
<tr>
<td>DETAIL.CHARGING_END_TIMESTAMP</td>
<td>Charging Time Stamp</td>
<td></td>
</tr>
<tr>
<td>DETAIL.CHARGING_END_TIMESTAMP</td>
<td>Charging Time Stamp</td>
<td></td>
</tr>
<tr>
<td>DETAIL.CHARGING_END_TIMESTAMP</td>
<td>Call Event Start Timestamp</td>
<td></td>
</tr>
<tr>
<td>DETAIL.CHARGING_END_TIMESTAMP</td>
<td>Call Event Start Timestamp</td>
<td></td>
</tr>
<tr>
<td>DETAIL.CONNECT_SUB_TYPE</td>
<td>Call Type Level 3</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.CONNECT_TYPE</td>
<td>Call Type Level 1</td>
<td>Contents of the EDR field are mapped as concatenated items to Call Type Level 1 and Call Type Level 2.</td>
</tr>
<tr>
<td>DETAIL.CONNECT_TYPE</td>
<td>Call Type Level 2</td>
<td></td>
</tr>
</tbody>
</table>
Table 10–2 (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.DESCRIPTION</td>
<td>• Called Place</td>
<td>Destination: Contents of the EDR field are mapped as concatenated comma-separated values into Called Place and Called Region.</td>
</tr>
<tr>
<td></td>
<td>• Called Region</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Message Description Code</td>
<td></td>
</tr>
<tr>
<td>SCU Charge Type:</td>
<td>The EDR field mapped to Message Description corresponds to the Message Description Code present in SCU Charge Type.</td>
<td></td>
</tr>
<tr>
<td>DETAIL.DESTINATION_NETWORK</td>
<td>Destination Network</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.DISCOUNT_KEY</td>
<td>SIM Toolkit Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.DURATION</td>
<td>Total Call Event Duration</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.FRAUD_MONITOR_INDICATOR</td>
<td>Fraud Monitor Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.GEOGRAPHICAL_LOCATION</td>
<td>Geographical Location</td>
<td>Contents of the EDR field are mapped as comma-separated tag-value pairs.</td>
</tr>
<tr>
<td></td>
<td>The tag values of the corresponding fields are as follows:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ServingNetwork: 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ServingBID: 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ServingLocationDescription: 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Longitude: 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Latitude: 5</td>
<td></td>
</tr>
<tr>
<td>DETAIL.INTERN_A_NUMBER_ZONE</td>
<td>MSISDN</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.LONG_DURATION_INDICATOR</td>
<td>Partial Type Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.OPERATOR_SPECIFIC_INFO</td>
<td>Operator Specific Information</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.QOS_REQUESTED</td>
<td>• Priority Code</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>• Radio Channel Requested</td>
<td></td>
</tr>
<tr>
<td>DETAIL.QOS_USED</td>
<td>• Message Type</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>• Radio Channel Used</td>
<td></td>
</tr>
<tr>
<td>DETAIL.RAP_FILE_SEQ_NO</td>
<td>RAP File Sequence Number</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.SOURCE_NETWORK</td>
<td>Originating Network</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.SOURCE_NETWORK_TYPE</td>
<td>Network Type</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
### Table 10–2 (Cont.) EDR-to-TAP Mapping

<table>
<thead>
<tr>
<th>EDR Field</th>
<th>TAP Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAIL.USAGE_CLASS</td>
<td>GPRS Chargeable</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>Subscriber:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ Charging Characteristics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ SCU Basic Information,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Call Originator:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ CLIR Status Indicator</td>
<td></td>
</tr>
<tr>
<td>DETAIL.USAGE_DIRECTION</td>
<td>Charged Party Status</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.UTC_TIME_OFFSET</td>
<td>• Charging Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td></td>
<td>• LCS Request Timestamp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Actual Delivery Timestamp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Requested Delivery Timestamp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Order Placed Timestamp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completion Timestamp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Deposit Timestamp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Call Event Start Timestamp</td>
<td></td>
</tr>
<tr>
<td>DETAIL.VOLUME_RECEIVED</td>
<td>Data Volume Incoming</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.VOLUME_SENT</td>
<td>Data Volume Outgoing</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.WHOLESALE_CHARGED_TAX_RATE</td>
<td>Tax Rate Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.WHOLESALE_CHARGED_TAX_VALUE</td>
<td>Tax Value</td>
<td>No comment.</td>
</tr>
<tr>
<td>DETAIL.ZONE_DESCRIPTION</td>
<td>Distance Charge Band Code</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.CREATION_TIMESTAMP</td>
<td>File Creation Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.UTC_TIME_OFFSET</td>
<td>File Type Indicator</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.OPERATOR_SPECIFIC_INFO</td>
<td>Operator Specific Information</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.RAP_FILE_SEQ_NO</td>
<td>RAP File Sequence Number</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.RECIPIENT</td>
<td>Recipient</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.SENDER</td>
<td>Sender</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.SEQUENCE_NUMBER</td>
<td>File Sequence Number</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.SPECIFICATION_VERSION_NUMBER</td>
<td>Specification Version Number</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.TAP_DECIMAL_PLACES</td>
<td>TAP Decimal Places</td>
<td>No comment.</td>
</tr>
<tr>
<td>EDR Field</td>
<td>TAP Field</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>HEADER.TRANSFER_CUTOFF_TIMESTAMP</td>
<td>Transfer Cut Off Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.UTC_TIME_OFFSET</td>
<td>File Available Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>HEADER.TRANSMISSION_DATE</td>
<td>File Available Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>TRAILER.LAST_START_TIMESTAMP</td>
<td>Latest Call Timestamp</td>
<td>No comment.</td>
</tr>
<tr>
<td>TRAILER.LAST_CHARGING.UTC_TIME_OFFSET</td>
<td>Operator Specific Information</td>
<td>No comment.</td>
</tr>
<tr>
<td>TRAILER.TAP_TOTAL_DISCOUNT_VALUE</td>
<td>Total Discount Value</td>
<td>No comment.</td>
</tr>
<tr>
<td>TRAILER.TAP_TOTAL_NUMBER_OF_RECORDS</td>
<td>Call Event Details Count</td>
<td>No comment.</td>
</tr>
<tr>
<td>TRAILER.TAP_TOTAL_TAX_VALUE</td>
<td>Total Tax Value</td>
<td>No comment.</td>
</tr>
<tr>
<td>TRAILER.TOTAL_CHARGE_VALUE_LIST.CHARGE_TYPE</td>
<td>Charge Type</td>
<td>No comment.</td>
</tr>
<tr>
<td>TRAILER.TOTAL_CHARGE_VALUE_LIST.TOTAL_CHARGE_REFUND</td>
<td>Total Charge Refund</td>
<td>No comment.</td>
</tr>
</tbody>
</table>
This chapter describes how to set up the Oracle Communications Billing and Revenue Management (BRM) Pipeline Manager for rating CIBER events.

For information about pipeline rating, see "About Pipeline Rating" in BRM Configuring Pipeline Rating and Discounting.

### About Processing CIBER OCC Records

Other charges and credits (OCC) records are CIBER records of types 50 and 52. When you configure a pipeline to create CIBER OCC records, one OCC record is generated for each day that a roaming subscriber makes one or more calls from a visited network. By default, a CIBER OCC record is created only for the first call processed for a subscriber for a particular day, with the day beginning at 12:00 a.m.

To generate CIBER OCC records for network operators, you configure the following components:

1. Use Pricing Center to specify that CIBER OCC records are generated for network operators. See "About Generating CIBER OCC Records for Network Operators."

2. Configure the FCT_CiberOcc function module to create CIBER OCC records. See "FCT_CiberOcc" in BRM Configuring Pipeline Rating and Discounting.

   Use the EdrNetworkModel entry to specify the network model, which identifies the home network to use for the pipeline. Use the value you entered in the Code field in Pricing Center when defining network models. See the discussion of defining a network model in BRM Pricing Center Online Help.

3. Configure the FCT_DuplicateCheck function module to set an EDR field for duplicate EDRs. This field is checked by the FCT_CiberOcc module to determine whether to create an OCC record. See "Configuring Duplicate Check for CIBER OCC Records" and "FCT_DuplicateCheck" in BRM Configuring Pipeline Rating and Discounting.

---

**Note:** To rate CIBER records, an EDR must be able to contain multiple charge packets. To enable this, create price models with multiple RUMs. See "About Pipeline Price Models" in BRM Setting Up Pricing and Rating.

CIBER OCC records are created only when the call record being processed by FCT_CiberOcc has OCC-associated charges. The type of call record determines which OCC record type is generated as shown in Table 11–1:
If a combination of these types occur for a subscriber on the same day, the type of OCC record created is based on the first processed call record.

### About Generating CIBER OCC Records for Network Operators

You use Pricing Center to specify whether to generate CIBER records for other charges and credits (OCC records) during outcollect processing. These records let you apply surcharges when your partner’s roaming customers make calls from your network.

To specify that CIBER OCC records be generated for a network operator, see the discussion of generating CIBER OCC records for the network operator in BRM Pricing Center Online Help.

### Configuring Duplicate Check for CIBER OCC Records

You can avoid creating duplicate OCC records by configuring the FCT_CiberOcc module to work with the FCT_DuplicateCheck module.

1. Determine which field you want to use for duplicate check. Typically, this field is DETAIL.ASS_CIBER_EXT.NO_OCC. If you use a different field, it must be an Integer value.

2. Enter the field name in the FCT_CiberOcc module NoOCCField registry entry:

   \[
   \text{NoOCCField} = \text{DETAIL.ASS_CIBER_EXT.NO_OCC}
   \]

3. Enter the same field name in the FCT_DuplicateCheck module DuplicateIndicatorField registry entry:

   \[
   \text{DuplicateIndicatorField} = \text{DETAIL.ASS_CIBER_EXT.NO_OCC}
   \]

See "FCT_DuplicateCheck" in BRM Configuring Pipeline Rating and Discounting.

### Changing the Default Time Scheme

A CIBER OCC record is generated only for the first call processed for a subscriber for the day, with the day beginning at 12:00 a.m. You can customize this feature to use another time scheme for all system identification numbers (SIDs). However, you cannot specify different time schemes for different SIDs.

To use another time scheme:

1. Define a new EDR field that records an attribute of the call date and time. This field will be used to determine whether to generate an OCC record. For example, record a value between 1 and 12 to generate an OCC record once per month, or record a value between 1 and 52 to generate a weekly OCC record.

2. Write an iScript that sets a value in the new EDR field based on the call date. (See “Creating iScripts and iRules” in BRM Developer’s Guide.) This iScript must be executed in the pipeline before the FCT_DuplicateCheck module.

<table>
<thead>
<tr>
<th>Call record type</th>
<th>Type of OCC record generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>10, 20, 30</td>
<td>50</td>
</tr>
<tr>
<td>22, 32</td>
<td>52</td>
</tr>
<tr>
<td>Other call records</td>
<td>No OCC record is generated.</td>
</tr>
</tbody>
</table>
3. Specify the new EDR field for duplicate checking in the **Fields** entry in the FCT_DuplicateCheck module registry. See "FCT_DuplicateCheck" in *BRM Configuring Pipeline Rating and Discounting*.

4. Specify the values that describe the new time interval in the **OCCIntervalIndicator** and **OCCDescription** entries in the FCT_CiberOcc module registry. See FCT_CiberOcc in *BRM Configuring Pipeline Rating and Discounting*.
   - The **OCCDescription** entry specifies the service associated with the OCC. This value is entered in the OCC_DESCRIPTION field in the ASSOCIATED_CIBER_EXTENSION block of the OCC record created.
   
   **Important:** This field must not contain spaces. If you require spaces in the description, write an iScript to populate this field.

   - The **OCCIntervalIndicator** field specifies the interval at which the associated OCC record is generated.
   
   **Important:** To use an interval other than the default (daily), you must customize this feature. See "Changing the Default Time Scheme".

   Possible values:
   1 = Event (Generates an OCC record based on an event.)
   2 = Hourly
   3 = Daily
   4 = Weekly
   5 = Monthly
   
   This value is entered in the OCC_INTERVAL_INDICATOR field in the ASSOCIATED_CIBER_EXTENSION block of the OCC record.

5. Change the DETAIL.ASS_CIBER_EXT.OCC_END_DATE field in the OCC record to the date or time specific to your needs. By default, this field is set to the value of OCC_START_DATE to apply a daily surcharge.

**Note:** You can change the field by writing an iScript.

### About Finding the Rate Plan for CIBER Records

To ensure that a rate plan is selected for every CIBER record, you must define a default Interconnect (IC) Product for source networks. IC products are linked to rate plans. If a search for a corresponding rate plan can not be found for the source network, the rate plan for the default IC Product is used.

You configure IC Products in Pricing Center. To configure default IC products for source networks:

1. In Pricing Center, go to the **Interconnect Product Configuration** tab. See the discussion of configuring an interconnect product in *BRM Pricing Center Online Help*. 
2. For every IC Product Configuration that has a value in the **Source Network** entry, add a new IC Product Configuration. In the new IC Product Configuration, specify the same value for **Source Network** and enter .* (a period and an asterisk) as the value for the following fields:
   - **Destination Network**
   - **Origin Area Code**
   - **Destination Area Code**
   - **Transit Area Code**
   - **Record Type**
   - **Service Code**
   - **Service Class**
   - **Usage Class**

   In the **IC Product** field, enter the product that you want to use as the default.

3. Save the configuration.

### Configuring EDR Field Validation

You configure an EDR field validation to ensure that your roaming partner has followed the agreed procedure for generating files and automatically return the single EDRs that do not match the agreement, without rejecting the entire file.

To perform EDR field validation, follow these procedures:

- Configure the "ISC_CiberInputValidation" iScript in **BRM Configuring Pipeline Rating and Discounting** to validate CIBER record fields.
- Configure the iRuleValidation iRule module to validate CIBER record fields. See "Configuring the iRuleValidation Module".

To perform additional EDR field validation, configure rule sets and assign the rule sets to the FCT_IRules module. See "Configuring Rule Sets for the EDR Field Validation".

### Configuring the iRuleValidation Module

The iRuleValidation module is an instance of the FCT_IRules function module. To configure iRuleValidation, set up an instance of FCT_IRules in the **FunctionPool** section of the Pipeline Manager registry and use **iRulesValidation** as the module instance.

iRuleValidation uses one of the following XML files that contain the rules and rule sets used for validation:

- The **CIBER_VAL.xml** file specifies the rules and rule items for CIBER records.

Rules in the .xml file must be loaded into the Pipeline Manager database before starting a pipeline. See "Importing and Exporting Validation Rules" in **BRM Developer’s Guide**.

Specify the XML rules file in the **Rules** entry of the iRuleValidation registry.

For more information, see "iRuleValidation" IN **BRM Configuring Pipeline Rating and Discounting**.
Configuring Rule Sets for the EDR Field Validation

You configure rule sets for EDR field validation in the database. You name a rule set according to the format used, such as CIBER. Each rule set consists of a series of rules, defining one rule for each of the EDR fields that are validated. Each rule contains a rule item. This rule item represents the current default error condition that results in an error message.

There are several levels of error messages:

- Severe errors
- Fatal errors
- Warning errors

**Note:** In case of warning errors, Pipeline Manager generates an internal error that is logged in the stream log but does not return any detail. In this case, you discuss the settlement with your roaming partner using a conventional method, such as telephone or mail.

The rules and rule sets for EDR field validation are stored in the following database tables:

- IFW_RULESET
- IFW_RULESETLIST
- IFW_RULE
- IFW_RULEITEM

You can use the following tools to configure rules and rule sets:

- Pricing Center. See the discussion of creating rules and rule items and creating rule sets and rule set lists in BRM Pricing Center Online Help.
- The FCT_IRules module. This module can use rules stored in the database. See "FCT_IRules" in *BRM Configuring Pipeline Rating and Discounting*. 
This chapter describes how to install CIBER Roaming Manager.

### Important:
- Before you install CIBER Roaming Manager, you must install Interconnect Roaming Manager. See "Installing InterConnect Manager".
- If you are installing CIBER Roaming Manager to replace an identical release (for example, to restore a clean version of the package), you must first uninstall the existing installation. See "Uninstalling CIBER Roaming Manager".

### Installing CIBER Roaming Manager

To install CIBER Roaming Manager:

1. If the Third-Party software package is not installed already, install it. See "Installing the Third-Party Software" in BRM Installation Guide.

2. Go to the directory where you installed the Third-Party package and source the `source.me`:
   ```
   source source.me.sh
   ```
   **C shell:**
   ```
   source source.me.csh
   ```

3. Download the CIBER Roaming Manager software to a temporary directory (`temp_dir`).

   **Note:** You must increase the heap size used by the Java Virtual Machine (JVM) before running the installation program to avoid “Out of Memory” error messages in the log file. For information, see "Increasing Heap Size to Avoid “Out of Memory” Error Messages".

4. Go to `temp_dir` and enter the following command:
   ```
   7.5.0_CIBERRoaming_platform_opt.bin
   ```
   where `platform` is the operating system name.
Uninstalling CIBER Roaming Manager

To uninstall CIBER Roaming Manager, run the `uninstaller.bin` program from `Pipeline_home/uninstaller/CIBERRoaming/uninstaller.bin`.

**Increasing Heap Size to Avoid “Out of Memory” Error Messages**

To avoid “Out of Memory” error messages in the log file after installation, increase the maximum heap size used by the Java Virtual Machine (JVM). The exact amount varies greatly with your needs and system resources. By default, the JVM used has a maximum heap size of 60 MB. Increase the maximum heap size to 120 MB by entering the following sample code in a text editor:

\[
\%IF\_EXISTS\%(\"INIT\_JAVA\_HEAP\", \"0\"\%) %IF\_EXISTS\%(\"MAX\_JAVA\_HEAP\", \"20m\")
\]

where `20m` and `120m` indicate the minimum and maximum heap sizes respectively.

Save the file as `Packagename.ja` in the temporary directory (`temp_dir`) to which you downloaded the installation software.

`Packagename` indicates the name of the installation software. For example, if you downloaded the `7.5.0_Pipeline_solaris_64_opt.bin` file on Solaris then, save the file as `7.5.0_Pipeline_solaris_64_opt.ja`.

---

**Note:** You can use the `-console` parameter to run the installation in command-line mode. To enable a graphical user interface (GUI) installation, install a GUI application such as X Windows and set the DISPLAY environment variable before you install the software.

**Note:** If you do not specify an installation directory, CIBER Roaming Manager is installed in the `/opt/ifw` directory.

---

5. Follow the instructions displayed during installation.
This chapter describes how to set up the Oracle Communications Billing and Revenue Management (BRM) Pipeline Manager for rating interconnect events.

You should be familiar with how roaming events are rated by Pipeline Manager. See "About Rating Roaming Events".

For information about pipeline rating, see "About Pipeline Rating" in BRM Configuring Pipeline Rating and Discounting.

About Interconnect Rating

Interconnection means the process of handling events over physical lines between two or more network operators. The following types of network can be involved in an interconnect process:

- Originating network: where a call originates
- Transit network: network which passes the call on
- Terminating network: where a call terminates

An interconnect process always involves an originating and terminating network; a transit network is optional.

The cost added for handling an interconnect event is called the interconnect charge. An interconnect charge is calculated according to a service agreement between interconnect partners.

For information about processing settlements for rated interconnect events, see "About Managing Settlement for Interconnect Charges".

About Setting Up Interconnect Rating

To set up interconnect rating, do the following:

1. Use Pricing Center to create network operators, network models, and interconnect products. When you set up interconnect rating, you also define the following:
   - The calculation mode to define which EDR data to rate for the network model, for example, inroute, outroute, or transit data. See the discussion of defining a network model in BRM Pricing Center Online Help.
   - Network elements to find the zone for interconnect calls.
     - Map points of interconnection (POIs) to area codes or logical point codes.
     - Assign switches to network operators.
About Setting Up Interconnect Rating

- Assign trunks to network operators.
  See the discussion of defining network elements in BRM Pricing Center Online Help.

2. Configure the FCT_CarrierICRating module. See "About FCT_CarrierICRating Module".

3. Configure the DAT_InterConnect module. See "About the DAT_InterConnect Module".

4. Define aggregation scenarios. See "About Aggregation Scenarios for Roaming".


About FCT_CarrierICRating Module
The FCT_CarrierICRating module uses the interconnect products to identify the network operator and which rate plan to use.

The FCT_CarrierICRating module creates associated charge breakdown records and charge packets that contain data used for rating roaming events, for example, the network operator and event timestamp. This data is used by the FCT_PreRating and FCT_MainRating modules to determine the impact category and calculate the charges for the event. The roaming data is used for both incollect and outcollect processing.

FCT_CarrierICRating creates ratable charge packets for each valid roaming rate (IFW_ICPRODUCT_RATE) entry for the IC product.

When you configure the FCT_CarrierICRating module:

- Use the EdrNetworkModel entry to specify the network model, which identifies the home network to use for the pipeline. Use the code you entered in the Code field in Pricing Center when defining network models. See the discussion of defining a network model in BRM Pricing Center Online Help.

- Use the IcProductGroup entry to specify the network model, which identifies the home network to use for the pipeline. Use the code you entered in the Interconnect Product Group field in Pricing Center when defining network models. See the discussion of defining an interconnect product group in BRM Pricing Center Online Help.

See "FCT_CarrierICRating" in BRM Configuring Pipeline Rating and Discounting.

About the DAT_InterConnect Module
To provide roaming configuration data to pipeline function modules, you must configure the DAT_Interconnect module. This module caches interconnect and roaming related configuration data. This information is used by FCT_CarrierICRating module.

To configure this module, see "DAT_InterConnect" in BRM Configuring Pipeline Rating and Discounting.

You can use the Reload semaphore to reload interconnect data. See "Reloading Data Into a Pipeline Manager Module" in BRM System Administrator’s Guide.

About Aggregation Scenarios for Roaming
You use aggregation scenarios to do the following:

- Aggregate charges for outcollect rating to send to network operators.
About Setting Up Network Operator Accounts

- Aggregate charges for incollect processing to compare with the charges in the invoice sent to you from network operators.

Pipeline Manager aggregates settlement information for each network operator and stores it in the Pipeline Manager database. You can use this settlement information to bill your interconnect partners or verify interconnect charges.

To compare aggregated charges to those from network operators, you extract the aggregated settlement data from the Pipeline Manager database. This gives you a text file containing charge information. To bill network operators for interconnect charges, you load the extracted aggregation data into the BRM database and run billing. For more information, see "About Processing Outcollect Settlement Data".

You can also set up your own aggregation scenarios. See "Setting Up Pipeline Aggregation" in BRM Configuring Pipeline Rating and Discounting.

About Network Operator Bill Cycles

**Note:** You only define network operator bill cycles when you use the settlement_extract utility to load aggregated settlement data into the BRM database.

You define bill cycles in Pricing Center for your interconnect partners. A bill cycle is defined as a billrun. Billruns are used to determine whether you have billed the network operator for roaming usage during a specified period.

When you define billruns, you enter the bill cycle period, and the begin and end dates of the bill cycle. All events generated within this period apply to the specified billrun.

To define billruns in Pricing Center, see Defining network operator bill cycles in BRM Pricing Center Online Help.

**Closing a Billrun**

Prior to extracting aggregated roaming settlement data from the Pipeline Manager database, you must close the bill cycle for the network operator. This ensures that only unbilled events are extracted for loading into the BRM database.

See the discussion of closing a network operator bill cycle in BRM Pricing Center Online Help.

About Setting Up Network Operator Accounts

To set up network operator accounts, you use Pricing Center to configure the following elements in the Pipeline Manager database:

- About Network Operators
- About Network Models
- About Interconnect Products
- About Interconnect Product Groups
- About Linking Rate Plans to Network Operators and IC Products
About Setting Up Network Operator Accounts

About Network Operators

Use Pricing Center to create a network operator account in the Pipeline Manager database for every roaming partner.

Note: When creating network operator accounts for roaming, the roaming partner account for that network operator must be created in the BRM database before creating a network operator account.

When you set up network operators, you include the following data:

- Network operator name.
- Network operator type, for example, interconnect partner or service provider partner. (This information is for your reference, not for processing.)
- How to identify the network operator; for example, by the carrier access code or by the PLMN ID.
- Whether to apply taxes for roaming charges.
- (Roaming) The network operator’s roaming partner account in the BRM database.
- (Roaming) Fraud or high-usage limits.

To define network operators in Pricing Center, see the discussion of defining a network operator in BRM Pricing Center Online Help.

About Network Models

A network model identifies your roaming agreements and is associated with your home network. Each network operator representing a roaming partner is linked to the network model.

When you set up a roaming network model, you include the following data:

- Model type. For roaming, this is always Reseller Roaming.
- The network operator that represents your network.
- Your home currency.

To define network models in Pricing Center, see the discussion of defining a network model in BRM Pricing Center Online Help.

About Interconnect Products

An IC product specifies the network data that identifies a network operator and type of service. You create one or more IC products for each network operator and link them to rate plans. You create IC products to select the rate plan to use for the network operator’s services. For example, to use a rate plan that includes mailbox inquiries, you include a mailbox inquiry usage class in the IC product configuration. You identify the network operator by specifying the source and destination of the call.

You configure IC products in the IC product group in Pricing Center. When you configure an IC product, you specify the following information:

- Validity dates
- To identify the network operator:
  - Source and destination area codes
About Setting Up Network Operator Accounts

Rating Interconnect Events

- Source and destination networks
- Transit area code

■ To identify the type of service:
  - Record type
  - Service code, service class, and usage class

Roaming events with data that matches an interconnect product belong to the associated network operator and are rated by using the associated rate plan. See "About Linking Rate Plans to Network Operators and IC Products".

To define interconnect products in Pricing Center, see the discussion of defining interconnect products in BRM Pricing Center Online Help.

About Interconnect Product Groups

An interconnect product group is a collection of interconnect product configurations. You create an interconnect product group to define the set of interconnect products available to each network model. You can create multiple interconnect product groups, but you use only one interconnect product group in a pipeline.

When you create interconnect product groups, you specify the following:

■ The network model that uses the interconnect product group.
■ The ranking of interconnect products in the interconnect product group. The first configuration that matches an event attribute will be used for rating.

An interconnect product can be in several interconnect product groups.

To create interconnect product groups in Pricing Center, see the discussion of defining an interconnect product group in BRM Pricing Center Online Help.

About Linking Rate Plans to Network Operators and IC Products

To rate a call and perform settlements, you must link the call attributes defined by the interconnect product to a network operator and rate plan. You can link each interconnect product to multiple network operators and rate plans. This allows you to:

■ Use a different rate plan for the same network operator. For example, you might use different rate plans for different types of services such as telephony and SMS, or for different types of usage such as mailbox inquiries and friends-and-family calls.
■ Use the same rate plan for different network operators. For example, you might have roaming agreements with two network operators that provide the same services.

To link the call attributes defined by the interconnect product to a network operator and rate plan:

1. Use Pricing Center to link network operators to IC products and rate plans by configuring the following:
   ■ Validity dates.
   ■ The network model.
   ■ The rate plan.
   ■ The IC product.
Zone direction. For roaming, this is always **Standard Zoning (A#->B#)**.

See the discussion of linking an IC product to a network operator and a rate plan in BRM Pricing Center Online Help.

2. Configure the FCT_CarrierIcRating module. See “About FCT_CarrierICRating Module”.

---

**About Managing Settlement for Interconnect Charges**

---

**Note:** To install Roaming Settlement Package, see "Installing Roaming Settlement Package" in *BRM Installation Guide*.

---

To manage settlement for interconnect charges, you do the following:

- For outcollect processing, you process settlement data for visiting customers. You send this data to your roaming partners. To process this data, you do the following:
  - Set up accounts for roaming partners in BRM. See "About Creating Accounts for Interconnect Partners”.
  - Extract settlement data from the Pipeline Manager database.
  - Load settlement data into the BRM database. You can then create an invoice to send to your roaming partners.

- For incollect processing, you process settlement data from your roaming partners. This data is from calls made by your customers on other networks.
  - Validate the interconnect charges you receive from your roaming partners.

---

**About Creating Accounts for Interconnect Partners**

You create BRM accounts for each network operator by using Customer Center. For each network operator, create one parent account with a paying bill unit and two child accounts with nonpaying bill units.

Network operator accounts store the following information:

- The parent account is responsible for the accounts receivable.
- One child account is responsible for incoming roaming charges.
  - **Incoming roaming charges** are fees that you owe your roaming partner for calls made by your subscribers. These fees are aggregated into a single amount. Incoming charges are represented as accounts receivable in the parent account.
- The second child account is responsible for outgoing roaming charges.
  - **Outgoing roaming charges** are fees that your roaming partner owes you for calls made by their subscribers. These fees are aggregated into a single amount. Outgoing charges are represented as bill items in the parent account.

---

**How Settlements Are Applied to Account Balances**

When you rate usage by a visiting customer, you bill the visiting customer’s network operator for that usage. Pipeline Manager aggregates charges for each network operator on a daily basis. When you load the aggregated settlement information and bill the accounts, the amount due is the difference between what you owe your
About Processing Outcollect Settlement Data

partners and what they owe you. Amounts owed to you are included in the bill. The net roaming charges are stored in the balance impact of your roaming partner’s parent account.

If there are any disputed items, you can use Customer Center to enter and clear the dispute.

About Price Plans for Roaming Partners

To support roaming settlements, the GSM sample price list includes a Settlement price plan. You apply this price plan to the network operator accounts that you create.

For information on creating price lists, see "About Creating a Price List" in BRM Setting Up Pricing and Rating.

---

**Note:** Before you can use the sample Settlement price plan, you need to load the GSM Manager sample price list. See "About the Sample GSM Pricing Configuration" in BRM Telco Integration.

---

The Settlement price plan includes a Settlement deal and product. The Settlement product includes a rate plan as a placeholder for the settlement service. You define a rate plan for each network operator when you set up roaming in Pipeline Manager. See "About Setting Up Network Operator Accounts".

About Processing Outcollect Settlement Data

When Pipeline Manager rates roaming calls, it stores the settlement information, such as what is owed by each participating network provider, in the Pipeline Manager database. You extract the settlement information from the pipeline database and load it into the BRM database. After the settlement information is loaded, you can bill your network partners for the settlement amounts.

Before you can extract settlement information from the pipeline database and load it into the BRM database, you must complete the following tasks:

1. Install the roaming settlements package. This package includes the utility and template files you use to extract and load settlement data. See "Installing Roaming Settlement Package" in BRM Installation Guide.

2. Import the Universal Event Mapper settlement template by running the pin_uei_deploy utility. See "Importing the UE Mapper Settlement Template".

3. Configure Universal Event (UE) Loader to load the settlement file. See "Configuring UE Loader to Load the Settlement Data File".

To get the settlement data from the Pipeline Manager database to the BRM database, you use the following:

- The settlement_extract.pl utility to extract the data from the Pipeline Manager database into a data file. See "Extracting Settlement Information from the Pipeline Manager Database".

- Universal Event (UE) Loader to load the settlement data file into the BRM database. UE Loader uses the Universal Event Mapper settlement template (SettlementTemplate.xml) that specifies the settlement data file format. See "Loading Settlement Data into the BRM Database".
The ASCII file created by the settlement_extract utility contains the settlement fees. There is one record for fees owed to each network. For example, if you have settlements between networks B and C, the file contains the following:

- How much you owe B
- How much B owes you
- How much you owe C
- How much C owes you

Settlement amounts can be in different currencies. You define the currencies when you set up roaming in Pipeline Manager.

**Importing the UE Mapper Settlement Template**

The UE Mapper settlement template specifies the format of the file containing settlement information.

When you install Roaming Settlement Package, you install the SettlementTemplate.xml template in the BRM_home/apps/uel directory. You must import the template into the BRM database by running the pin_uei_deploy utility.

---

**Note:** To connect to the BRM database, the pin_uei_deploy utility needs a configuration (pin.conf) file in the directory from which you run the utility. See “Creating Configuration Files For BRM Utilities” in BRM System Administrator’s Guide.

---

To import the SettlementTemplate.xml template:

1. If you have not already done so, download and install Roaming Settlement package. See “Installing Roaming Settlement Package” in BRM Installation Guide.
2. Run the pin_uei_deploy utility:

   ```
   pin_uei_deploy -c -t template_name -i SettlementTemplate.xml
   ```

   where template_name is the name you want to give to the template in BRM.

   For more information, see ”pin_uei_deploy” in BRM Developer’s Guide.

   For more information about importing UE Mapper templates, see ”Migrating Event Import Templates From One BRM Database to Another” in BRM Setting Up Pricing and Rating.

**Configuring UE Loader to Load the Settlement Data File**

After you extract settlement data by using the settlement_extract.pl utility, you load the data by using UE Loader. You must first configure UE Loader to load the settlement file.

---

**Note:** Before following this procedure, you should be familiar with UE Loader. See ”About Rating Events Created by External Sources” in BRM Setting Up Pricing and Rating.

---

To configure UE Loader to load the settlement data, see ”Configuring the Universal Event Loader” in BRM Setting Up Pricing and Rating and be sure to modify the
following settlement-specific entries in the UE Loader properties file (BRM_home/apps/uel/Infranet.properties):

1. Open the BRM_home/apps/uel/Infranet.properties file in a text editor.

2. If necessary, edit the infranet.connection entry to point to the correct database. For example:
   ```
infranet.connection=pcp://root.0.0.0.1:password@localhost:37180/service/pcm_client
   ```

3. Specify the following date/time format for the settlement file in the infranet.uel.date_pattern entry:
   ```
infranet.uel.date_pattern=yyyy-MM-dd
   ```

4. Specify the location of the settlement data file in the infranet.uel.event_log_file_location entry.

---

**Configuring UE Loader to Run Automatically (Optional)**

If you load settlement data on a regular basis, you can schedule UE Loader to load the settlement file automatically. To do this, you use the Batch Controller and sample batch handler. For more information, see "Loading Events Automatically" in BRM Setting Up Pricing and Rating.

---

**Note:** Before following this procedure, you should be familiar with the Batch Controller. See "Controlling Batch Operations" in BRM System Administrator’s Guide.

To configure automatic loading:

1. Create a UE Loader batch handler to load the settlement data file by using the sample batch handler. See "About SampleHandler" in BRM System Administrator’s Guide.

   You specify the UE Mapper settlement template in the $TEMPLATE entry of the batch handler .values file (BRM_home/apps/sample_handler/samplehandler_config.values, unless you renamed the file). For example:
   ```
   $TEMPLATE = "Template_name";
   ```

2. Configure the Batch Controller to start the UE Loader batch handler. See "Setting Activity Times and Triggers" in BRM System Administrator’s Guide.

**Extracting Settlement Information from the Pipeline Manager Database**

You extract settlement information from the Pipeline Manager database by using the settlement extraction utility (BRM_home/apps/uel/settlement_extract.pl). This utility creates a data file containing settlement amounts and other activity information.
When the `settlement_extract.pl` utility extracts settlement data, it marks the data in the database as exported so the next time you run the utility, you export only new data. For this reason, you cannot use this utility to extract the same settlement information twice. However, if you make adjustments to the aggregated settlement amounts by using Pricing Center, you can extract the adjusted settlement data. For more information, see "About Adjusting Aggregated Settlement Amounts".

For example (using the HP-UX PA-RISC library file):

```
# sateens LD_PRELOAD /u01/ape/oracle/product/817/JRE/lib/PA_RISC/native_threads/libjava.sl
```

To extract settlement information:

1. Close the billrun for each roaming partner account.
2. Use the following command to run the `settlement_extract.pl` utility:

   ```
   settlement_extract.pl [-u] dbsn username password [filepath]
   ```

   where `dbsn` is the Perl database source name.

   For example:

   ```
   settlement_extract.pl -u dbi:Oracle:orcl scott tiger /usr/home/files
   ```

   For more information, see "settlement_extract" in `BRM Configuring Pipeline Rating and Discounting`.

---

**Loading Settlement Data into the BRM Database**

To load the data in the settlement file, you run UE Loader.

There are two ways to run UE Loader:

- To run UE Loader manually, use the following command:

  ```
  uel -t template_name settlement_file_name
  ```

  where:
About Generating SMS Usage Reports

- template_name is the name you gave the template when you imported it into the BRM database. (See "Importing the UE Mapper Settlement Template").
- settlement_file_name is the name of the extracted settlement data file.

---

**Note:** Do not include the path in the command line. You specify the path to the settlement file in the UE Loader properties file. See "Configuring UE Loader to Load the Settlement Data File".

---

For more information, see "Universal Event Loader" in *BRM Setting Up Pricing and Rating*.

- To run UE Loader automatically, create a UE Loader batch handler and configure the Batch Controller. See "Configuring UE Loader to Run Automatically (Optional)".

About Adjusting Aggregated Settlement Amounts

Pipeline Manager stores aggregated settlement data in the IC_DAILY database table. If any aggregated settlement amounts are in error, you can use Pricing Center to adjust the aggregated amounts in the Pipeline Manager database and then load them into the BRM database.

To make adjustments, you search for the aggregated settlements you want to modify by searching for associated data such as network operators, IC products, and dates the events were aggregated. You then make changes and update the database. See the discussion of adjusting aggregated settlement amounts in BRM Pricing Center Online Help.

About Generating SMS Usage Reports

You can collect aggregated information about SMS messages exchanged between your subscribers’ home networks and other networks for generating settlement reports. The FCT_AggreGate module includes a scenario defined to aggregate the number of SMS messages based on the following attributes:

- Origination Carrier ID
- Destination Carrier ID
- Record type
- Date of the message

The FCT_AggreGate module extracts the SMS usage information from the input call details record (CDR) files and creates aggregated data files. For more information about aggregation, see the following topics:

- "Setting Up Pipeline Aggregation" in *BRM Configuring Pipeline Rating and Discounting*.
- "FCT_AggreGate" in *BRM Configuring Pipeline Rating and Discounting*.

You use the Universal Event (UE) Loader to load the aggregate SMS information into the BRM database. UE Loader parses the FCT_AggreGate output files that contain the SMS message information and calls the PCM_OP_IC_LOAD_SMS_REPORT opcode to create or update the /sms_settle_report object in the BRM database. See "Loading SMS Data into the BRM Database".

---

**Note:** Do not include the path in the command line. You specify the path to the settlement file in the UE Loader properties file. See "Configuring UE Loader to Load the Settlement Data File".
You can run a report to generate SMS bulk reports from the data in the /sms_settle_report object.
For more information on BRM reports, see “About BRM Reports” in BRM Reports.

Generating an SMS Usage Report
To generate an SMS usage report, perform these tasks:

1. Make sure you have installed and configured Pipeline Manager.
   See "Installing Pipeline Manager" in BRM Upgrade Guide.

2. Install the roaming settlements package.
   See "Installing Roaming Settlement Package" in BRM Installation Guide.

3. Install the BRM reports SMS Settlement Reports package.
   See "Installing BRM Reports" in BRM Reports.

4. Create the aggregation scenario in the database.
   See "Creating the Aggregation Scenario in the Database”.

5. Configure the FCT_AggreGate registry file to specify the SMS Message scenario, SMS_SCE_01.
   See "Configuring the FCT_AggreGate Module to Collect SMS Usage Information”.

6. Load the SMS interworking message information for settlement reports into the BRM database.
   See "Loading the SMS Message Data into the Database”.

7. Run reports to generate the SMS bulk reports.
   See "Generating SMS Bulk Reports”.

Creating the Aggregation Scenario in the Database
This section describes how to create aggregation scenarios in Oracle database.

---
**Note:** You can also create aggregation scenarios by using Pricing Center. See the discussion of working with aggregation scenarios in BRM Pricing Center Online Help.
---

To create the aggregation scenario in an Oracle database, run the SMS_Interworking_Scenario.sql script from the Pipeline_home/database/Oracle/Scripts directory.

This SQL script creates the SMS_SCE_01 scenario in the database that the FCT_AggreGate module uses to collect SMS usage information.

Configuring the FCT_AggreGate Module to Collect SMS Usage Information
Add an entry for the SMS settlement report scenario in the registry file.

For example:

```
Aggregate
{
    ModuleName = FCT_AggreGate
    Module
```
About Generating SMS Usage Reports

| Active = TRUE |
| ScenarioReaderDataModule = ifw.DataPool.ScenarioReader |
| Scenarios |
| SMS_SCE_01 |
| TableName = TAB_SMS_RPT |
| Threshold = 100000 |
| TempDir = sms_result/temp |
| DoneDir = sms_result/done |
| CtlDir = sms_result/ctl |
| FieldDelimiter = , |
| FlushMode = 0 |
| ResultFile |
| TempSuffix = .tmp |
| DoneSuffix = .dat |
| WriteEmptyFile = FALSE |
| ControlFile |
| Suffix = .ctl |
| DataFilePath = TRUE |

For detailed information about configuring the FCT_AggrGate module, see “Setting Up Pipeline Aggregation” in BRM Configuring Pipeline Rating and Discounting.

Loading the SMS Message Data into the Database

When you install the roaming settlements package, you install the SMS settlement report template file (SMSSettlementRptTemplate.xml) in the BRM_home/apps/uel directory. This template is used by UE Loader to parse aggregated SMS settlement data when it loads the data into the BRM database.

1. Import the SMSSettlementRptTemplate.xml template by running the pin_uei_deploy utility:
   
   ```bash
   pin_uei_deploy -c -t template_name -i SMSSettlementRptTemplate.xml
   ```

   where template_name is the name you want to give the template.

   For more information, see "pin_uei_deploy" in BRM Developer’s Guide.

2. Configure Universal Event (UE) Loader to load the SMS settlement data by modifying the BRM_home/apps/uel/Infranet.properties file.
   
   See "Configuring the Universal Event Loader" in BRM Setting Up Pricing and Rating.

3. To load the file manually, run UE Loader by using this command:
   
   ```bash
   uel -t template_name log_file_name
   ```

   For example:

   ```bash
   uel -t SMSSettlementRpt SMSSettlementRpt.dat
   ```
Opcodes Used for Managing Settlement Data

For more information about settlement, see "About Managing Settlement for Interconnect Charges".

Use the following IC Daily standard opcodes to manage settlement data:

- To load settlement data into the BRM database, use PCM_OP_IC_DAILY_LOADER. See "Loading Settlement Data into the BRM Database".
- To load aggregated SMS data into the BRM database, use PCM_OP_IC_LOAD_SMS_REPORT. See "Loading SMS Data into the BRM Database".

Opcodes Used for Managing Settlement Data

Loading Settlement Data into the BRM Database

Use PCM_OP_IC_DAILY_LOADER to load settlement data files into the BRM database. Settlement data files are generated by the settlement_extract utility and specify the amount you owe to each network partner. See "About Processing Outcollect Settlement Data".

Universal Event (UE) Loader calls this opcode when loading settlement data into the BRM database.

**Note:** You configure UE Loader to call this opcode by using the Universal Event Mapper. See "Importing the UE Mapper Settlement Template".

PCM_OP_IC_DAILY_LOADER performs the following tasks:

1. Prepares the data from the settlement data file.
2. Records the event and updates the network provider’s account balance in the BRM database.

3. Creates an /event/activity/settlement object to record details about the roaming event.

   **Note:** Each event contains information for one network partner.

4. Returns the POID of the /event/activity/settlement object.

### Loading SMS Data into the BRM Database

Use PCM_OP_IC_LOAD_SMS_REPORT to validate SMS aggregation data and create or update the /sms_settle_report object. See "About Generating SMS Usage Reports".

Universal Event (UE) Loader calls this opcode when loading aggregated SMS data into the BRM database.

   **Note:** You configure UE Loader to call this opcode by using the Universal Event Mapper. See "Loading the SMS Message Data into the Database".

PCM_OP_IC_LOAD_SMS_REPORT performs the following tasks:

1. Determines whether the /sms_settle_report object already exists in the BRM database.
   - If it finds the report object, it updates the object with the value for SMS_TOTAL from the input flist.
   - If it does not find the object, it creates the /sms_settle_report object.

2. Returns the POID of /sms_settle_report object.
Detecting Roaming Fraud Using NRTRDE

This chapter provides an overview of the roaming incollect and outcollect processes for generating and processing roaming usage data for NRTRDE (Near Real-Time Roaming Data Exchange).

**Note:** The NRTRDE feature replaces the High Usage Reports (HUR) feature.

Before reading this document, you should be familiar with the following:

- Pipeline rating. See “About Pipeline Rating” in *BRM Configuring Pipeline Rating and Discounting*.
- Rating roaming events. See “About Rating Roaming Events”.

**About Roaming Usage Data for NRTRDE**

In NRTRDE, roaming usage data records are transferred in TD35 file format. A TD35 record is structurally similar to a TAP (Transfer Account Procedure) record and contains basic call details (without the charging information), to allow HPMN (Home Public Mobile Network) operators to quickly analyze the usage data. The actual charge information is still exchanged using TAP records.

Generally, the Visited Public Mobile Network (VPMN) operator generates the TD35 files and sends them to the HPMN operator. The HPMN operator processes the TD35 files and analyzes the roaming usage data to determine any fraudulent activity.

**About Handling Roaming Usage Data for NRTRDE**

Roaming partners exchange roaming usage data in near real time by sending the data in TD35 file format. Pipeline Manager handles TD35 files as follows:

- TD35 files are created during roaming outcollect processing by the outcollect rating pipeline. See “About Generating Roaming Usage Data for NRTRDE” for more information.
- TD35 files are processed during roaming incollect processing by the NRTRDE processing pipeline. See “About Processing Roaming Usage Data for NRTRDE” for more information.
About Generating Roaming Usage Data for NRTRDE

Figure 14–1 Generating Roaming Usage Data (Outcollect Processing)

Figure 14–1 shows a high-level overview of how roaming usage data is generated for NRTRDE during roaming outcollect processing:

1. CDRs arrive at the splitter pipeline.
2. The outcollect splitter pipeline converts incoming call data records (CDRs) into event data record (EDR) format and separates the EDRs into home subscribers’ EDRs and visiting subscribers’ roaming EDRs.
3. Home subscribers’ EDRs are sent to the normal rating pipeline to be rated and to the Rated Event Loader.
   Visiting subscribers’ roaming EDRs are sent to the outcollect rating pipeline to be rated. The outcollect rating pipeline rates the visiting subscribers’ roaming EDRs and generates TAP files and TD35 files for each roaming partner. A copy of the visiting subscribers’ roaming EDRs is sent to the outcollect settlement pipeline from where they are sent to the rated event loader.
4. The rated event loader send the data to be recorded in the BRM database.

See "About Processing Visiting Subscribers’ Roaming Usage" and "Setting Up Pipeline Manager for NRTRDE" for more information.

About Processing Roaming Usage Data for NRTRDE

Figure 14–2 Generating Roaming Usage Data (Incollect Processing)

The following is a high-level overview of how roaming usage data is processed for NRTRDE during roaming incollect processing (shown in Figure 14–2):

1. Incoming TD35 files are sent to the NRTRDE processing pipeline.
2. The input module uses NRTRDE input grammar to convert the TD35 records into EDR format and performs file and record validations based on the TD35 specifications.

3. For each TD35 record that fails validation, an NRTRDE error record is created in the Pipeline Manager database. Information stored in the error records is used in generating NRTRDE Error reports. See "About NRTRDE Reports".

4. For each TD35 file processed, a file processing record is created in the Pipeline Manager database. Information stored in the file processing records is used in generating NRTRDE File Delivery reports. See "About NRTRDE Reports".

About NRTRDE Reports

During roaming incollection processing, the NRTRDE processing pipeline creates NRTRDE error records and NRTRDE file processing records in the Pipeline Manager database. The information stored in these records is used to generate NRTRDE reports. See "Creating NRTRDE Reports" for more information.

Setting Up Pipeline Manager for NRTRDE

**Important:** You must have Roaming Manager installed and configured before you configure Pipeline Manager for NRTRDE. See "Installing TAP Roaming Manager" and "Setting Up Roaming for TAP" for more information.

Roaming usage data is transferred in TD35 file format between network operators for NRTRDE. To set up Pipeline Manager for NRTRDE, do the following:

1. Create NRTRDE tables in the BRM database. See "Creating NRTRDE Tables in the BRM Database" for more information.

2. Set up Pipeline Manager for generating roaming usage data. See "Setting Up Pipeline Manager for Generating Roaming Usage Data for NRTRDE" for more information.

3. Set up Pipeline Manager for processing roaming usage data. See "Setting Up Pipeline Manager for Processing Roaming Usage Data for NRTRDE" for more information.

Creating NRTRDE Tables in the BRM Database

NRTRDE File Delivery and NRTRDE Error reports use the following tables located in the BRM database:

- NRTRDE_FILES
- NRTRDE_ERRORS
- NRTRDE_SEQUENCES

Create these tables in your BRM database by manually running each of the SQL commands in the NRTRDE_Tables.sql script. This script is located in the Pipeline_home/database/Oracle/Scripts directory, where Pipeline_home is the directory where the Pipeline Manager is installed.
Setting Up Pipeline Manager for Generating Roaming Usage Data for NRTRDE

TD35 files are generated during roaming outcollect processing by the outcollect rating pipeline. To configure roaming outcollect processing for TD35 file generation, do the following:

1. Limit the number of records in a TD35 file. See "Limiting the Number of Records by Configuring a Batch Controller" for more information.

2. Configure a sequence generation for NRTRDE files. See "Configuring a Sequence Generation for NRTRDE Files" for more information.

3. Include descriptions for NRTRDE stream format. See "Including NRTRDE Stream Format Descriptions" for more information.

4. Provide the required EDRs to roaming partner NRTRDE output streams. See "Providing Required EDRs to Roaming Partner NRTRDE Output Streams" for more information.

5. Configure an NRTRDE output stream for each roaming partner in the outcollect rating pipeline. See "Configuring NRTRDE Output Stream for Roaming Partners" for more information.

Limiting the Number of Records by Configuring a Batch Controller

One of the requirements for NRTRDE is to limit the number of records in a TD35 file to a maximum of 1000 records.

When you have files with a large number of records, use the SplitSol42.sh script to split the files into multiple files and limit the number of records to a maximum of 1000 per TD35 file. You must run SplitSol42.sh on the output files generated by the outcollect splitter pipeline.


Configure a batch controller to invoke the SplitSol42.sh script as in the following example:

SplitSol42.sh source_directory target_directory

where

- **source_directory** is the source directory
- **target_directory** is the input directory of the outcollect rating pipeline.

SplitSol42.sh splits the files in **source_directory** and puts the new files in **target_directory**. If a source file contains less than 1000 records, SplitSol42.sh moves the file to the **target_directory**.

Configuring a Sequence Generation for NRTRDE Files

Configure sequence generation for NRTRDE files as follows:
1. Using Pricing Center, define a sequence generator for each roaming partner by entering a name and a unique sequence key. See the description on defining a sequence generation in BRM Pricing Center Online Help.

2. Configure each sequencer by editing the `SequencerPool` registry entries of the roaming registry (`Pipeline_home/conf/roaming.reg`), where `Pipeline_home` is the directory where Pipeline Manager is installed.
   a. Set the `SequencerInstance` name to the name of the sequence generator defined in the (step 1) Pricing Center.
   b. Set the `SequencerType` registry entry to `Generation`.

The following sample configuration shows two sequence generators for HPMN operators `hpmn01` and `hpmn02`.

```plaintext
SequencerPool
{
  SEQ_GEN_NRTRDEOUT_hpmn01
  {
    Source = Database
    Controller
    {
      SequencerType = Generation
      ReuseGap = True
      SequenceLength = 7
      DatabaseConnection = ifw.DataPool.Login
    }
  }
  SEQ_GEN_NRTRDEOUT_hpmn02
  {
    Source = Database
    Controller
    {
      SequencerType = Generation
      ReuseGap = True
      SequenceLength = 7
      DatabaseConnection = ifw.DataPool.Login
    }
  }
}
```

Including NRTRDE Stream Format Descriptions

Edit the outcollect rating pipeline `DataDescription` registry entries to include the NRTRDE stream format description as follows:

```plaintext
DataDescription
{
  StreamFormats
  {
    SOL42 = ./formatDesc/Formats/Solution42/SOL42_V670_REL_FORINPUT.dsc
    TAP3 = ./formatDesc/Formats/TAP3/TAP3_v12_Blocks.dsc
    NRTRDE2 = ./formatDesc/Formats/TAP3/NRTRDE2_v01_Blocks.dsc
    SUSPENSE_CREATE_OUTPUT = ./formatDesc/Formats/SuspenseHandling/SuspendedUsageCreation.dsc
    SUSPENSE_UPDATE_OUTPUT = ./formatDesc/Formats/SuspenseHandling/SuspendedUsageUpdate.dsc
  }
  InputMapping
  {
```
Setting Up Pipeline Manager for NRTRDE

SOL42 = ./formatDesc/Formats/Solution42/SOL42_V670_REL_InMap.dsc

OutputMapping
{
  SUSPENSE_CREATE_OUTPUT =
  ./formatDesc/Formats/SuspenseHandling/SuspendedUsageCreationMapping.dsc
  SUSPENSE_UPDATE_OUTPUT =
  ./formatDesc/Formats/SuspenseHandling/SuspendedUsageUpdateMapping.dsc
}

Providing Required EDRs to Roaming Partner NRTRDE Output Streams

The ISC_NRTRDE_EventSplit iScript is provided for use by roaming outcollect processing to duplicate and route EDRs to the corresponding roaming partner NRTRDE output streams based on the SOURCE_NETWORK EDR field.

Configure ISC_NRTRDE_EventSplit in the outcollect rating pipeline. For example,

NRTRDE_EventSplit
{
  FileName = ./iScriptLib/iScriptLib_Roaming/ISC_NRTRDE_EventSplit.isc
  NRTRDE_STREAM_PATTERN = NRTRDEOutput
}

See the description for ISC_NRTRDE_EventSplit in BRM Configuring Pipeline Rating and Discounting.

Configuring NRTRDE Output Stream for Roaming Partners

Configure an NRTRDE output stream for each roaming partner in the outcollect rating pipeline. For each roaming partner, configure the OUT_GenericStream module registry entries as follows:

1. Set the Grammar registry entry to the NRTRDE output grammar description file.

   Grammar = ./formatDesc/Formats/TAP3/NRTRDE2_v01__OutGrammar.dsc

2. Set the Sequencer registry entry to the name of the sequence generator for generating the sequence number for this roaming partner. See "Configuring a Sequence Generation for NRTRDE Files", described earlier.

3. Set the Sender registry entry to the VPMN ID sending the TD35 file.

4. Configure the EXT_OutFileManager registry entries to specify the output file information. See "EXT_OutFileManager" in BRM Configuring Pipeline Rating and Discounting.

   The following example shows output stream configurations for HPMN operators hpmn01 and hpmn02:

   hpmn01NrtrdeOutput
   {
     ModuleName = OUT_GenericStream
     ...
     Module
     {
       Grammar = ./formatDesc/Formats/TAP3/NRTRDE2_v01__OutGrammar.dsc
       DeleteEmptyStream = False
       Sequencer = SEQ_GEN_NRTRDEOUT_hpmn01
       Sender = PORTL
       Recipient = hpmn01
       OutputStream
   }
Setting Up Pipeline Manager for Processing Roaming Usage Data for NRTRDE

TD35 files are processed during roaming incollect processing by the NRTRDE processing pipeline.

To configure the NRTRDE processing pipeline, do the following:

Note: For an example of NRTRDE processing pipeline configuration, see Pipeline_home/conf/roaming.reg, where is Pipeline_home the directory where Pipeline Manager is installed.
1. Configure the NRTRDE processing pipeline **DataDescription** registry entries by setting the stream format as shown in this code sample:

```plaintext
DataDescription
{
    StreamFormats
    {
        NRTRDE2 = ./formatDesc/Formats/TAP3/NRTRDE2_v01_Blocks.dsc
    }
    InputMapping
    {
    }
    OutputMapping
    {
    }
}
```

2. Configure the NRTRDE processing pipeline input processing as follows:

   a. Set the Grammar registry entry for the **INP_GenericStream** input module to the NRTRDE input grammar description file with the following command:

   ```plaintext
   Grammar = ./formatDesc/Formats/TAP3/NRTRDE2_v01_InGrammar.dsc
   ```

   b. Configure the **EXT_InFileManager** registry entries to specify information about the NRTRDE input file. See “**EXT_InFileManager**” in *BRM Configuring Pipeline Rating and Discounting*.

   The following example shows input processing for the NRTRDE processing pipeline.

   ```plaintext
   InputModule
   {
       ModuleName = INP_GenericStream
       Module
       {
           DefaultOutput = DevNull
           Grammar = ./formatDesc/Formats/TAP3/NRTRDE2_v01_InGrammar.dsc
           InputStream
           {
               ModuleName = EXT_InFileManager
               Module
               {
                   InputPath = ./data/incollect/nrtrdein/in
                   InputPrefix = NR
                   InputSuffix = .edr
                   DonePath = ./data/incollect/nrtrdein/done
                   DonePrefix = test_NRTRDEInProcessingPipeline_
                   DoneSuffix = .done
                   ErrorPath = ./data/incollect/nrtrdein/error
                   ErrorPrefix = test_NRTRDEInProcessingPipeline_
                   ErrorSuffix = .err
                   TempPrefix = temp_NRTRDEInProcessingPipeline_
                   Replace = True
                   InputDirEmptyTimeout = 10
               }
           }
       }
   }
   ```
3. Configure the **ISC_NrtrdeHeaderValidation_v2_01** iScript. For more information on ISC_NrtrdeHeaderValidation_v2_01, see *BRM Configuring Pipeline Rating and Discounting*.

4. Configure the **ISC_NRTRDE_ErrorReport** iScript. For more information on ISC_NRTRDE_ErrorReport, see *BRM Configuring Pipeline Rating and Discounting*.

### Creating NRTRDE Reports

Roaming NRTRDE reports include the following:

- **NRTRDE Delivery Report**
- **NRTRDE Error Report**

Use the NRTRDEReportGen64 utility to generate the "NRTRDE Delivery Report" and the "NRTRDE Error Report".

To run the NRTRDE reports, you use the NRTRDEReportGen64 utility. You can generate the reports for a specific VPMN operator or for all VPMNs. See NRTRDEReportGen64.

### iScripts

BRM provides the following iScripts for use with NRTRDE:

- **ISC_NRTRDE_EventSplit**. This iScript is used by roaming outcollect processing to duplicate and route EDRs to the corresponding roaming partner NRTRDE output streams based on the SOURCE_NETWORK EDR field. For more information on the ISC_NRTRDE_EventSplit iScript, see *BRM Configuring Pipeline Rating and Discounting*.

- **ISC_NrtrdeHeaderValidation_v2_01**. This iScript is used during roaming incollect processing by the NRTRDE processing pipeline. ISC_NrtrdeHeaderValidation_v2_01 validates the information in the header record of the TD35 file based on the TD35 specifications. For more information on the ISC_NrtrdeHeaderValidation_v2_01 iScript, see *BRM Configuring Pipeline Rating and Discounting*.

- **ISC_NRTRDE_ErrorReport**. This iScript is used during roaming incollect processing by the NRTRDE processing pipeline. It collects the validation errors in the EDRs and creates error records in the Pipeline Manager database. ISC_NRTRDE_ErrorReport also collects NRTRDE file processing information and creates file processing records in the Pipeline Manager database. The information stored in the validation and file processing records in the database are used for generating NRTRDE reports. For more information on the ISC_NRTRDE_ErrorReport iScript, see *BRM Configuring Pipeline Rating and Discounting*.
NRTRDE Delivery Report

The NRTRDE File Delivery report file lists all the TD35 files processed by the HPMN. You can generate the report for a specific VPMN operator or for all VPMNs. Each NRTRDE File Delivery report includes a header record, one or more detail records, and a trailer record.

Header Record

The header record includes the following data:

\[ \text{ND}, \text{Version}, \text{HPMNId}, \text{VPMNId}, \text{SeqNo}, \text{CreationStartTime}, \text{PeriodStartTime}, \text{PeriodEndTime} \]

where:

- **ND**: NRTRDE File Delivery report identification.
- **Version**: Report version number.
- **HPMNId**: Home Public Mobile Network identifier.
- **VPMNId**: Visited Public Mobile Network identifier.
- **SeqNo**: Report file sequence number.
- **CreationStartTime**: Report creation date and time in the format `yyyyymmddhhmmss`.
- **PeriodStartTime**: Report period start date and time in the format `yyyyymmddhhmmss`.
- **PeriodEndTime**: Report period end date and time in the format `yyyyymmddhhmmss`.

Detail Record

The detail records include the following data:

\[ \text{FileName}, \text{ReceivedTime} \]

where:

- **FileName**: Name of the TD35 file in the format `NRxxxxxyyyyySeqNo`:

  \[ \text{NR}: \text{xxxxxyyyyySeqNo} \]

  where
  - **NR** identifies the file as containing NRTRDE information.
  - **xxxx** identifies the Sender TADIG Code in uppercase and five characters long.
  - **yyyy** identifies the Recipient TADIG Code in uppercase and five characters long.
  - **SeqNo** identifies the file sequence number.
- **ReceivedTime**: The time the TD35 file was received by HPMN, in the format `yyyyymmddhhmmss`, (described earlier).

Trailer Record

The trailer record includes the following data:

\[ \text{END}, \text{NumberOfRecords} \]

where,
■ **END.** End of file marker

■ **NumberOfRecords.** Number of total records in the report including, header and trailer records.

### Delivery Report Example

The following example shows the output of a NRTRDE File Delivery report for HPMN XYZ99 and VPMN ABC01.

```
ND,1.0,XYZ99,ABC01,00001,20070215020000-0500,20070214000000-0500,20070214235959-0500
NRABC01XYZ990000001,20070214010000-0500
NRABC01XYZ990000002,20070214040000-0500
NRABC01XYZ990000003,20070214070000-0500
NRABC01XYZ990000004,20070214100000-0500
NRABC01XYZ990000005,20070214130000-0500
NRABC01XYZ990000006,20070214160000-0500
NRABC01XYZ990000007,20070214190000-0500
NRABC01XYZ990000008,20070214220000-0500
END,10
```

### NRTRDE File Delivery Report File

NRTRDEReportGen64 generates the NRTRDE File Delivery report and sends the output to a file with the following file name format:

```
NDxxxxxyyyyySeqNo:
```

where

■ **ND** identifies the file as containing NRTRDE File Delivery Report.

■ **xxxx** identifies the Sender TADIG Code in uppercase and five characters long.

■ **yyyy** identifies the Recipient TADIG Code in uppercase and five characters long.

■ **SeqNo** identifies the report file sequence number.
NRTRDE Error Report

The NRTRDE Error report lists the TD35 records that failed the NRTRDE incollect validation process. You can generate the report for a specific VPMN (Visited Public Mobile Network) operator or for all VPMNs. You send this report to the VPMN for corrections.

Each NRTRDE Error report includes a header record, one or more detail records, and a trailer record.

Header Record

The header record includes the following data:

NE, Version, HPMNId, VPMNId, SeqNo, CreationStartTime, PeriodStartTime, PeriodEndTime

where:
- **NE.** NRTRDE Error report identification.
- **Version.** Report version number.
- **HPMNId.** Home Public Mobile Network identifier.
- **VPMNId.** Visited Public Mobile Network identifier.
- **SeqNo.** Report file sequence number.
- **CreationStartTime.** Report creation date and time in the format `yyyymmddhhmmss`.
- **PeriodStartTime.** Report period start date and time in the format `yyyymmddhhmmss`.
- **PeriodEndTime.** Report period end date and time in the format `yyyymmddhhmmss`.

Detail Record

The detail records include the following data:

FileName, RecordNo, RecordType, ErrorCode

where:
- **FileName.** Name of the TD35 file, that contains the TD35 record that failed, in the format

  NRxxxxxyyyyySeqNo:

  where
  - **NR** identifies the file as containing NRTRDE information.
  - **xxxx** identifies the Sender TADIG Code in uppercase and five characters long.
  - **yyyy** identifies the Recipient TADIG Code in uppercase and five characters long.
  - **SeqNo** identifies the file sequence number.
- **RecordNo.** TD35 record number.
- **RecordType.** The record type of **RecordNo.**
- **ErrorCode.** TD35 validation error code.
Trailer Record
The trailer record includes the following data:

- **END**: End of file marker
- **NumberOfRecords**: Number of total records in the report including, header and trailer records.

Error Report Example
The following example shows the output of a NRTRDE Error report for HPMN XYZ99 and VPMN ABC01.

```
NE,1.0,XYZ99,ABC01,00001,20070215020000-0500,20070214000000-0500,20070214235959-0500
NRABC01XYZ990000004,,,400
NRABC01XYZ990000005,123,MOC,315
NRABC01XYZ990000005,145,MOC,315
NRABC01XYZ990000005,167,MTC,315
NRABC01XYZ990000005,753,GPRS,304,307,308
NRABC01XYZ990000006,,,117
END,8
```

NRTRDE Error Report File
NRTRDEReportGen64 generates the NRTRDE Error report and sends the output to a file with the following file name format:

```
NExxxxxxyyyyySeqNo:
```

where
- **NE** identifies the file as containing NRTRDE Error Report.
- **xxxxxx** identifies the Sender TADIG Code in uppercase and five characters long.
- **yyyyyy** identifies the Recipient TADIG Code in uppercase and five characters long.
- **SeqNo** identifies the report sequence number.
NRTRDEReportGen64

Use the NRTRDEReportGen64 utility to generate the "NRTRDE Delivery Report" and the "NRTRDE Error Report".

Location

Pipeline_home/bin

where, Pipeline_home is the directory where Pipeline Manager is installed.

Syntax

NRTRDEReportGen64 database_access_library server_name user_name password database_name hpmn [vpmn]

Parameters

The parameters for this utility are:

- **database_access_library**. The database access library. For example, `liboci10g6312d.a` for Oracle on AIX.
- **server_name**. The database alias of the host machine running the Pipeline Manager database.
- **user_name**. The user name to log into the Pipeline Manager database.
- **password**. The password associated with **user_name**.
- **database_name**. The database ID of the Pipeline Manager database.
- **hpmn**. The Home Public Mobile Network Id.
- **vpmn**. The Visited Public Mobile Network Id. If this option is not specified, the utility generates reports for all VPMN operators.

Results

The NRTRDEReportGen64 utility generates the NRTRDE Error report and the NRTRDE File Delivery report with report period start as the previous report's report period end date and report period end as the current date.
Installing InterConnect Manager

This chapter describes how to install Interconnect Manager.

---

**Important:**

- Before you install Interconnect Manager, you must install Pipeline Manager. See "Installing Pipeline Manager" in *BRM Installation Guide*.

- If you are installing Interconnect Manager to replace an identical release (for example, to restore a clean version of the package), you must first uninstall the existing installation. See "Uninstalling Interconnect Manager".

---

**Installing Interconnect Manager**

To install InterConnect Manager:

1. If the Third-Party software package is not installed already, install it. See "Installing the Third-Party Software" in *BRM Installation Guide*.

2. Go to the directory where you installed the Third-Party package and source the `source.me`:

```bash
source source.me.sh
```

C shell:

```bash
source source.me.csh
```

3. Download the InterConnect Manager software to a temporary directory (`temp_dir`).

---

**Note:** You must increase the heap size used by the Java Virtual Machine (JVM) before running the installation program to avoid “Out of Memory” error messages in the log file. For information, see "Increasing Heap Size to Avoid “Out of Memory” Error Messages" in *BRM Installation Guide*.

---

4. Go to `temp_dir` and run the installation program.

To enable a graphical user interface (GUI) installation, install a GUI application such as X Windows and set the DISPLAY environment variable before you install the patch.

```
7.5.0_Interconnect_platform_opt.bin -console
```
Uninstalling Interconnect Manager

To uninstall Interconnect Manager, run the `uninstaller.bin` from `Pipeline_home/uninstaller/Interconnect`.

where `platform` is the operation system name.

5. Follow the instructions displayed during installation.

---

**Note:** If you do not specify an installation directory, Interconnect Manager is installed in the `/opt/ifw` directory.