tmforum

Frameworx 12
Product Conformance
Certification Report

Rancore Technologies Total Charge (RTTC) System V6.0.2

A product of Rancore, a unit of Reliance Jio Infocomm Ltd.

July 2013

Version 1.0

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1   Introduction

1.1   Executive Summary

This document provides details of Rancore Technologies's self-assessment and TM Forum's Conformance Assessment of **Rancore Technologies´s RT Total Charge** product, against the following Frameworx 12 components:

- Business Process Framework Version 12

- Information Framework Version 12

The assessment included a review of:

- The methodology approach to process modeling against the TM Forum's Business Process Framework Release 12 according to the specific processes submitted in scope for the Assessment.

- Conformance to the Information Framework Release 12 Domains/Aggregate Business Entities according to the specific ABEs submitted in scope for the Assessment.

2 Product Functionality/Capability Overview

2.1 Rancore Technologies´s RT Total Charge – Product Overview

Rancore's RtTotalCharge (RTTC) enables Communication Service Providers (CSP) with a convergent rating and charging solution for legacy and next generation communication services. This carrier class charging product is built around 3GPP specifications and TM Forum recommendations. It provides unmatched flexibility to retail and enterprise businesses by supporting complex customer hierarchies, payment models and usage based promotions.

RTTC helps CSPs to accelerate their Go-To-Market strategy by providing ready-to-use rich APIs and standard interfaces to integrate with both the networks and the OSS & BSS systems. The flexibility of RTTC architecture permits its deployment either as a stand-alone charging product or as an integrated solution along with other billing and invoicing systems.

The architectural constructs of RTTC supports virtually unlimited subscriber base, high availability and excellent performance, thus making it suitable for the incumbent as well as green field operators.

RTTC is a convergent rating and charging product that supports Prepaid, Post-paid and hybrid payment models. RTTC can be deployed as a standalone product because it has all the necessary modules to support core functions of customer and product management. The product can also be deployed along with other OSS/BSS products with ready to integrate APIs and well defined standard interfaces over SOAP/XML for integration with OSS/BSS nodes like CRM, Self-Care, Voucher Management System, and Notification Servers for customer provisioning and customer-centric services.

RtTotalcharge architecture is modular in nature
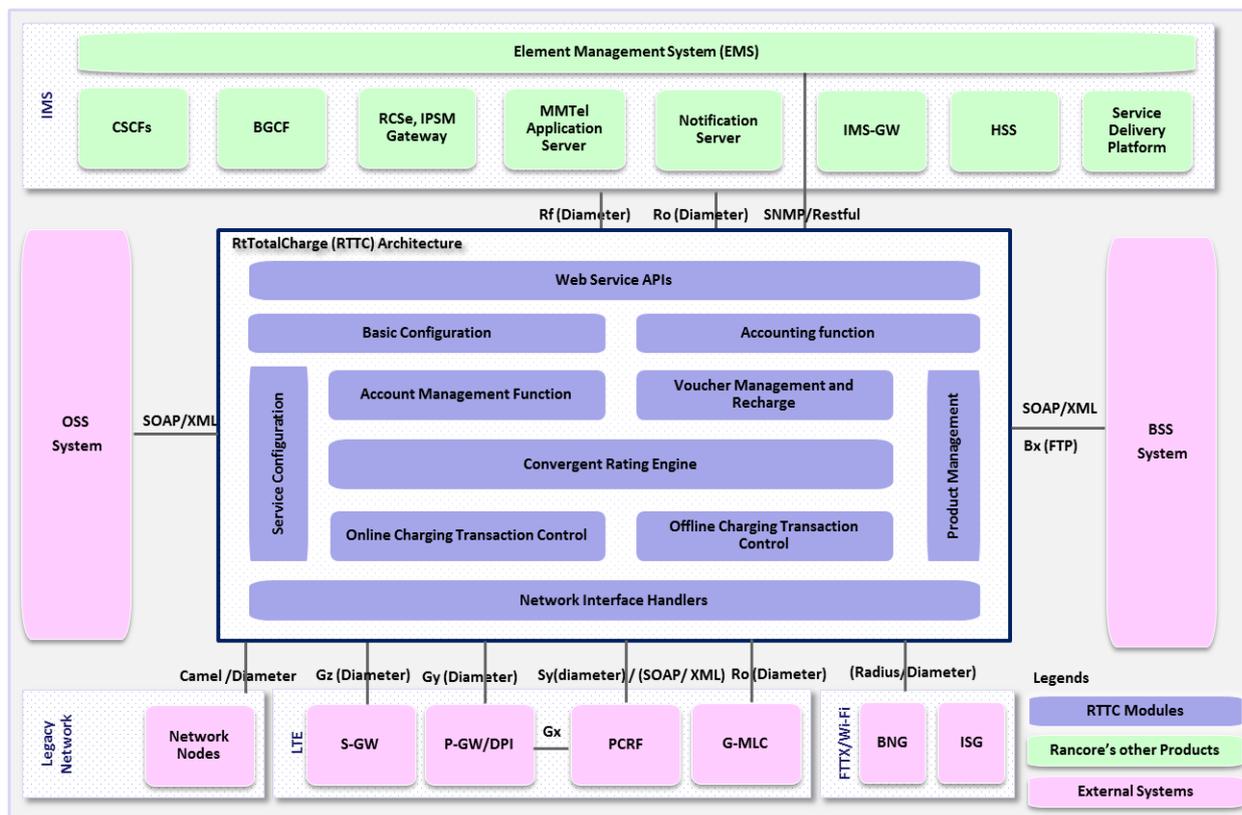
Figure 2.1 RtTotal Charge Architecture Diagram

The key components are:

- Network Interface Handlers - Handling of diameter and radius sessions/transactions
- Charging Transaction Control Function - Handling of online and offline charging session and transaction control based on 3GPP defined session and even based charging
- Product Management - Management of price plans, services, tariff matrix and class-of-service (buckets, accumulators)
- Account Management Function - Management of subscriber individual, shared, hybrid and hierarchical accounts. It also includes management of subscriber plans, buckets and accumulators
- SOA Based Interface - Customer and Product provisioning & activation
- Voucher Management and Recharge- PIN, Charge (denomination) and Recharge Package management, loading and activation of vouchers and provides SOAP/XML based interface to recharge adapters (IM, Self-Care, Online, IVR etc.) for performing voucher or denomination based recharge by the customers
- Accounting Function -Transferring of usage detail records to the post processing systems like Mediation System, Billing & Invoicing System, etc
- Convergent Rating Engine - Rate calculation based on flexible tariff matrix, real-time promotions based on usage/consumption of units by subscribers, call control and QoS control based on spending limits of subscribers

RTTC is compliant to 3GPP interfaces over diameter protocol – Ro, Rf, Gy, Gz and Sy. IP Multimedia Subsystem (IMS) basic voice, video and messaging services, MMTel and several other services are supported over Ro (online) and Rf (offline) interfaces.

Long Term Evolution (LTE) services are supported over Gy (online) and Gz (offline) interfaces. Policy aware usage control is governed over Sy interface.

RTTC supports Radius protocol for charging FTTH and Wi-Fi data services.

About Rancore:

Rancore, a unit of Reliance Jio Infocomm Ltd, designs and develops a wide range of 4G services and products. In addition to RTTC, these include –

- A suite for IP Multimedia System consisting of IMS HSS (Home Subscriber Service), S-SCCF, I-CSCF & P-CSCF (Call Session Control Function), BGCF (Border Gateway Control Function), EMS (Element Management System), RESTful & SDP (Service Delivery Platform), Notification Server, RCS Enhanced (Rich Communication Service), Social Networking Platform, Self-Care & SMP, MMTel (Multimedia Telephony) & OTM (One-To-Many Conference Application Server), IPSM Gateway, Cloud Address Book, Voice & Video Messaging Server, Location Server, Bandwidth Boost and a wide range of Application Servers

- A Converged Policy framework for LTE, FTTx and Wi-Fi access systems

- A device based self-care that provides a unique 360-degree view to customer for managing all products and services on mobile devices

- LTE HSS and LTE Devices such as LTE ODCPE, 4G communicator, LTE-WiFi Router, IAD, IP Set-Top-Box etc

- A range of application and clients on multiple operating systems such as Android, iOS, Windows etc

3   Business Process Framework Assessment Overview

3.1   Mapping Technique Employed

Business Process Framework Level 3 descriptions are analyzed by looking for implied tasks. (This is similar to how process decomposition can use Semantic Analysis). Each Business Process Framework process is supported by descriptive text. In many cases, each process is aligned and mapped to appropriate company documentation references solution, methodology or modeling material.

The Business Process Framework Level 3 descriptions are analyzed by looking for implied tasks. Color coded text as highlighted below is used as part of the process mapping whereby highlighted text indicates the level of support for a Level 3 process implied task:

- GREEN is used to highlight key words or key statements that are fully supported
- YELLOW is used to highlight key words/key statements that are partially supported
- GREY is used to highlight key words/key statements that are not supported
- No highlighting is used for words/statements that are irrelevant, just for reference or needed to complete the sentence.

Manual and Automated Support
It is important to determine whether the implied task is supported by manual steps, automated steps, or a combination of both. In this document, "A", "M", or "AM" is used for each task to indicate that the step or steps is/are automated (A), manual (M), or both (AM).

TM Forum Note 1: When process mappings are presented against Level 4 processes, the mappings are provided against the text in the "Mandatory" field for the process. In the event of the Mandatory field not being used, the process mappings are in that case provided against the Level 4 Brief/Extended descriptions.

TM Forum Note 2: Note that if a Level 3 process has not been decomposed to Level 4 processes in the Business Process Framework, in such cases the process mapping support is provided against the Level 4 process descriptions (Brief & Extended).

3.2 Business Process Framework Level 2 Process Scope

The following figures represent the Business Process Framework Level 2 processes that were presented in scope for the assessment, and the textual callouts represent the components of Rancore Technologies's RT Total Charge that were assessed and support the corresponding Business Process Framework processes according to the results in Chapter 6 Frameworx Conformance.
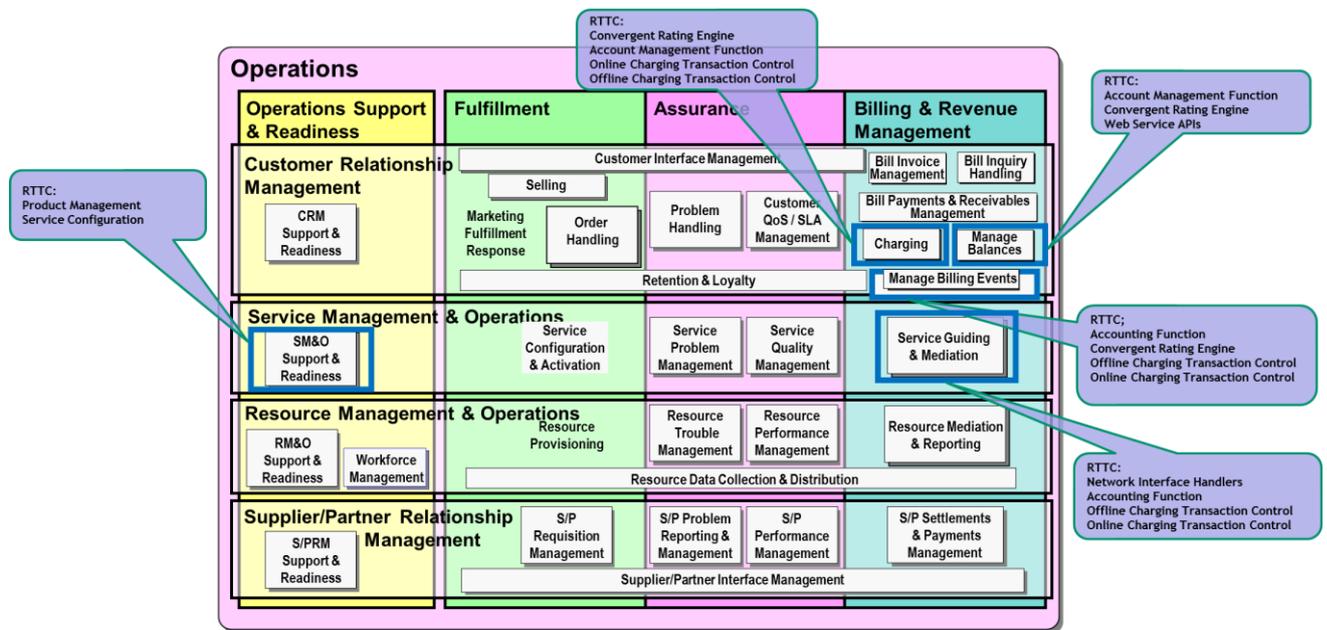
Figure 3.1 Operations Level 2 process coverage for Rancore Technologies's RT Total Charge Assessment

The following diagram identifies the number of Level 3 processes that were submitted for assessment, for each Level 2 process that was submitted in scope for the Assessment.
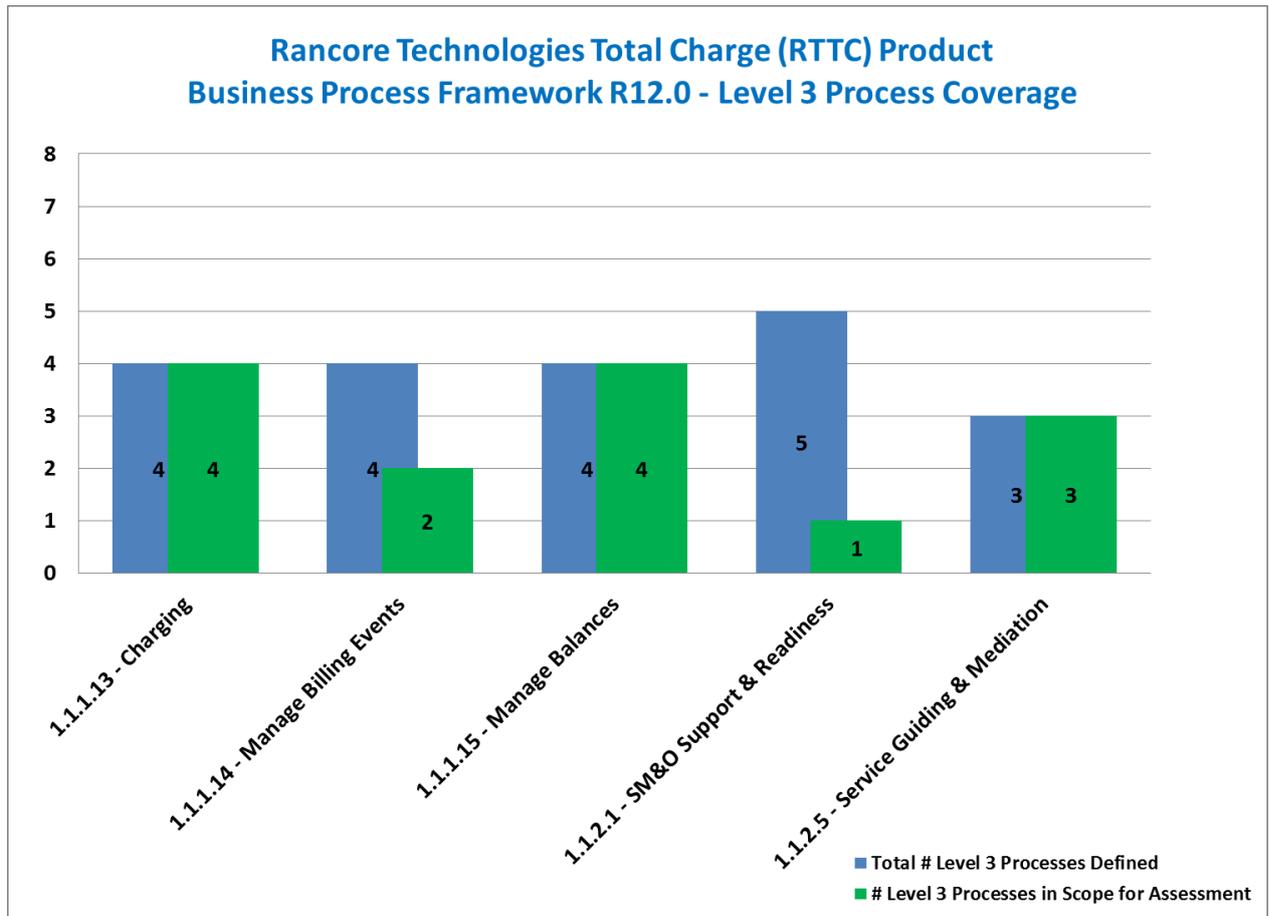
Figure 3.2 Level 3 process coverage for Rancore Technologies's RT Total Charge Assessment

3.3   Product Scope

The diagram in Figure 3.3 represents Rancore Technologies´s RT Total Charge and how it is mapped to the Business Process Framework processes that were assessed as part of this Frameworx Conformance Assessment.
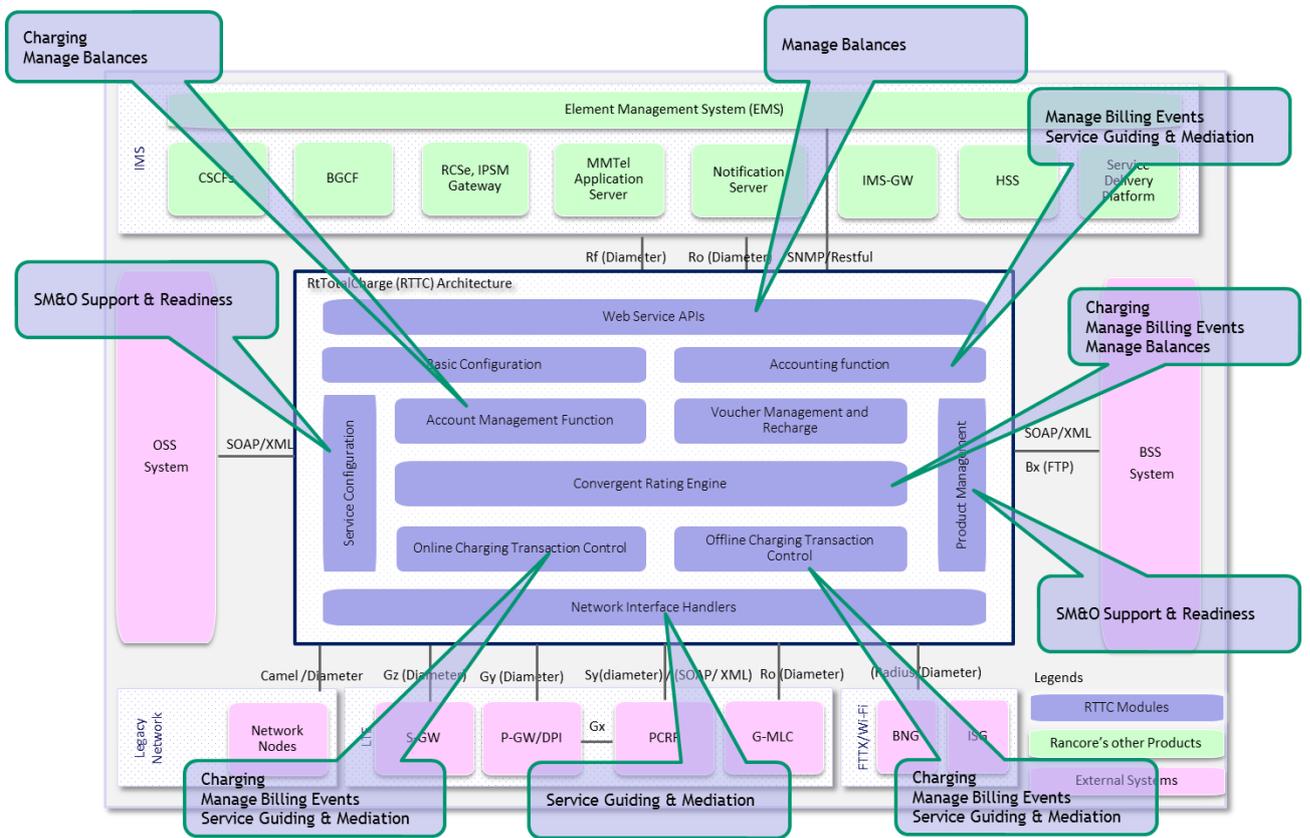
Figure 3.3 RT Total Charge Product Footprint with Scope for eTOM Assessment

4 Business Process Framework – Process Mapping Descriptions

This section provides the Process Mapping output from Rancore Technologies' Self-Assessment which was reviewed by TM Forum Subject Matter Experts alongside supporting documentation for Rancore Technologies´s RT Total Charge.

4.1   Level 2: Charging (1.1.1.13)
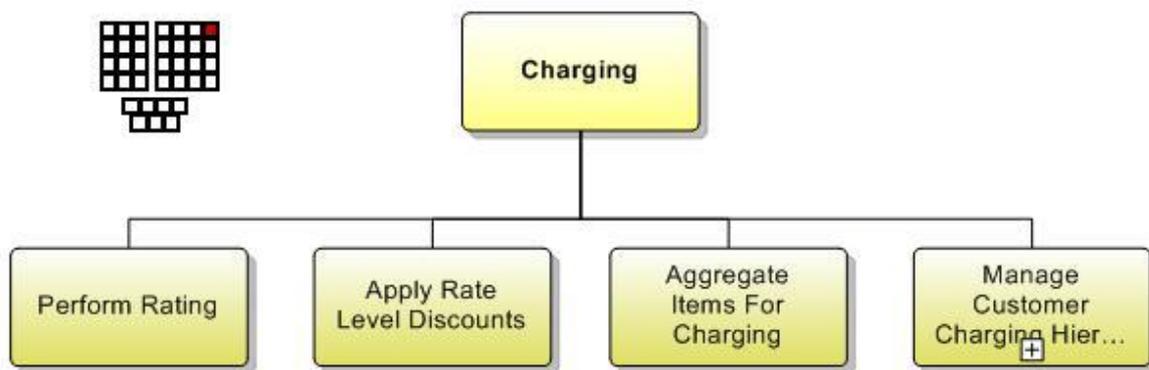
Figure 4.1 Charging decomposition into level 3 processes

Process Identifier: 1.1.1.13

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Managing the assignment of a value (monetary or other) to an event or product, or combination (bundle or aggregate) of the above.

Extended Description

The purpose of Charging is to assign a value (monetary or other) to an event or product, or combination(bundle or aggregate) of the above. The charge may be either a credit or a debit and can be handled either online or offline.

Online charging is performed in real-time, requiring an authorization component which may affect how the service is rendered and enables an operator to provide prepaid services to its customers. Whereas offline charging is performed after the service is rendered and is not required to be done in real-time and generally relates to subscription based products.

The charge may appear on a customer invoice via Apply Pricing, Discounting, Adjustments& Rebates.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.1.1   Level 3: Perform Rating (1.1.1.13.1)

Process Identifier: 1.1.1.13.1

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

4.1.1.1 Level 3: Perform Rating (1.1.1.13.1) – Mapping Details

NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

Level 3 PROCESS MAPPING DETAILS 1.1.1.13.1 Perform Rating
Brief Description Calculating the value of the service/product, before, during or after the rendering of the service. **A** **Extended description** *Process responsible for calculating the value of the service/product, before, during or after the rendering of the service,* **A** RTTC, on receipt of an online charging request from network, performs authorization of the request and permit the network to render the service. As part of authorization, the request will be rated for the service being rendered. The corresponding monetary units/value will be reserved from account based on the calculated rate and the units being granted for the service. Once the service units are consumed, the reserved amount is debited and further reservation will be made. RTTC, on receipt of offline charging request from network, performs rating of the consumed service units and accordingly debits the monetary units/value from the account. ([POD_FDD]**, 3. Online Charging Models)** This section provides the details of the various online charging models. ([POD_FDD]**, 4. Offline Charging Models)** This section provides the details of the various offline charging models. *based on parameters of the request (type, quantity, etc.),* **A** Rating of a service will be performed based on various parameters received in the request like calling-party, called-party, location, operating circle, roaming, media (voice, video etc.,), codec, call-type (LOCAL/STD/ISD) etc. RTTC maintains a tariff matrix based on the above parameters and the tariff can be configured for various combinations of these parameters. ([POD_FDD]**, 9. IMS Rating Function)** The details of the various parameters based on which rating of

an IMS service is done is mentioned in this section.

([POD_FDD], **10. PS Rating Function)** The details of the various parameters based on which rating of a PS service is done is mentioned in this section.

parameters of the customer/subscriber (tariffs, price plans, accumulated usage, contracts, etc.) **A**

During units reservation, after selecting the account to be charged, the price plan will be selected based on whether service is provided by the plan, calendar applicability and validity of the plan. Once the plan to be used is determined, the tariff matrix configured in the plan will be assessed based on various parameters (as explained above) and the rate to applied for service will be determined. Once the service is rendered, the reserved units will be debited from the bucket of the account and the corresponding units will be accumulated in the accumulators. These accumulators will be used for awarding real-time usage based promotions, controlling the subscriber spending limits, controlling the QoS of the subscriber etc.

([POD_FDD]**, 3. Online Charging Models)** This section provides the details of the various online charging models and the flow of events.

and other parameters (time-of-day, taxes, etc.). **A**

The price of the service being rendered will also be determined based on calendar features like day of week, month of year, start time, end time etc.

([POD_FDD], **9. IMS Rating Function)** The details of the various parameters based on which rating of an IMS service is done is mentioned in this section.

([POD_FDD], **10. PS Rating Function)** The details of the various parameters based on which rating of a PS service is done is mentioned in this section.

The same request may be rated differently for different subscribers based on their purchased offers or service agreements. **A**

Each subscriber may subscribe to one or more price plans and these plans will associated with the subscriber account. When a charging request is received, the subscriber account to be charged will be determined and then the price plans associated with that account will be used to rate the request and accordingly calculate the units to be reserved from the account. Hence the tariff/rate for the charging request may be different for various subscribers based on the price plans/offers they subscribed to.

([POD_FDD]**, 3. Online Charging Models)** This section provides the details of the various online charging models and the flow of events.

4.1.2   Level 3: Apply Rate Level Discounts (1.1.1.13.2)

Process Identifier: 1.1.1.13.2

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

4.1.2.1 Level 3: Apply Rate Level Discounts (1.1.1.13.2) - Mapping Details

NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

Level 3 PROCESS MAPPING DETAILS 1.1.1.13.2 Apply Rate Level Discounts
Brief Description Applies discounts to product prices. **A** **Extended description** This process applies discounts to product prices at an individual product level. **A** Tariff offers or discounts are applied over base price during the rating of charging requests. These offers are configurable at price plan level for each service associated with the price plan. ([POD_FDD], **9.2. Offers on Basic Rate**) This section provides the details of the tariff offers configured per service associated with a price plan and applied over base price ([POD_FDD], **9.3 Advanced Rating**) This section provides the details of the tariff offers applied on the service based on the special origination and/or destination party address A discount may be expressed as a monetary amount or percentage, and modifies a price for a product. When a discount is expressed as a percentage, the discounting process determines the discount calculated in relation to the price for the product. **A** During rating, once the base price is determined, the discount will be calculated and applied over this base price. The discount can be applied as FIXED-ADDITIVE, FIXED-DEDUCTIVE, PERCENT-ADD, PERCENT-DEDUCT or OVERWRITE over the base price. ([PROV_MAN_SMP], **3.25 Offer Modifier Type**) This section provides the details of various type of offers that can be applied over the base price as discounts ([PROV_MAN_SMP], **14 Tariff Offers Configuration**) This section provides the details of configuration of different types of offers The discount may be displayed as a separate entry on the bill or may be combined with the rate for

the product to only show as one entry.

Billing is out of scope of RTTC. Where rated CDR's are sent to Billing system for Invoice generation on FTP/SFTP interface.

Discounts may be a one-time event or may have some duration (days, months, life of product, etc.). **A**

The tariff discounts to be applied on the base price are configurable based on the calendar attributes like day of week, month of year, from time, to time etc. This implies that the discounts are applicable on during the timings specified by the calendar. And each discount entity will have its own effective and expiry dates which can be same as that of price plan or can be of any duration.

Additionally, the discounts can be included in the one-time subscription charges which will be deducted when the subscriber subscribes to a price plan.

(**[POD_FDD]**, **9.2. Offers on Basic Rate**) This section provides the details of the tariff offers configured per service associated with a price plan and applied over base price

(**[POD_FDD]**, **9.2. Advanced Rating**) This section provides the details of the tariff offers applied on the service based on the special origination and/or destination party address

(**[PROV_MAN_SMP]**, **14 Tariff Offers Configuration**) This section provides the details of configuration of different types of offers

Discounts may apply to a specific customer or be generally available based on selection of products (for example - bundles). **A**

Tariff discounts are configurable at price plan level and the subscribers can avail those discounts once they subscribe for those plans. Additionally special offers or discounts can be configured at subscriber account level based on attributes like special days etc.

(**[POD_FDD]**, **17.3. Special Day Promotions**) This section provides the details of the special day promotions offered to the subscribers.

Discounting structures may involve tiers, tapers, or thresholds. **A**

Step/tiered rating a subscriber session is performed by configuring the tiered discounts based on the usage and calendar timings. For example, first 15 minutes of the session will be rated at 5 paisa/sec, next 30 minutes of the session will be rated at 1 paisa/sec.

(**[PROV_MAN_SMP]**, **14.4 Step/Tiered Rating Offers**) This section provides the details of configuration of step/tiered rating offers which are done against a plan-service combination

4.1.3   Level 3: Aggregate Items For Charging (1.1.1.13.3)

Process Identifier: 1.1.1.13.3

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

4.1.3.1 Level 3: Aggregate Items For Charging (1.1.1.13.3) - Mapping Details

NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

Level 3 PROCESS MAPPING DETAILS 1.1.1.13.3 Aggregate Items For Charging
Brief Description Manages the accumulation of items that may be used in the selection of a value or in calculation of a rate/discount. **A** **Extended description** This process is responsible for accumulating contributing items, which can be quantities, values (monetary or other) or both. **A** Usage of monetary or non-monetary units can be accumulated per service or group of services. Accumulators are used for usage accumulation and the selection of accumulator is driven by calendar, call-direction (incoming/outgoing), operating-circle, location etc. The non-monetary quantities can be of bytes (volume), sec (time), units (events like SMS etc.). ([POD_FDD]**, 8.2 Accumulators)** This section provides the details of various accumulators which are used for usage accumulation ([PROV_MAN_SMP]**, 11.2 Usage based Promo Accumulators Configuration)** This section provides the details of configuration of usage based accumulators for promotional offers Aggregation can occur over time or can be initiated to gather a "snapshot" of the items at a point in time. **A** Aggregation of usage is done through accumulators, which will have a validity period. The usage will be accumulated throughout the validity period and as per calendar associated with the accumulator. ([POD_FDD]**, 8.2.4 Accumulator Applicability)** This section provides the details of Accumulator Applicability based on which the usage will be accumulated The aggregated items may be used in Perform Rating or Apply Rate Level Discounts to determine the applicable price or discount and may further be used as a quantity in the calculation of a rate or

discount. **A**

Usage is accumulated in RTTC for awarding real-time promotional offers to subscribers, controlling individual spending limits of the subscribers and controlling the QoS of the subscribers based on the spending limits. Examples of the promotional offers include free units, discounts etc.

([POD_FDD]**, 17.1 Usage based Promotions)** This section provides the details of usage based accumulators and promotional offers

4.1.4   Level 3: Manage Customer Charging Hierarchy (1.1.1.13.4)
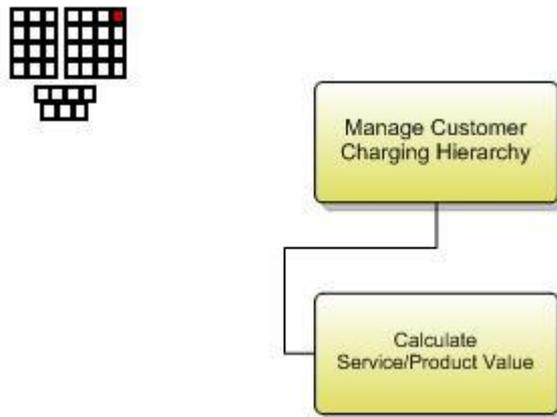
Figure 4.2 Manage Customer Charging Hierarchy decomposition into level 4 processes

Process Identifier: 1.1.1.13.4

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Managing the charging relationships among subscribers.

Extended Description

Customer hierarchies are commonly used for corporate customers, family plans or other type of affinity groups. This process manages the charging relationships among subscribers, e.g. sharing, inheriting or restricting balances, price plans and discounts. Thereby assuring that a charge is added to or subtracted from the correct (sub-) account balance.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.1.4.1 Level 4: Calculate Service/Product Value (1.1.1.13.4.1) – Mapping Details

Process Identifier: 1.1.1.13.4.1

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Level 4 PROCESS MAPPING DETAILS 1.1.1.13.4.1 Calculate Service/Product Value
Brief Description Calculate the value of the service/product, before, during or after the rendering of the service. **AM** **Extended Description** *Process responsible for calculating the value of the service/product, before, during or after the rendering of the service,* **A** RTTC, on receipt of an online charging request from network, performs authorization of the request and permit the network to render the service. As part of authorization, the request will be rated for the service being rendered. The corresponding monetary units/value will be reserved from account based on the calculated rate and the units being granted for the service. Once the service units are consumed, the reserved amount is debited and further reservation will be made. RTTC, on receipt of offline charging request from network, performs rating of the consumed service units and accordingly debits the monetary units/value from the account. (<u>[POD_FDD]</u>**, 3. Online Charging Models)** This section provides the details of the various online charging models. (<u>[POD_FDD],</u> **4. Offline Charging Models)** This section provides the details of the various offline charging models. *based on parameters of the request (type, quantity, etc.),* **A** Rating of a service will be performed based on various parameters received in the request like calling-party, called-party, location, operating circle, roaming, media (voice, video etc.,), codec, call-type (LOCAL/STD/ISD) etc. RTTC maintains a tariff matrix based on the above parameters and the tariff can be configured for various combinations of these parameters. (<u>[POD_FDD],</u> **9. IMS Rating Function)** The details of the various parameters based on which rating of an IMS service is done is mentioned in this section. (<u>[POD_FDD],</u> **10. PS Rating Function)** The details of the various parameters based on which rating of a PS service is done is mentioned in this section.

==parameters of the customer/subscriber (tariffs, price plans, accumulated usage, contracts, etc.)== **A**

During units reservation, after selecting the account to be charged, the price plan will be selected based on whether service is provided by the plan, calendar applicability and validity of the plan. Once the plan to be used is determined, the tariff matrix configured in the plan will be assessed based on various parameters (as explained above) and the rate to applied for service will be determined. Once the service is rendered, the reserved units will be debited from the bucket of the account and the corresponding units will be accumulated in the accumulators. These accumulators will be used for awarding real-time usage based promotions, controlling the subscriber spending limits, controlling the QoS of the subscriber etc.

([POD_FDD]**, 3. Online Charging Models)** This section provides the details of the various online charging models and the flow of events.

==and other parameters (time-of-day, taxes, etc.).== **A**

The price of the service being rendered will also be determined based on calendar features like day of week, month of year, start time, end time etc.

([POD_FDD], **9. IMS Rating Function)** The details of the various parameters based on which rating of an IMS service is done is mentioned in this section.

([POD_FDD], **10. PS Rating Function)** The details of the various parameters based on which rating of a PS service is done is mentioned in this section.

==The same request maybe rated differently for different subscribers based on their purchased offers or service agreements.== **A**

Each subscriber may subscribe to one or more price plans and these plans will associated with the subscriber account. When a charging request is received, the subscriber account to be charged will be determined and then only the price plans associated with that account will be used to rate the request and accordingly calculate the units to be reserved from the account. Hence the tariff/rate for the charging request may be different for various subscribers based on the price plans/offers they subscribed to.

The subscriber account to be charged will be determined based on the account type like individual or hierarchical account. Examples of hierarchical accounts include family or corporate accounts. In case of hierarchical account, the parent account may be charged for sessions corresponding to the child account as per the rules configured based on service, calendar and insufficient balance in the child account.

([POD_FDD]**, 3. Online Charging Models)** This section provides the details of the various online charging models and the flow of events.

([POD_FDD], **15. Account Hierarchy)** The details of the hierarchical accounts are provided in this section.

([POD_FDD], **14 Charges Redirection)** The details of the charges redirection feature are provided in this section.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.1.5   Supporting Evidence References (Works Cited)

[PROV_MAN_SMP]   RtTotalCharge Service Management Point (SMP) Provisioning Flow Manual

[POD_FDD]   RtTotalCharge - Feature Description Document

4.1.6   Level 2: Charging (1.1.1.13) – Conformance Scores

Table 4.1 Charging (1.1.1.13) – Conformance Scores

Level 2: 1.1.1.13 - Charging [4/4]		
Level 3 Process	**Level 4 Process**	**L4/L3 Process Score**
1.1.1.13.1 - Perform Rating		**5**
1.1.1.13.2 - Apply Rate Level Discounts		**4.7**
1.1.1.13.3 - Aggregate Items For Charging		**5**
1.1.1.13.4 - Manage Customer Charging Hierarchy		**5**
	1.1.1.13.4.1 - Calculate Service/Product Value	100%

4.2   Level 2: Manage Billing Events (1.1.1.14)
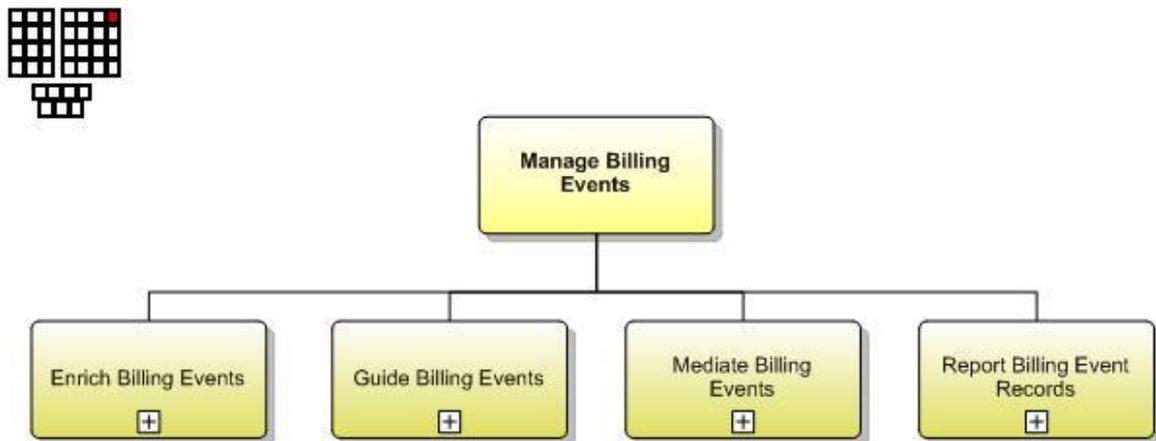
Figure 4.3 Manage Billing Events decomposition into level 3 processes

Process Identifier: 1.1.1.14

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Encompasses the functions required to guide, distribute, mediate, summarize, accumulate, and analyze billing event records.

Extended Description

The billing events management processes encompass the functions required to guide, distribute, mediate, summarize, accumulate, and analyze billing event records. These processes may occur in real-time, near real-time, or may be executed on a periodic basis.

 Billing event records include records produced by network elements (service events), records that indicate the need for periodic billing of a reoccurring product rate, and records that indicate the need for billing of a non-reoccurring rate.

 The guiding processes ensures that the event records used in the billing processes are appropriately related to the correct customer billing account and products.

 The billing event records are edited and if necessary reformatted (mediated) to meet the needs of subsequent processes. The billing event records may also be enriched with additional data during this process.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.2.1   Level 3: Enrich Billing Events (1.1.1.14.1)
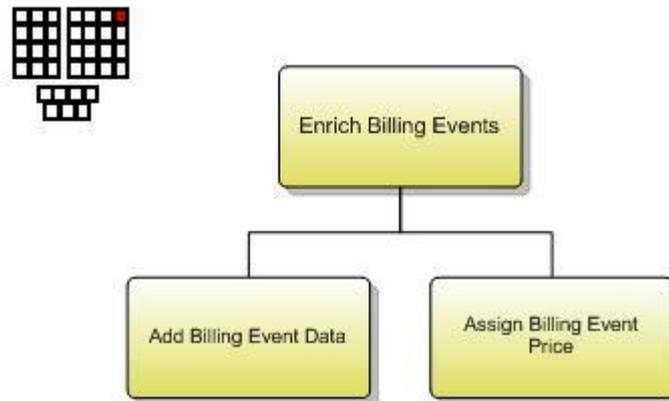
Figure 4.4 Enrich Billing Events decomposition into level 4

Process Identifier: 1.1.1.14.1

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Enrich billing event records with additional data.

Extended Description

The Enrich Billing Events processes will augment the billing event records by adding data to the records from sources such as customer, product, or other reference data.

A billing event may be assigned a price without consideration of specific product or customer information. The assigned price may be used to enrich the billing event record.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.2.1.1 Level 4: Add Billing Event Data (1.1.1.14.1.1) – Mapping Details

Process Identifier: 1.1.1.14.1.1

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

Level 4 PROCESS MAPPING DETAILS
1.1.1.14.1.1 Add Billing Event Data

Brief Description

Add data to the records from sources such as customer, product, or other reference data to augment the billing event records. **AM**

Extended Description

The purpose of Add Billing Event Data process is to add data to the records from sources such as customer, product, or other reference data to augment the billing event records. This process is responsible for enriching billing events with additional data which is not provided by or known by services providing the billing events, but needed by other billing processes.

An example of such data is service to product mapping information and subscriber identity to customer mapping information. Data can be fetched from internal configuration or be looked up in data sources. Hence this process is also responsible for obtain additional data s from corresponding data sources based on each billing events record information.

Explanatory

An example of such data is service to product mapping information and subscriber identity to customer mapping information. Data can be fetched from internal configuration or be looked up in data sources.

Mandatory

The purpose of Add Billing Event Data process is to add data to the records from sources such as customer, product, or other reference data to augment the billing event records. **A**

Billing event records are received by RTTC from various network elements like IMS-GW, RCSE, PGW etc. These charging records are received over the diameter protocol over Ro/Gy (online) and Rf/Gz (offline) interface. These are non-rated CDRs and contains only network specific information.

Online charging records are rated in real-time according to the quota-reservation and debit mechanism. Offline charging records are rated in near real-time once the service is rendered and usage is reported after service consumption. On termination of the session, the CDR will be dumped with the information received from the network along with the customer and rating specific

information.

(**[POD_FDD]**, **27. CDR/TDR generation**) This section provides the details of the CDR generation

This process is responsible for enriching billing events with additional data which is not provided by or known by services providing the billing events, but needed by other billing processes. **A**

The additional data dumped in the CDR along with network specific information includes but not limited to

– charged party account identifier (along with technical subscriber identity)
– tariff plan identifier (along with service identifier)
– rate value
– total call cost
– individual bucket deductions and remaining balances
– session usage

(**[IS_BO_CSV]**, **5.1 IMS Subsystem level CDR**) This section provides the details of various parameters of IMS online CDR

(**[IS_BO_CSV]**, **5.2 Bearer level PS Domain CDR**) This section provides the details of various parameters of PS online CDR

(**[IS_BO_CSV]**, **5.3 LCS CDR**) This section provides the details of various parameters of LCS online CDR

(**[IS_BX_CSV]**, **5.1 IMS Subsystem level CDR**) This section provides the details of various parameters of IMS offline CDR

(**[IS_BX_CSV]**, **5.1 Bearer level PS Domain CDR**) This section provides the details of various parameters of PS offline CDR

Hence this process is also responsible for obtain additional data from corresponding data sources based on each billing events record information. **A**

The details of subscriber account will be loaded in to in-memory of RTTC application from the database on session initiation, if not present in in-memory cache. Meta data information like tariff plans, services, buckets etc., will always be pre-loaded in the application in-memory and will be periodically refreshed from database.

Hence while dumping the CDR, additional account and rating information will be obtained from the in-memory cache of the application.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.2.1.2 Level 4: Assign Billing Event Price (1.1.1.14.1.2) – Mapping Details

Process Identifier: 1.1.1.14.1.2

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

Level 4 PROCESS MAPPING DETAILS
1.1.1.14.1.2 Assign Billing Event Price

Brief Description

Assign a price to a billing event without consideration of specific product or customer information. The assigned price may be used to enrich the billing event record. **AM**

Extended Description

The purpose of Assign Billing Event Price process is to assign a price to a billing event without consideration of specific product or customer information. The assigned price may be used to enrich the billing event record. This process performs static rating of service events without considering customer or product information. As an example, originating on-net call CDRs are priced at $1 per started minute during peak hours, without considering customer data or agreements for the involved user which could affect the final price paid.

This process may assign a price to a billing event automatically according to pre-configured rules, or manually.

Explanatory

The assigned price may be used to enrich the billing event record. As an example, originating on-net call CDRs are priced at $1 per started minute during peak hours, without considering customer data or agreements for the involved user which could affect the final price paid.

Mandatory

The purpose of Assign Billing Event Price process is to assign a price to a billing event without consideration of specific product or customer information. This process performs static rating of service events without considering customer or product information. **A**

Subscriber independent price plans and offers are configured with higher priority than the subscriber specific plans in RTTC. As a result, when a request is received for rating, the rating will be done based on these plans and offers, if applicable.

These subscriber independent price plans and offers are classified in to three categories:

- Location based tariffs

- Advanced calendar based tariffs
- Special origination/destination tariffs

Location based price plans configured with a discounted tariffs are applied when the subscriber initiates a session from a particular location, which can be a cell or a zone (group of cells).

Advanced calendar based tariffs are configured at service level with discounted rates. These tariffs can be configured to be applied over the base rate or to over-write the base rate.

Special origination and/or destination based tariffs are configured at service level with discounted rates. These tariffs can be configured to be applied over the base rate or to over-write the base rate.

([PROV_MAN_SMP]**, 14.5 Special Origination and Destination Offers, 14.6 Advanced Calendar Offers)** This section provides the details of the special origination and destination offers which are independent of the plans associated with the subscriber account

([PROV_MAN_SMP]**, 14.6 Advanced Calendar Offers)** This section provides the details of the advanced calendar offers which are independent of the plans associated with the subscriber account

([POD_FDD]**, 6.1.2 Subscriber Independent Plans)** This section provides the details of the location based plans which is a subscriber independent plan

([POD_FDD]**, 9.3 Advanced Rating)** This section provides the details of the advanced offers which are applied for rating of services and are independent of plans associated with the subscriber account

Optional

This process may assign a price to a billing event automatically according to pre-configured rules, or manually.

Interactions

Not used for this process element

4.2.2   Level 3: Guide Billing Events (1.1.1.14.2)
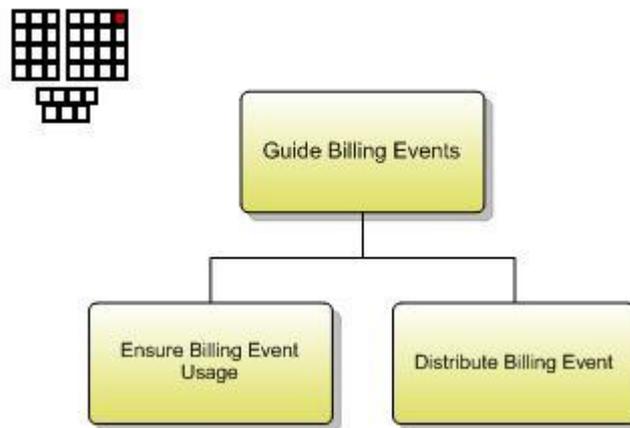
Figure 4.5 Guide Billing Events decomposition into level 4 processes

Process Identifier: 1.1.1.14.2

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Ensures that the event records used in the billing processes are related to the correct customer billing account and subscribed products.

Extended Description

The Guide Billing Events processes ensure that the event records used in the billing process relate to the correct customer billing account and products. A specific event record may be related to multiple customer billing accounts and subscribed products.

Distribution of billing event records to other processes may also occur.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.2.2.1 Level 4: Ensure Billing Event Usage (1.1.1.14.2.1) – Mapping Details

Process Identifier: 1.1.1.14.2.1

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

Level 4 PROCESS MAPPING DETAILS 1.1.1.14.2.1 Ensure Billing Event Usage
Brief Description Ensure that the event records used in the billing process relate to the correct customer billing account and products. **AM** **Extended Description** The purpose of Ensure Event Record Usage process is to ensure that the event records used in the billing process relate to the correct customer billing account and products. A specific event record may be related to multiple customer billing accounts and subscribed products. **Explanatory** A specific event record may be related to multiple customer billing accounts and subscribed products.   **Mandatory** The purpose of Ensure Event Record Usage process is to ensure that the event records used in the billing process relate to the correct customer billing account and products. **A** As parting of rating the subscriber usage on receipt of charging request, following steps are followed which will ensure that the account and plans used for debiting units are correct – the subscriber account to be charged will be derived from the technical identifier (like MSISDN) and additional rules, if configured – the additional rules for account selection will be present in cases like hierarchical accounts where the cost of service consumption of a child account will be deducted from the parent account based on criteria like service being used, calendar, insufficient balance in child account etc. – once the charged party account is identified, one of the tariff plans from the account will be selected based on the criteria like plan applicability, presence of the service in that plan etc. – Once the plan is identified the used units will be rated according to the plan rates and units will be deducted from the buckets associated with the plans. (POD_FDD), **3.1 Overview)** This section provides the details of the online charging models in which

the flow of events which guides a service usage record through the rating procedure

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.2.2.2 Level 4: Distribute Billing Event (1.1.1.14.2.2) – Mapping Details

Process Identifier: 1.1.1.14.2.2

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

Level 4 PROCESS MAPPING DETAILS 1.1.1.14.2.2 Distribute Billing Event
Brief Description Distribute billing event records to other processes. **AM** **Extended Description** The purpose of Distribute Billing Event process is to distribute billing events to other processes which need access to billing events. As a typical example, billing events are transferred to Charging process for event/product charging via this process. In general, the billing events are distributed in the specific format, e.g. plain text format, binary format, XML format. This process is also responsible for recording distribution logs to avoid duplicated billing event distribution. **Explanatory** As a typical example, billing events are transferred to Charging process for event/product charging via this process. In general, the billing events are distributed in the specific format, e.g. plain text format, binary format, XML format.   **Mandatory** ==The purpose of Distribute Billing Event process is to distribute billing events to other processes which need access to billing events. This process is also responsible for recording distribution logs to avoid duplicated billing event distribution.== **A** RTTC receives service/network specific billing event records from the network, rates them and generates the rated CDR. The rated CDRs will be pushed to an FTP server and make them available for various OSS/BSS entities for analytics and billing purpose. PULL option is also available for pulling the CDRs from RTTC by OSS/BSS entities. In case of online charging, the rated CDRs will be generated in CSV format. In case of offline charging, correlated rated CDRs will be generated in CSV format. (**[IS_BO_CSV]**, **3 CDR File Format Description)** This section provides details of the file format of the online CDR files which are transferred to the downstream systems

([IS_BO_CSV]**, 4 CDR File Transfer Mechanism)** This section provides details of the file transfer methods for transferring the online CDRs to the downstream systems

([IS_BX_CSV]**, 3 CDR File Format Description)** This section provides details of the file format of the offline CDR files which are transferred to the downstream systems

([IS_BX_CSV]**, 4 CDR File Transfer Mechanism)** This section provides details of the file transfer methods for transferring the offline CDRs to the downstream systems

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.2.3   Level 3: Mediate Billing Events (1.1.1.14.3) [Not assessed]

This process was not submitted for assessment.

4.2.4   Level 3: Report Billing Event Records (1.1.1.14.4) [Not assessed]

This process was not submitted for assessment.

4.2.5   Supporting Evidence References (Works Cited)

[IS_BO_CSV]   RtTotalCharge Bo Interface Specification - CSV.doc

[IS_BX_CSV]   RtTotalCharge Bx Interface Specification - CSV.doc

[PROV_MAN_SMP]   RtTotalCharge Service Management Point (SMP) Provisioning Flow Manual

[POD_FDD]   RtTotalCharge - Feature Description Document

4.2.6   Level 2: Manage Billing Events (1.1.1.14) – Conformance Scores

Table 4.2 Manage Billing Events (1.1.1.14) – Conformance Scores

Level 2: 1.1.1.14 - Manage Billing Events [2/4]		
Level 3 Process	**Level 4 Process**	**L4/L3 Process Score**
1.1.1.14.1 - Enrich Billing Events		**5**
	1.1.1.14.1.1 - Add Billing Event Data	100%
	1.1.1.14.1.2 - Assign Billing Event Price	100%
1.1.1.14.2 - Guide Billing Events		**5**
	1.1.1.14.2.1 - Ensure Billing Event Usage	100%
	1.1.1.14.2.2 - Distribute Billing Event	100%
1.1.1.14.3 - Mediate Billing Events		*0*
1.1.1.14.4 - Report Billing Event Records		*0*

4.3 Level 2: Manage Balances (1.1.1.15)
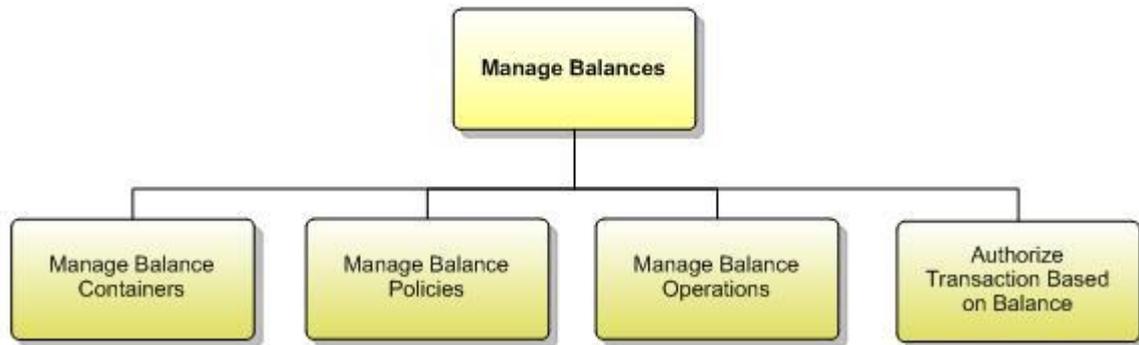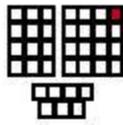
Figure 4.6 Manage Balances decomposition into level 3 processes

Process Identifier: 1.1.1.15

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Management of customer and/or subscriber account balances.

Extended Description

This process is responsible for holding, calculating, applying policies and managing functionality/interfaces for the account balances of a customer and/or a subscriber.

Here the values resulting from rating and the application of discounts are applied to a customer's balance. The balance affected by the value may be monetary or other balances such as minutes, points, or tokens. Authorizing service requests based on available balance is optional.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.3.1   Level 3: Manage Balance Containers (1.1.1.15.1)

Process Identifier: 1.1.1.15.1

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

4.3.1.1 Level 3: Manage Balance Containers (1.1.1.15.1) – Mapping Details
NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

Level 3 PROCESS MAPPING DETAILS 1.1.1.15.1 Manage Balance Containers
Brief Description Hold and maintain the different balances that a customer and/or a subscriber may have. **AM** **Extended description** This process manages the balance containers assigned to a customer and/or subscriber and **AM** Balance containers in RTTC are named as Buckets. Buckets are configured in the Class of Service which is associated with a Price Plan. When a subscriber subscribes for a price plan, all the buckets associated with the Class of Service of that plan will be attached to the subscriber's account. Balance containers are configured and managed through Service Management Point which is a graphical user interface. ([POD_FDD], **8.1. Buckets)** The details of the Buckets or Balances are provided in this section. ([POD_FDD], **6. Price Plan Management)** The details of the association of Buckets to the Price Plan and Class of Service is provided in this section. ([POD_FDD], **5. Customer Account Management)** The details of the association of Price Plan and hence Buckets to the Customer Account is provided in this section. is used to keep track of usage events, providing input for decision making processes (such as service or product authorization) by means of the balance policies. **AM** Each bucket in RTTC is configured with a priority which decides the order of selection of a bucket while performing debit from the subscriber's account. Multiple services can be associated with a bucket and all these services can consume the units from the same bucket. As part of processing the charging request from the network for a service, units will be reserved from the bucket and then debited once the service is rendered.

([POD_FDD], **8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

([PROV_MAN_SMP], **9. Balance Configuration)** The details of the different types of balance or bucket configuration is provided in this section.

The containers include monetary and non-monetary balances (or shared) **AM**

Buckets can be of two types - monetary and non-monetary. Monetary buckets are amount buckets and non-monetary buckets are counter buckets. Non monetary buckets hold units of type volume (bytes) or duration (sec) or events.

([POD_FDD], **8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

([PROV_MAN_SMP], **9. Balance Configuration)** The details of the different types of balance or bucket configuration is provided in this section.

and are used as prepaid balances (enabling real-time service or product authorization), **AM**

In case of prepaid subscriber, the base monetary bucket is the CORE bucket which holds the prepaid balance of the subscriber. During online charging, real-time rating is performed and balance reservation will be made from this core bucket. When the service is rendered, the used units will be debited and unused units will be rolled back. If this bucket runs out of balance, the service authorization fails and the subscriber will be denied of the service.

([POD_FDD], **8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

([PROV_MAN_SMP], **9. Balance Configuration)** The details of the different types of balance or bucket configuration is provided in this section.

postpaid balances (in conjunction with an Account-Receivables [AR] application). **AM**

In case of postpaid subscriber, the base monetary bucket is the CORE bucket which holds the postpaid balance, which is the unbilled amount of the subscriber. During offline charging, near real-time rating is performed and the calculated usage price will be added to this core bucket as unbilled amount. If this bucket reaches a credit limit, charging system notifies the subscriber regarding the same.

([POD_FDD], **8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

([PROV_MAN_SMP], **9. Balance Configuration)** The details of the different types of balance or bucket configuration is provided in this section.

Examples of non-monetary balances and allowances are: free minutes, WAP-only quota, etc. **AM**

In addition to the CORE bucket, PAID, ZR-PROMO, DR-PROMO are the other bucket types which are applicable for both prepaid and postpaid subscribers. These additional bucket types provide the functionality of discounts or allowances.

ZR-PROMO buckets hold units (allowance) which are free of cost to the subscriber. DR-PROMO buckets hold units which are available at a discounted price.

([POD_FDD]**, 8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

([PROV_MAN_SMP]**, 9. Balance Configuration)** The details of the different types of balance or bucket configuration is provided in this section.

4.3.2   Level 3: Manage Balance Policies (1.1.1.15.2)

Process Identifier: 1.1.1.15.2

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

4.3.2.1 Level 3: Manage Balance Policies (1.1.1.15.2) - Mapping Details
NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

Level 3 PROCESS MAPPING DETAILS
1.1.1.15.2 Manage Balance Policies

Brief Description

Executing policies per balance or balance type.**AM**

Extended description

Balance policies are rules that describe how balance affecting events are to be handled. **AM**

Each bucket in RTTC is configured with a set of attributes which acts like rules or policies for that bucket. Some of the policies will be derived from the price plan corresponding to the bucket.

([POD_FDD], **8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

([PROV_MAN_SMP], **9. Balance Configuration)** The details of the different types of balance or bucket configuration is provided in this section.

([POD_FDD], **6.2. Price Plan Attributes)** The details of some of the price plan attributes are provided in this section.

This is done by comparing the value of each event against criteria such as the following:

- a minimum allowable balance limit (e.g. balance must remain above zero), **AM**

The minimum value of CORE bucket will be governed by the maximum negative balance configured in the price plan. The minimum value of other bucket types is 0. When the charging request is being processed, the maximum negative balance of the bucket will be verified and if not crossed, the request will be authorized.

([POD_FDD], **5.7. Subscription Balances)** The details of the Buckets or Balances associated with the subscriber account are provided in this section.

([POD_FDD], **8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

([PROV_MAN_SMP], **9. Balance Configuration)** The details of the different types of balance or

bucket configuration is provided in this section.

(**[POD_FDD],** **6.2. Price Plan Attributes)** The details of some of the price plan attributes are provided in this section.

<mark>- balance expiration dates,</mark> **AM**

Each bucket associated with the subscriber's account will have an expiry date till which the bucket is valid in that account. When the charging request is being processed, the expiry date of the bucket will be verified against the event timestamp and accordingly the bucket will be selected for reservation and debit.

(**[POD_FDD],** **5.7. Subscription Balances)** The details of the Buckets or Balances associated with the subscriber account are provided in this section.

(**[POD_FDD],** **8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

<mark>- balance thresholds actions and notifications and</mark> **AM**

The CORE bucket warning balance is configured in the price plan. When the charging request is being processed, on reaching the warning balance at the time of debit, a notification will be sent to the customer. Additionally the network will also be notified in the Credit-Control-Answer message of diameter with a Low-Balance-Indication AVP. The network element may take any corrective action on the same.

(**[POD_FDD],** **26. Notifications)** The details of various Bucket or Balance specific notifications are provided in this section.

(**[PROV_MAN_SMP],** **9. Balance Configuration)** The details of the different types of balance or bucket configuration is provided in this section.

(**[POD_FDD],** **6.2. Price Plan Attributes)** The details of some of the price plan attributes are provided in this section.

<mark>- roll-over & cyclic policies.</mark> **AM**

Each bucket can be configured to carry forward the units and expiry date whenever the bucket is reset or recharged. If units-carry-forward is true, then unused units will be carried forward along with the new units. If it is false, the new units will be over-written in to the bucket and the unused units will be discarded. Similar is the case with expiry carry forward attribute.

(**[POD_FDD],** **8.1. Buckets)** The details of the Buckets or Balances are provided in this section.

(**[PROV_MAN_SMP],** **9. Balance Configuration)** The details of the different types of balance or bucket configuration is provided in this section.

4.3.3   Level 3: Manage Balance Operations (1.1.1.15.3)

Process Identifier: 1.1.1.15.3

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

4.3.3.1 Level 3: Manage Balance Operations (1.1.1.15.3) - Mapping Details

NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

Level 3 PROCESS MAPPING DETAILS 1.1.1.15.3 Manage Balance Operations
Brief Description Allow different operations to be performed on the managed balance. **AM** **Extended description** Balance operations processes the charged events, using balance policies and then guides the results towards the relevant balance containers. Operations include : - Reserving amounts from any balance for any session, and crediting unused reservations back into the balance, when a session is released. **A** As part of online charging request processing, RTTC performs balance reservation, debit and rollback operations. A diameter credit-control-request will be received on session initiation for a service. On receipt of this request, RTTC performs balance reservation for the service and authorizes the request. Once the service is rendered, the used units will be debited from the balance and unused units will be rolled back to the account. Again units will be reserved from the balance to continue the session. On session release, no units will be reserved and unused units will be rolled back to the subscriber's account. ([POD_FDD], **3. Online Charging Models)** This section provides the details of the various online charging models and the flow of events. - Updating balances by applying charges to the balance and credit/debit adjustments. **A** All charging requests will be rated according to the price plan and the amount to be reserved/debited will be calculated based on the rate and units requested. The amount (monetary or non-monetary) will be debited from the subscriber's balance. SOAP/XML API is exposed by RTTC towards OSS/BSS entities like CRM, Billing System etc., to perform balance adjustments, if required. ([POD_FDD], **3. Online Charging Models)** This section provides the details of the various online

charging models and the flow of events.

- Balance queries. **A**

Subscriber can perform balance enquiry to know the available values of all monetary and non-monetary balances.

SOAP/XML API and Diameter Ro interface is exposed by RTTC towards OSS/BSS entities like self-care and IMS entities like notification server etc., to perform balance enquiry on behalf of subscriber.

([IS_RBEF], **8.1.4 Balance Enquiry Request, 8.1.5 Balance Enquiry Response)** The details of the SOAP/XML interface of Balance Enquiry are provided in this section.

([IS_RBEF], **9.1 AVPs in CCR Message for Recharge and Balance Enquiry, 9.2 AVPs in CCR Message for Recharge and Balance Enquiry)** The details of the Ro interface of Balance Enquiry are provided in this section.

- Transferring amounts from one balance to another. **A**

A subscriber can transfer a part core monetary balance of his account to the other subscriber's account.

SOAP/XML API and Diameter Ro interface is exposed by RTTC towards OSS/BSS entities like self-care and IMS entities like notification server etc., to perform balance transfer.

([IS_RBEF], **8.1.10 Balance and Credit Transfer Request, 8.1.5 Balance and Credit Transfer Response)** The details of the SOAP/XML interface of Balance and Credit transfer are provided in this section.

([IS_RBEF], **9.5 AVPs in CCR Message for Balance and Credit Transfers, 9.6 AVPs in CCR Message for Balance and Credit Transfers)** The details of the Ro interface of Balance and Credit transfer are provided in this section.

4.3.4   Level 3: Authorize Transaction Based on Balance (1.1.1.15.4)

Process Identifier: 1.1.1.15.4

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

4.3.4.1 Level 3: Authorize Transaction Based on Balance (1.1.1.15.4) - Mapping Details
NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

Level 3 PROCESS MAPPING DETAILS 1.1.1.15.4 Authorize Transaction Based on Balance
Brief Description Manages authorization of service/ product requests based on available balances (monetary or non-monetary) and policies. **AM** **Extended description** This process may include balance reservation and must be performed online. **A** When an online charging request is received by for authorization, RTTC performs balance reservation and authorizes the request. This is a real-time authorization procedure in which if enough balance is not available, the service will be denied to the end user. ([POD_FDD]**, 3. Online Charging Models)** This section provides the details of the various online charging models and the flow of events. Subsequent balance updates are not required to be done in real-time. In this context a service is provided by the network, e.g. voice call. Product is digital content delivered via the network, e.g. content such as music, games, etc. **A** Three types of online charging requests are supported by RTTC - SCUR, ECUR and IEC. SCUR stands for session charging with unit reservation. This is used in cases like voice, video and data sessions where the balance reservation, debit and rollback cycle is repeated throughout the session. ECUR stands for event charging with unit reservation. This is used in cases like messaging services where the balance reservation will be made once. If the service is delivered, the units will be debited. Otherwise the units will be rolled back. IEC stands for immediate event charging where a direct debit without any reservation will be done. If the service is not delivered, a separate refund request will be received to credit the account. In case of ECUR and IEC, subsequent reservations are not done. ([POD_FDD]**, 3. Online Charging Models)** This section provides the details of the various online

charging models and the flow of events.

4.3.5   Supporting Evidence References (Works Cited)

[POD_FDD]   RtTotalCharge - Feature Description Document

[IS_RBEF]   RtTotalCharge - Recharge and Balance Enquiry Interface Specification

[PROV_MAN_SMP]   RtTotalCharge Service Management Point (SMP) Provisioning Flow Manual

4.3.6   Level 2: Manage Balances (1.1.1.15) – Conformance Scores

Table 4.3 Manage Balances (1.1.1.15) – Conformance Scores

Level 2: 1.1.1.15 - Manage Balances [4/4]		
Level 3 Process	Level 4 Process	L4/L3 Process Score
1.1.1.15.1 - Manage Balance Containers		5
1.1.1.15.2 - Manage Balance Policies		5
1.1.1.15.3 - Manage Balance Operations		5
1.1.1.15.4 - Authorize Transaction Based on Balance		5

4.4   Level 2: SM&O Support & Readiness (1.1.2.1)
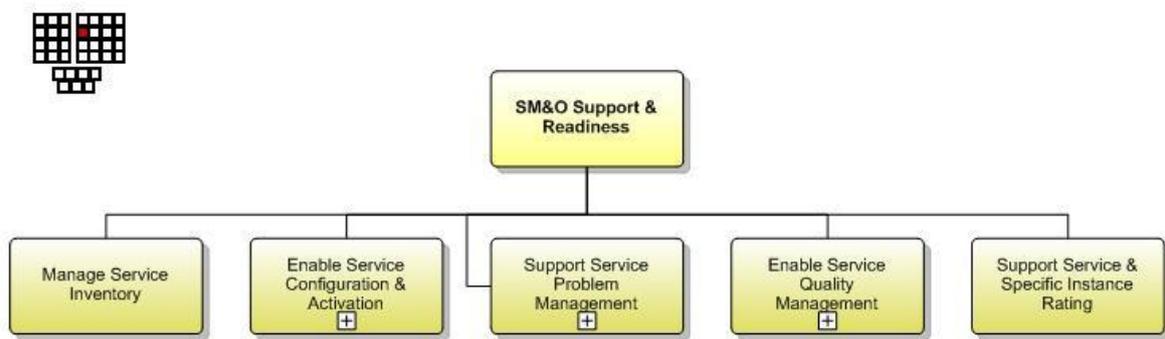
Figure 4.7 SM&O Support & Readiness decomposition into level 3 processes

Process Identifier: 1.1.2.1

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Manage service infrastructure, ensuring that the appropriate service capacity is available and ready to support the SM&O Fulfillment, Assurance and Billing processes

Extended Description

SM&O Support & Readiness processes manage service infrastructure, ensuring that the appropriate service capacity is available and ready to support the SM&O Fulfillment, Assurance and Billing processes in instantiating and managing service instances, and for monitoring and reporting on the capabilities and costs of the individual SM&O FAB processes.

The responsibilities of these processes include, but are not limited to:

· Supporting the operational introduction of new and/or modified service infrastructure;

· Managing and ensuring the ongoing quality of the Service Inventory;

· Applying service capacity rules from Infrastructure Lifecycle Management processes;

· Analyzing availability and quality over time on service infrastructure and service instances, including trend analysis and forecasting;

· Ensuring the operational capability of the SM&O processes; and

· Maintaining rating and tariff information for service infrastructure and service instances.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.4.1 Level 3: Manage Service Inventory (1.1.2.1.1) [Not assessed]

This process was not submitted for assessment.

4.4.2 Level 3: Enable Service Configuration & Activation (1.1.2.1.2) [Not assessed]

This process was not submitted for assessment.

4.4.3 Level 3: Support Support Service Problem Management (1.1.2.1.3) [Not assessed]

This process was not submitted for assessment.

4.4.4 Level 3: Enable Service Quality Management (1.1.2.1.4) [Not assessed]

This process was not submitted for assessment.

4.4.5   Level 3: Support Service and Specific Instance Rating (1.1.2.1.5)

Process Identifier: 1.1.2.1.5

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

4.4.5.1   Level 3: Support Service and Specific Instance Rating (1.1.2.1.5) – Mapping Details

NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

LEVEL 3 PROCESS MAPPING DETAILS
1.1.2.1.5 Support Service and Specific Instance Rating

Brief Description

Ensure that rating and tariff information is maintained for each service class, for use by Service & Specific Instance Rating. **A**

Extended description

The purpose of the Support Service & Specific Instance Rating processes ensure that rating and tariff information is maintained for each service class, for use by Service & Specific Instance Rating. **AM**

In RTTC, tariff information can be configured per service associated with the price plan. The tariff information includes the configuration of tariff matrix based on various parameters like operating circle, roaming etc. The base rate to be applied for a service will be derived from the tariff matrix when the charging request is processed. The rate level discounts to be applied on the tariff are also configurable per service of the price plan.

(**[PROV_MAN_SMP]**, **13 Tariff Matrix Configuration)** This section provides the details of the tariff configuration for various services

(**[PROV_MAN_SMP]**, **14 Tariff Offers Configuration)** This section provides the details of the tariff offers configuration of various services

They are also responsible for the processing of this information related to administration of the services **M**

The services and corresponding price plans are configured and administered in RTTC through service management point (GUI) which provides a graphical user interface.

(**[PROV_MAN_SMP]**, **7 Service Configuration)** This section provides the details of the service configuration of various services

([PROV_MAN_SMP]**, 15 Price Plans Configuration)** This section provides the details of the price plan configuration of various services

4.4.6   Supporting Evidence References (Works Cited)

[PROV_MAN_SMP]   RtTotalCharge Service Management Point (SMP) Provisioning Flow Manual

4.4.7   Level 2: SM&O Support & Readiness (1.1.2.1) – Conformance Scores

Table 4.4 SM&O Support & Readiness (1.1.2.1) – Conformance Scores

Level 2: 1.1.2.1 - SM&O Support & Readiness [1/5]		
Level 3 Process	**Level 4 Process**	**L4/L3 Process Score**
1.1.2.1.1 - Manage Service Inventory		*0*
1.1.2.1.2 - Enable Service Configuration & Activation		*0*
1.1.2.1.3 - Support Service Problem Management		*0*
1.1.2.1.4 - Enable Service Quality Management		*0*
1.1.2.1.5 - Support Service & Specific Instance Rating		**5**

4.5   Level 2: Service Guiding and Mediation (1.1.2.5)
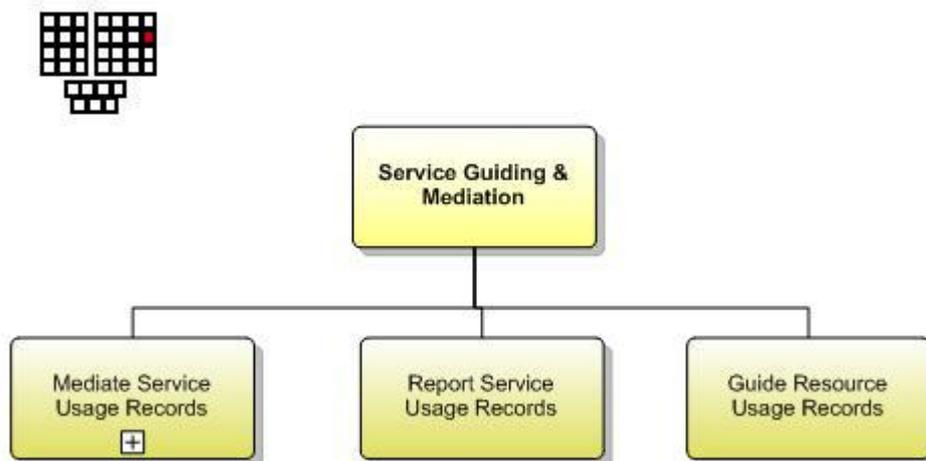
Figure 4.8 Service Guiding & Mediation decomposition into level 3 processes

Process Identifier: 1.1.2.5

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Manage usage events by correlating and formatting them into a useful format as well as guiding them to an appropriate service.

Extended Description

Service Guiding & Mediation processes manage usage events by correlating and formatting them into a useful format.   These processes include guiding resource events to an appropriate service, mediation of these usage records, as well as de-duplication of usage records already processed. These processes provide information on customer-related and Service-related events to other process areas across assurance and billing. This includes reports on non-chargeable events and overcharged events and analysis of event records to identify fraud and prevent further occurrences.

In many cases, this process is performed by a resource such as a network element.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.5.1   Level 3: Mediate Service Usage Records (1.1.2.5.1)

Figure 4.9 Mediate Service Usage Records decomposition into level 4 processes

Process Identifier: 1.1.2.5.1

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

Brief Description

Validate, normalize, convert and correlate usage records collected from the resource layer

Extended Description

The purpose of the Mediate Service Usage Records process is to validate, normalize, convert and correlate usage records collected. It also removes any duplicate usage records that have already been processed.

Explanatory

Reserved for future use.

Mandatory

Reserved for future use.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.5.1.1 L4: Validate Service Usage Record (1.1.2.5.1.1) – Mapping Details

Process Identifier: 1.1.2.5.1.1

Process Context

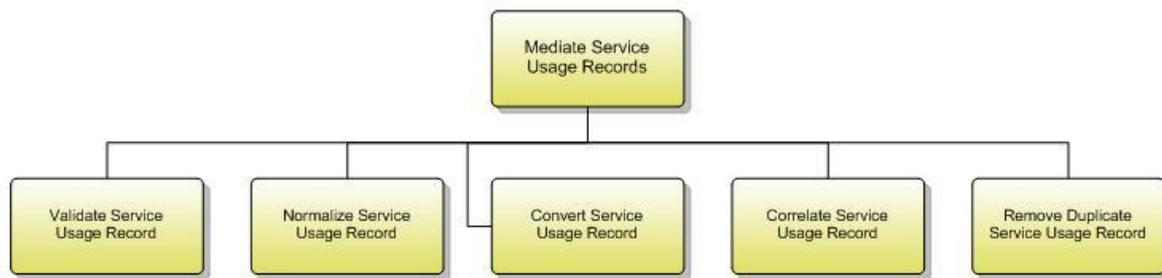This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

LEVEL 4 PROCESS MAPPING DETAILS
1.1.2.5.1.1 Validate Service Usage Record

Brief Description

Validate service usage records collected from the resource layer. **AM**

Extended Description

The purpose of Validate Service Usage Record process is to validate service usage records collected from the resource layer. This process is responsible for collecting the Service Usage Records, filtering out of non-billing relevant Service Usage Records and validating the Service Usage Records and their integrity. For example, checking loss of Service Usage Records, illegal characters in Service Usage Records, invalid field length in Service Usage Records, the service usage duration mismatching to start time and end time.

Explanatory

Reserved for future use.

Mandatory

The purpose of Validate Service Usage Record process is to validate service usage records collected from the resource layer. This process is responsible for collecting the Service Usage Records, filtering out of non-billing relevant Service Usage Records and validating the Service Usage Records and their integrity.. **A**

RTTC receives the service usage records from various network elements of resource layer like IMS-GW, P-CSCF, S-CSCF, RCSE, PGW, SGW etc. These charging records are received over the diameter protocol over Ro/Gy (online) and Rf/Gz (offline) interface.

Following are some of the validations done while processing the service usage records received as diameter messages.

- If there is any mismatch in the sequence of the diameter messages received from network (like CC-Req-No AVP sequence etc.,), the request will be rejected with an error code
- If any out of context diameter messages are received, the requests will be rejected with a relevant error code i.e., the a CCR-UPDATE/TERMINATE may be after session timeout in OCS

- In case of offline charging, diameter messages may be received with an error SIP cause code in some cases. Such records will not be rated

The fields in the service usage records are received in diameter protocol in the form of attribute-value pairs (AVP). Following are some of the validations done while processing the received AVPs in diameter message.

- If any malformed AVPs (like invalid data type, absence of all AVPs inside a grouped AVP etc.,) are received, the request will be rejected with an error code
- If the length of AVPs crosses the pre-defined limits, the request will be rejected with a relevant error code
- If any mandatory AVPs for application level processing are missing, the request will be rejected with a relevant error code

([POD_FDD], **3.1.1.SCUR/ECUR Initial**) –**Please refer the process flow and their process step & description**

([POD_FDD], **3.1.2.SCUR Update**) –**Please refer the process flow and their process step & description**

([POD_FDD], **3.1.3.SCUR/ECUR Terminate**) –**Please refer the process flow and their process step & description**

([POD_FDD], **3.1.4.IEC direct debit Request**) –**Please refer the process flow and their process step & description**

([POD_FDD], **3.1.5.IEC Refund Request**) –**Please refer the process flow and their process step & description**

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.5.1.2 L4: Normalize Service Usage Record (1.1.2.5.1.2) – Mapping Details

Process Identifier: 1.1.2.5.1.2

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

LEVEL 4 PROCESS MAPPING DETAILS 1.1.2.5.1.2 Normalize Service Usage Record
Brief Description Normalize service usage records to specific expression format. **AM** **Extended Description** The purpose of Normalize Service Usage Record process is to normalize Service Usage Records to specific expression format. Service Usage Records generated by different systems are used distinct expressions for same record data. For example, 10 min voice call can be either expressed by 4 indicators including start time, end time, duration and QoS, or expressed by 3 indicators excluding end time. This process is responsible for unifying all Service Usage Records to specific expression manner. **Explanatory** For example, 10 min voice call can be either expressed by 4 indicators including start time, end time, duration and QoS, or expressed by 3 indicators excluding end time.   **Mandatory** The purpose of Normalize Service Usage Record process is to normalize Service Usage Records to specific expression format. Service Usage Records generated by different systems are used distinct expressions for same record data. This process is responsible for unifying all Service Usage Records to specific expression manner. **A**   Most of the fields received in the service usage records are stored in the CDRs of RTTC. Some of them are directly extracted and stored. Some of them are converted in to a common format required by the downstream systems and stored in the CDR. Following are few examples of the same. The service delivery start and end timestamps received in the UTC format in offline charging are converted and stored in the Call Detail Records in "YYYYMMDD HHMiSS" format. Similarly, in online charging these fields in the Call Detail Records are derived from the current time or

event-timestamp information.

The roaming information will be received in a current operating circle (Inter-Operator-Identifier) format from the IMS network. The current circle will be mapped against the home circle of the subscriber and accordingly the roaming type (NON-ROAM, NATIONAL-ROAM, INTL-ROAM) will be derived and stored in the CDR.

The current location of the subscriber in IMS extracted from the Access-Network-Information AVP received on Ro and Rf interfaces. This information will be stored as a cell-identifier in CDR.

(**[IS_RF]**, **3.2 IMS Information AVPs in ACR Message)** The details of inter-operator-identifier, Access-Network-Information, SIP-Request-Timestamp, SIP-Response-Timestamp AVPs and other AVPs are mentioned in this section

(**[IS_RO_IMS]**, **3.3 IMS Information AVPs in CCR Message)** The details of Access-Network-Information and other AVPs are mentioned in this section

(**[IS_BX_CSV]**, **5.1 IMS Subsystem Level CDR)** The details of the roaming-indicator, Access-Network-Information, service request, delivery start and delivery end time and other fields are mentioned in this section

(**[IS_BO_CSV]**, **5.1 IMS Subsystem Level CDR)** The details of the roaming-indicator, Access-Network-Information, service request, delivery start and delivery end time and other fields are mentioned in this section

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.5.1.3 L4: Convert Service Usage Record (1.1.2.5.1.3) – Mapping Details

Process Identifier: 1.1.2.5.1.3

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

LEVEL 4 PROCESS MAPPING DETAILS
1.1.2.5.1.3 Convert Service Usage Record

Brief Description

Convert service usage records to specific record format. **AM**

Extended Description

The purpose of Convert Service Usage Record process is to convert Service Usage Records to specific record format. The Service Usage Records are collected from different upstream systems and stored in different file formats. This process is responsible for identifying the data formats of collected Service Usage Records and changing them to specific common data format for downstream system using. This process is also responsible for consolidating multiple Service Usage Records and producing more than one records from single Service Usage Record for varied billing requirements.

Explanatory

The Service Usage Records are collected from different upstream systems and stored in different file formats.

Mandatory

The purpose of Convert Service Usage Record process is to convert Service Usage Records to specific record format. This process is responsible for identifying the data formats of collected Service Usage Records and changing them to specific common data format for downstream system using. This process is also responsible for consolidating multiple Service Usage Records and producing more than one records from single Service Usage Record for varied billing requirements. **A**

RTTC receives the service usage records from various network elements of resource layer like IMS-GW, P-CSCF, S-CSCF, RCSE, PGW, SGW etc. These charging records are received over the diameter protocol over Ro/Gy (online) and Rf/Gz (offline) interface.

In case of online charging interface, the service usage records will be rated in real-time and stored in a specific CDR format. Three different CDR formats are maintained for IMS, PS and LCS charging. In case of IMS, online service usage records will be received from multiple network nodes like IMS-GW,

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RCSE, SIP-AS etc. The value of the fields from these various service usage records will be extracted, verified and stored in the IMS CDR format. In case of PS, the service usage records will be received from PGW and in case of LCS, they will be received from GMLC.

In case of offline charging interface, the service usage records will be rated in near real-time. Two different CDR formats are maintained for IMS and PS. In case of IMS, offline service usage records will be received from multiple network nodes like S-CSCF, P-CSCF, I-CSCF etc. In case of PS, offline charging records will be received from multiple network nodes like S-GW and P-GW. The records from different network nodes will be having different format of AVPs. These records will be correlated at the end of service/session in to a common CDR format - IMS/PS. The correlated CDRs will be rated.

For a single session specific service usage records, multiple CDRs may be dumped in scenarios like service change, tariff switch, plan change etc., during the session.

These three types of rated CDRs will be pushed to the FTP server for analytics and billing. The CDR formats will be shared with the systems like billing etc.

([IS_BX_CSV]**, 5.1 IMS Subsystem Level CDR)** The details of the roaming-indicator, Access-Network-Information, service request, delivery start and delivery end time and other fields are mentioned in this section

([IS_BO_CSV]**, 5.1 IMS Subsystem Level CDR)** The details of the roaming-indicator, Access-Network-Information, service request, delivery start and delivery end time and other fields are mentioned in this section

([POD_FDD]**, 27. CDR/TDR Generation)** This section provides the details of the CDR generation

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.5.1.4 L4: Correlate Service Usage Record (1.1.2.5.1.4) – Mapping Details

Process Identifier: 1.1.2.5.1.4

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

LEVEL 4 PROCESS MAPPING DETAILS
1.1.2.5.1.4 Correlate Service Usage Record

Brief Description

Correlate collected service usage records. **AM**

Extended Description

The purpose of Correlate Service Usage Record process is to correlate collected service usage records. Since the Service Usage Records are collected from different upstream system, sometime more than one Service Usage Records store same service consumption. In order to resolve this case, this process is responsible for identifying the correlative Service Usage Records and associating them together for downstream system use.

Explanatory

Since the Service Usage Records are collected from different upstream system, sometime more than one Service Usage Records store same service consumption.

Mandatory

The purpose of Correlate Service Usage Record process is to correlate collected service usage records. In order to resolve this case, this process is responsible for identifying the correlative Service Usage Records and associating them together for downstream system use. **A**

Two types of correlation happens in RTTC.

– Diameter session level correlation
– User session level correlation (from one or multiple nodes)

One is correlation of various diameter messages (service records) corresponding to a single session from a network node. The service usage records of a session for a particular duration will be sent over multiple diameter messages. These diameter messages are correlated based on the diameter session identifier.

User session is identified through {ICID (IMS charging identifier)+Call-Direction (Orig/Term)} in case of IMS and through {PGW-Address+3GPP-Charging-Id} in case of PS charging. Service Usage records of a session received from one or more (in case of offline charging) nodes will be correlated based on these identifiers. The correlated records will be rated and CDR will be dumped. These CDRs will pushed to the billing domain.

For example, in case of offline charging, service usage records for an IMS session will be received from nodes like P-CSCF, I-CSCF and S-CSCF. The records from these three nodes will be correlated and the correlated CDR will be rated.

For example, in case of online charging, initial service usage record may be sent by SIP-AS followed by IMS-GW for a particular session. RTTC correlates the IMS-GW record with SIP-AS record based on {ICID+Call-Direction} and accordingly responds to IMS-GW with CREDIT-CONTROL-NOT-APPLICABLE cause code as the session is already being rated from SIP-AS.

([POD_FDD]**, 3. Online Charging Models)** This section provides the details of correlation in online scenarios.

([POD_FDD]**, 4. Offline Charging Models)** This section provides the details of correlation in offline scenarios.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.5.1.5 L4: Remove Duplicate Service Usage Record (1.1.2.5.1.5) – Mapping Details

Process Identifier: 1.1.2.5.1.5

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (i.e. "instantiated") with other similar process elements for application within a specific organization or domain.

LEVEL 4 PROCESS MAPPING DETAILS 1.1.2.5.1.5 Remove Duplicate Service Usage Record
Brief Description Remove service usage records. **AM**   **Extended Description** The purpose of Remove Service Usage Record process is to remove any duplicate usage records that have already been processed or to achieve service usage records according to Service Provider's policy. This process includes detect duplicate records and removing them from billing process. The duplication detection is usually by checking the values of the key fields of Service Usage Records with combined criteria. Achieving service usage records is normally happened when the records are no need for further billing process.   **Explanatory** The duplication detection is usually by checking the values of the key fields of Service Usage Records with combined criteria. Achieving service usage records is normally happened when the records are no need for further billing process.   **Mandatory** The purpose of Remove Service Usage Record process is to remove any duplicate usage records that have already been processed or to achieve service usage records according to Service Provider's policy. This process includes detect duplicate records and removing them from billing process. **A**   The service usage records in RTTC are received over the diameter protocol from LTE and IMS networks. Duplicate record detection happens at two levels - diameter session level and IMS/PS session level. Diameter session is identified by a session-id AVP which will be set as a unique field in diameter online and offline charging requests from client network nodes. Before the response of a received

request is sent from RTTC to the network node for a request, if duplicate request is received with the same session-id, it will be rejected by RTTC with a relevant error code.

IMS session is identified by an ICID (IMS Charging Identifier) and Call-direction (Orig/Term) AVP values. If the call context for an ongoing session already exists in RTTC and a new credit-control request (INITIAL) is received with the same ICID and Call-direction for the same service, it will be rejected by RTTC with a relevant error code.

PS session is identified by an 3GPP-Charging-Id and PGW-Address AVP values. If the call context for an ongoing session already exists in RTTC and a new credit-control request (INITIAL) is received with the same 3GPP-Charging-Id and PGW-Address for the same service, it will be rejected by RTTC with a relevant error code.

([POD_FDD]**, 3. Online Charging Models)** This section provides the details of charging sessions.

([POD_FDD]**, 4. Offline Charging Models)** This section provides the details of charging sessions.

Optional

Reserved for future use.

Interactions

Reserved for future use.

4.5.2   Level 3: Report Service Usage Records (1.1.2.5.3)

Process Identifier: 1.1.2.5.3

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

4.5.2.1 Level 3: Report Service Usage Records (1.1.2.5.3) – Mapping Details
NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

LEVEL 3 PROCESS MAPPING DETAILS 1.1.2.5.3 Report Service Usage Records
Brief Description Generate reports on usage records based on requests from other processes. **AM** **Extended description** The purpose of the Report Service Usage Record processes is to generate reports on service usage records based on requests from other processes. **A** The service usage records from the network will be validated, normalized and converted in to CDR/TDRs. The CDR/TDR history data in the form of CSV files will be provided to downstream systems for analytics and generating reports. ([IS_BO_CSV], **5.1 IMS Subsystem Level CDR)** The details of the fields in IMS online CDR which will be sent to downstream systems is mentioned in this section ([IS_BO_CSV], **5.2 Bearer Level PS Domain CDR)** The details of the fields in PS online CDR which will be sent to downstream systems is mentioned in this section ([IS_BO_CSV], **5.3 LCS CDR)** The details of the fields in LCS online CDR which will be sent to downstream systems is mentioned in this section ([IS_BX_CSV], **5.1 IMS Subsystem Level CDR)** The details of the fields in IMS offline CDR which will be sent to downstream systems in mentioned in this section ([IS_BX_CSV], **5.2 Bearer Level PS Domain CDR)** The details of the fields in PS offline CDR which will be sent to downstream systems in mentioned in this section ([IS_TDR_CSV], **5.1 Recharge TDR)** The details of the recharge transaction detail record which will be sent to downstream systems is mentioned in this section These processes produce reports that may identify abnormalities, which may be caused by

fraudulent activity or related to customer complaints.

Not in scope in OCS/OFCS i.e., RTTC.

4.5.3   Level 3: Guide Service Usage Records (1.1.2.5.4)

Process Identifier: 1.1.2.5.4

Process Context

This process element represents part of the overall enterprise, modeled in business process terms, and can be applied (ie "instantiated") with other similar process elements for application within a specific organization or domain.

4.5.3.1 Level 3: Guide Resource Usage Records (1.1.2.5.4) – Mapping Details

NOTE: No decomposition to Level 4 processes, hence mappings provided against the Level 3 process descriptions and implied tasks.

LEVEL 3 PROCESS MAPPING DETAILS **1.1.2.5.4 Guide Service Usage Records**
Brief Description Relates the usage record to the appropriate service. **AM** **Extended description** The Guide Resource Usage Records process converts/relates the record to the appropriate service. **A** Guides the service usage records received over diameter to appropriate IMS/PS/LCS service specific CDR. Also guides the recharge, one-time and recurring-charge records to service specific Transaction Detail Record. All these service specific records will be guided to appropriate downstream systems (Billing/Revenue Assurance/Fraud Management/Recharge & Dealer Management/ Customer Care etc.) based on their service type. ([IS_RO_IMS]**, 3. Credit-Control Request Message)** This section provides the details of the IMS online service usage records received over diameter. ([IS_RO_LCS]**, 3. Credit-Control Request Message)** This section provides the details of the LCS online service usage records received over diameter. ([IS_RF]**, 3. Accounting Request Message)** This section provides the details of the IMS offline accounting service usage records received over diameter. ([IS_GY]**, 3. Credit-Control Request Message)** This section provides the details of the PS (LTE) online service usage records received over diameter. ([IS_GZ]**, 3. Accounting Request Message)** This section provides the details of the PS (LTE) offline accounting records received over diameter.   ([IS_BO_CSV]**, 5.1 IMS Subsystem Level CDR)** The details of the fields in IMS online CDR which will

be sent to downstream systems is mentioned in this section

([IS_BO_CSV], **5.2 Bearer Level PS Domain CDR)** The details of the fields in PS online CDR which will be sent to downstream systems is mentioned in this section

([IS_BO_CSV], **5.3 LCS CDR)** The details of the fields in LCS online CDR which will be sent to downstream systems is mentioned in this section

([IS_BX_CSV], **5.1 IMS Subsystem Level CDR)** The details of the fields in IMS offline CDR which will be sent to downstream systems in mentioned in this section

([IS_BX_CSV], **5.2 Bearer Level PS Domain CDR)** The details of the fields in PS offline CDR which will be sent to downstream systems in mentioned in this section

([IS_TDR_CSV], **5.1 Recharge TDR)** The details of the recharge transaction detail record which will be sent to downstream systems is mentioned in this section

In many cases, this process is performed by a resource such as a network element.

Not in scope in OCS/OFCS i.e., RTTC.

4.5.4   Supporting Evidence References (Works Cited)

[IS_BO_CSV]   RtTotalCharge Bo Interface Specification - CSV.doc

[IS_BX_CSV]   RtTotalCharge Bx Interface Specification - CSV.doc

[IS_RO_IMS]   RtTotalCharge Ro (IMS) Interface Specification

[IS_RO_LCS]   RtTotalCharge Ro (LCS) Interface Specification

[IS_RF]   RtTotalCharge Rf Interface Specification

[IS_GY]   RtTotalCharge Gy Interface Specification

[IS_GZ]   RtTotalCharge Gz Interface Specification

[POD_FDD]   RtTotalCharge - Feature Description Document

[IS_TDR_CSV]   RtTotalCharge TDR Transfer Interface Specification

4.5.5   Level 2: Service Guiding & Mediation (1.1.2.5) – Conformance Scores

Table 4.5 Service Guiding & Mediation (1.1.2.5) – Conformance Scores

Level 2: 1.1.2.5 - Service Guiding & Mediation [3/3]		
Level 3 Process	**Level 4 Process**	**L4/L3 Process Score**
1.1.2.5.1 - Mediate Service Usage Records		**5**
	1.1.2.5.1.1 - Validate Service Usage Record	100%
	1.1.2.5.1.2 - Normalize Service Usage Record	100%
	1.1.2.5.1.3 - Convert Service Usage Record	100%
	1.1.2.5.1.4 - Correlate Service Usage Record	100%
	1.1.2.5.1.5 - Remove Duplicate Service Usage Record	100%
1.1.2.5.3 - Report Service Usage Records		**4**
1.1.2.5.4 - Guide Resource Usage Records		**4.5**

5 Information Framework Assessment Overview

5.1 Mapping Technique Employed

The certification scope defines the list of ABEs (Aggregated Business Entities) to be addressed during the assessment. The entities, association classes and dependent entities for each ABE in scope are also included in the assessment.

The mapping technique used, was based on the analysis of the SID model files and addendum specifications for the entities', association classes' in scope and its related attributes. The role of each entity', association class or attribute is then interpreted and mapped into the RT Total Charge information model related element. This will clearly state how the SID model is supported by RT Total Charge.

5.2 Information Framework Assessment - ABE Scope

The diagram in Figure 5.1 illustrates the Information Framework Level 1 ABEs that were presented in scope for the Assessment, and the textual callouts represent the domain areas of Rancore Technologies's RT Total Charge that were assessed and support the corresponding SID ABEs.

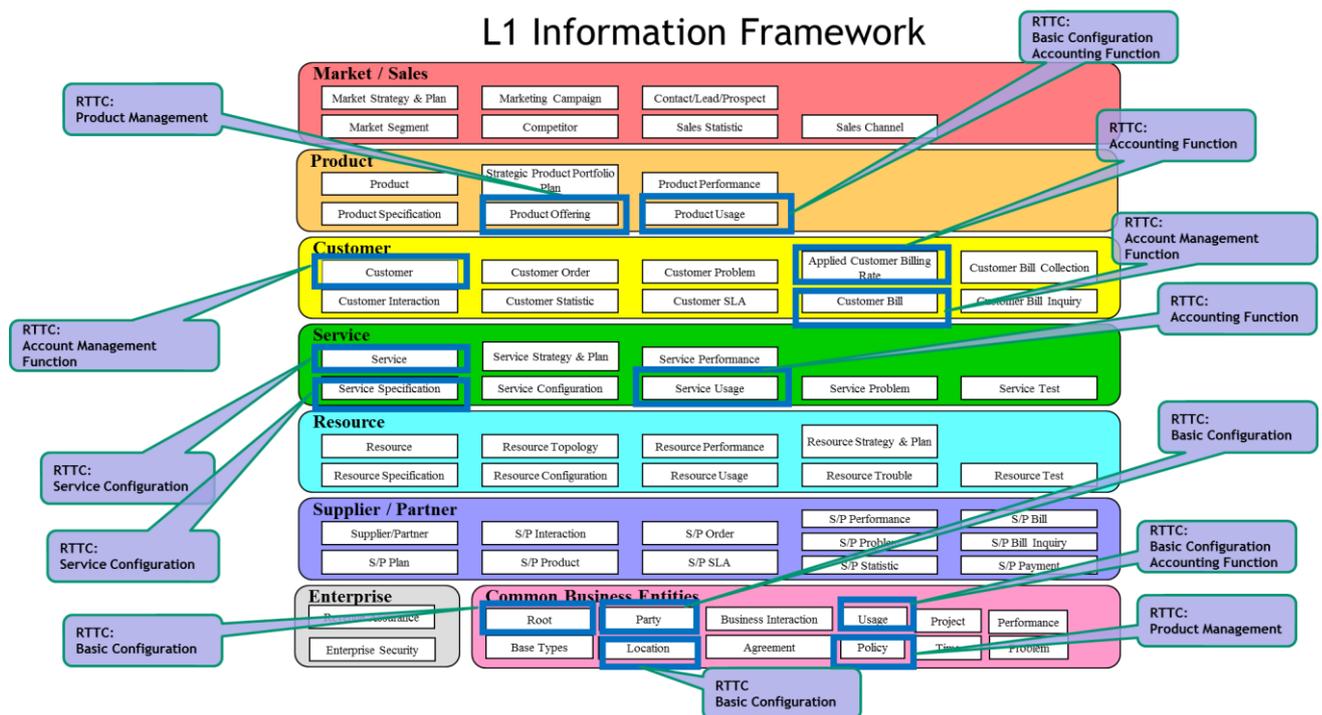**Figure 5.1 Level 1 ABEs in scope for Rancore Technologies's RT Total Charge Assessment**

5.3 Product Scope

The diagram in Figure 5.2 represents Rancore Technologies´s RT Total Charge and how it is mapped to the Information Framework Level 1 ABEs that were assessed as part of this Frameworx Conformance Assessment.
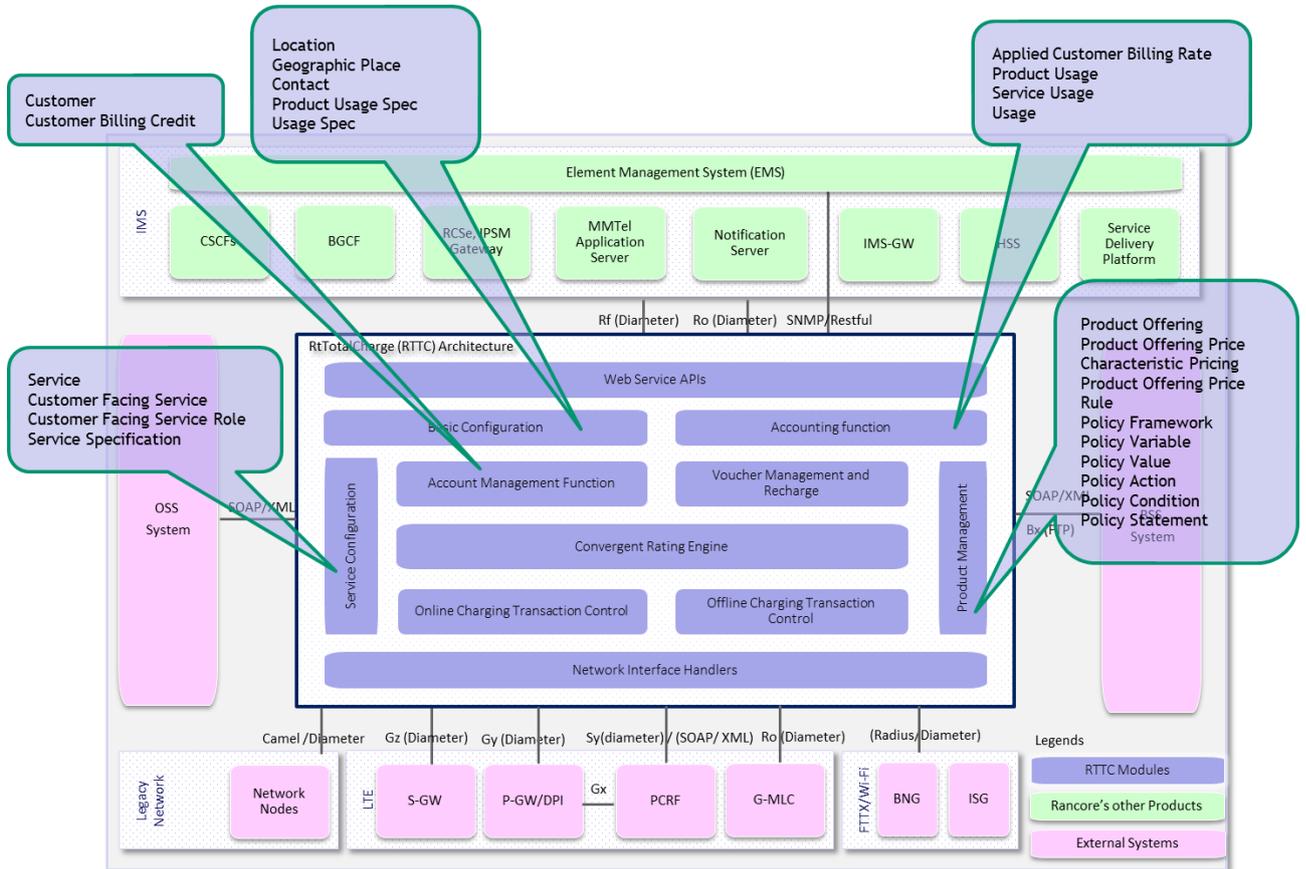

Figure 5.2 RT Total Charge Product Footprint: Product Scope for SID Assessment

6 Frameworx Conformance Result

This section details the Scores awarded to reflect Conformance of Rancore Technologies´s RT Total Charge to the Business Process Framework & Information Framework components of Frameworx 12.

6.1 Business Process Framework – Scoring Rules

The conformance scores granted were based on the following TM Forum scoring rules:

Frameworx 12.0 Conformance Certification (Product/Solution/Implementation)		
Business Process Framework (eTOM) - Conformance Level Descriptions (Level 3 processes)		
Process level	**Conformance Score**	**Qualifier**
Level 1	Not applicable	Conformance Assessment shall not be carried out at this process level - hence Confomance Level shall not be awarded at this level.
Level 2	Not applicable	A conformance level is not awarded to Level 2 processes in Frameworx 12.0 Assessments. The Certification Report shall highlight the coverage of a Level 2 process submitted in scope for an Assessment in terms of number of Level 3 processes submitted for assessment out of the total number defined for the Level 2 process.
Level 3	Score is awarded between 3.1 & 5.	The Conformance Score is awarded for each Level 3 processes submitted in scope for the Assessment. The Conformance Score awarded can be a value between 3.1 & 5 depending on the level of coverage & conformance to the Level 3 process based on the alignment to the level 3 Implied Tasks as decomposed in the Level 4 process definitions. *Any manual implementation of the process support shall be noted in the Conformance Report and Detailed Results Report.*

Figure 6.1 TM Forum Business Process Framework: Conformance Scoring Rules

6.2   Business Process Framework - Conformance Result Summary

The graphs in this section provide an overview of the conformance levels granted to the Level 3 Processes presented in scope for Rancore Technologies´s RT Total Charge Assessment. Each Level 3 process was measured using a Business Process Framework (eTOM) conformance score according to level of Conformance – Full Conformance or Partial Conformance as described in section 6.1 Business Process Framework – Scoring Rules.
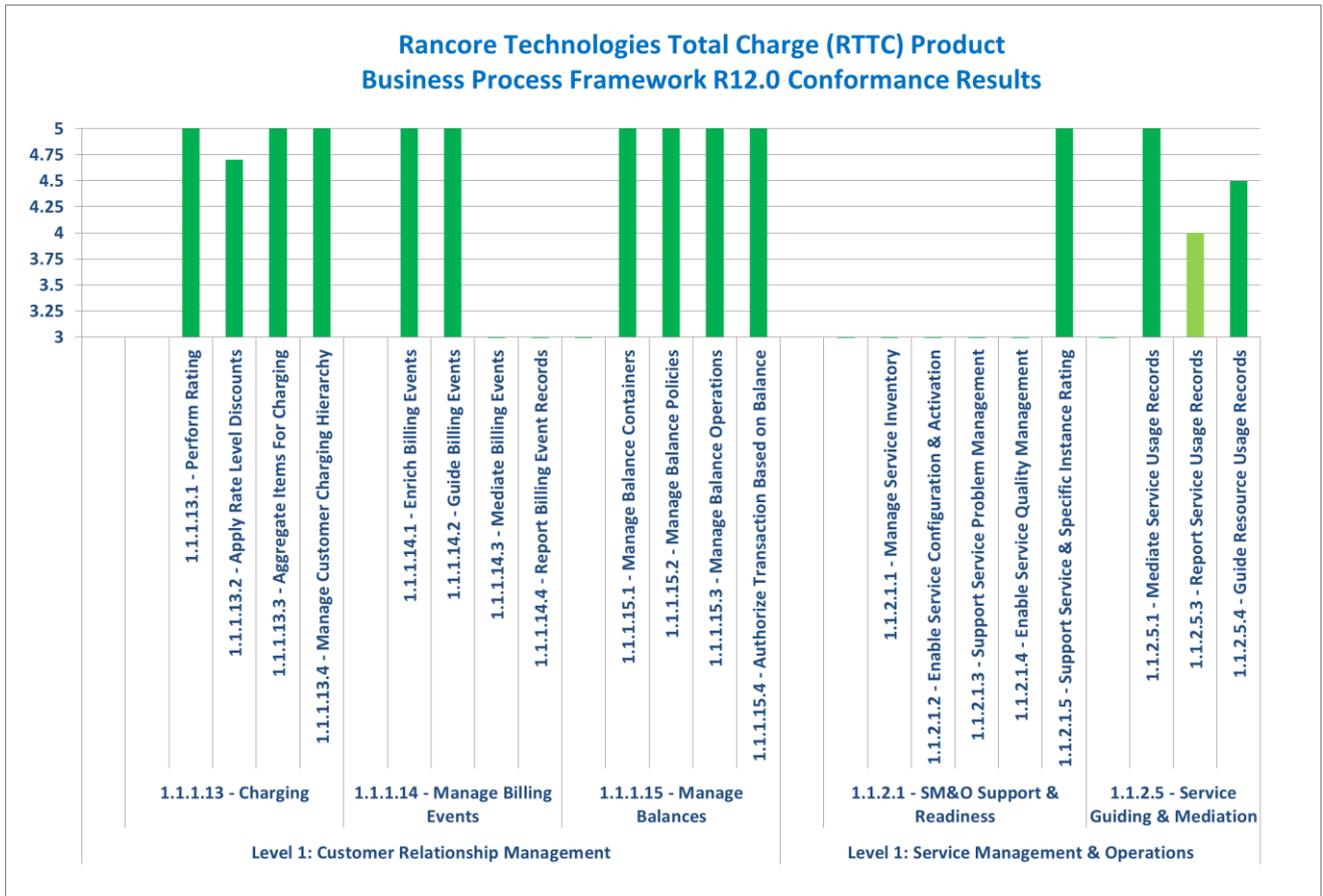

Figure 6.2 Business Process Framework: Conformance Result Summary

6.3 Business Process Framework – Detailed Conformance Results

The following table provides a more detailed breakdown of the scores awarded with some additional commentary

Table 6.1 Business Process Framework: Detailed Conformance Results

Rancore Technologies Total Charge (RTTC) Product Business Process Framework (eTOM) Release 12.0 Conformance		
Business Process Framework Process	**L3 Process Score [L2 Coverage]**	**Comments**
Level 1: 1.1.1 - Customer Relationship Management		
Level 2: 1.1.1.13 - Charging	**[4/4]**	
1.1.1.13.1 - Perform Rating	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
1.1.1.13.2 - Apply Rate Level Discounts	4.7	**Partially Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM) but with some deviations. See Mapping Table for more details.
1.1.1.13.3 - Aggregate Items For Charging	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).

Business Process Framework Process	L3 Process Score [L2 Coverage]	Comments
Rancore Technologies Total Charge (RTTC) Product Business Process Framework (eTOM) Release 12.0 Conformance		
1.1.1.13.4 - Manage Customer Charging Hierarchy	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
Level 2: 1.1.1.14 - Manage Billing Events	**[2/4]**	
1.1.1.14.1 - Enrich Billing Events	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
1.1.1.14.2 - Guide Billing Events	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
1.1.1.14.3 - Mediate Billing Events	*0*	*Not assessed.*
1.1.1.14.4 - Report Billing Event Records	*0*	*Not assessed.*
Level 2: 1.1.1.15 - Manage Balances	**[4/4]**	
1.1.1.15.1 - Manage Balance Containers	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).

Rancore Technologies Total Charge (RTTC) Product Business Process Framework (eTOM) Release 12.0 Conformance		
Business Process Framework Process	**L3 Process Score [L2 Coverage]**	**Comments**
1.1.1.15.2 - Manage Balance Policies	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
1.1.1.15.3 - Manage Balance Operations	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
1.1.1.15.4 - Authorize Transaction Based on Balance	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
Level 1: 1.1.2 - Service Management & Operations		
Level 2: 1.1.2.1 - SM&O Support & Readiness	**[1/5]**	
1.1.2.1.1 - Manage Service Inventory	*0*	*Not assessed.*
1.1.2.1.2 - Enable Service Configuration & Activation	*0*	*Not assessed.*
1.1.2.1.3 - Support Service Problem Management	*0*	*Not assessed.*
1.1.2.1.4 - Enable Service Quality Management	*0*	*Not assessed.*

Rancore Technologies Total Charge (RTTC) Product Business Process Framework (eTOM) Release 12.0 Conformance		
Business Process Framework Process	**L3 Process Score [L2 Coverage]**	**Comments**
1.1.1.1.15 - Support Service & Specific Instance Rating	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
Level 2: 1.1.2.5 - Service Guiding & Mediation	**[3/3]**	
1.1.2.5.1 - Mediate Service Usage Records	5	**Fully Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM).
1.1.2.5.3 - Report Service Usage Records	4	**Partially Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM) but with some deviations. See Mapping Table for more details.
1.1.2.5.4 - Guide Resource Usage Records	4.5	**Partially Conformant** Supporting evidence and documentation submitted for the assessment of this level 3 process fulfilled alignment criteria with the standard Business Process Framework (eTOM) but with some deviations. See Mapping Table for more details.

6.4   Information Framework – Scoring Rules

The conformance scores granted were based on the following TM Forum scoring rules:

Frameworx 12.0 Conformance Certification (Product/Solution/Implementation)	
Information Framework (SID) - Conformance Score Descriptions	
Conformance Score	**Qualifier**
Non Conformance [Score = 1]	The content of the model is compatible with a subset of the Information Framework (SID) ABEs that define its domain coverage. This provides two interacting components/solutions with a common vocabulary and model structure. The subset represents the scope of the model, expressed in Information Framework (SID) domains
Non Conformance [Score = 2]	The model has passed level 1 conformance and the content of the ABE, part of the domain coverage and defined in the model, contains the ABE's core business entity or entities. A core business entity is an entity upon which other entities within the ABE are dependent. e.g. Service in the Service ABE. A core entity is also an entity whose
Very Low Conformance [2.0 < Score <= 3.0]	The model has passed level 2 conformance and *a percentage of the required attributes of the ABE's core entity or entities are defined in the model.
Low Conformance [3.0 < Score <= 4.0]	The model has passed level 3 conformance and *a percentage of the dependent entities within the ABE are defined in the model. A dependent entity is one whose instances are dependent on an instance of a core entity. For example, a ServiceCharacteristic instance within the Service ABE is dependent upon an instance of the Service entity.
Medium Conformance [4.0 < Score <= 5.0]	The model has passed level 4 conformance and *a percentage of the required attributes of the ABE's dependent entities are defined in the model.
High Conformance [5.0 < Score <= 6.0]	The model has passed level 5 conformance and *a percentage of all attributes of the ABE's core entities are defined in the model.
Very High Conformance [6.0 < Score < 7.0]	The model has passed level 6 conformance and *a percentage of all attributes of the ABE's dependent entities are defined in the model.
Full Conformance [Score = 7.0]	The model has achieved Level 7 conformance (Full Conformance) and all attributes of the ABE's core & dependent entities are defined in the model.
* For each level, according to what is required, a value is calculated based on the percentage of entities/attributes supported - as appropriate. This will result in a decimal figure (rounded to one decimal place).	

Figure 6.3 TM Forum Information Framework: Conformance Scoring Rules

Notes:

A **core business entity** is an entity upon which other entities within the ABE are dependent. For example, Service in the Service ABE. A model should strive to attain as high a level of Information Framework (SID) conformance as possible. A core entity is also an entity whose absence in the ABE would make the ABE incomplete.

*A **dependent entity** is one whose instances are dependent on an instance of a core entity. For example, a ServiceCharacteristic instance within the Service ABE is dependent upon an instance of the Service entity.*

6.5   Information Framework – Conformance Result Summary

The following graphs provide an overview of the conformance levels granted to the ABEs presented in scope for Rancore Technologies´s RT Total Charge Information Framework Assessment. Each ABE was measured using an Information Framework (SID) conformance scale of 1–7 as described in section 6.4.
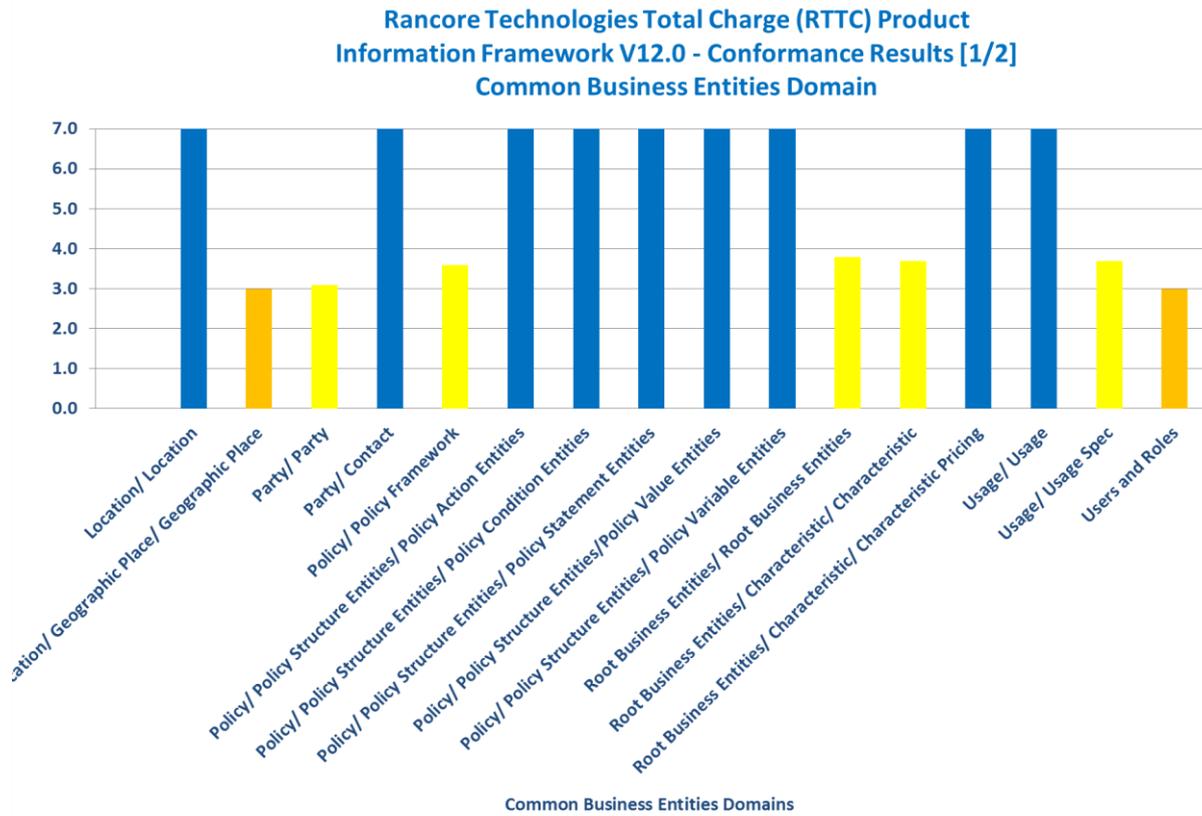

Figure 6.4 Information Framework: Conformance Result Summary CBE Domain
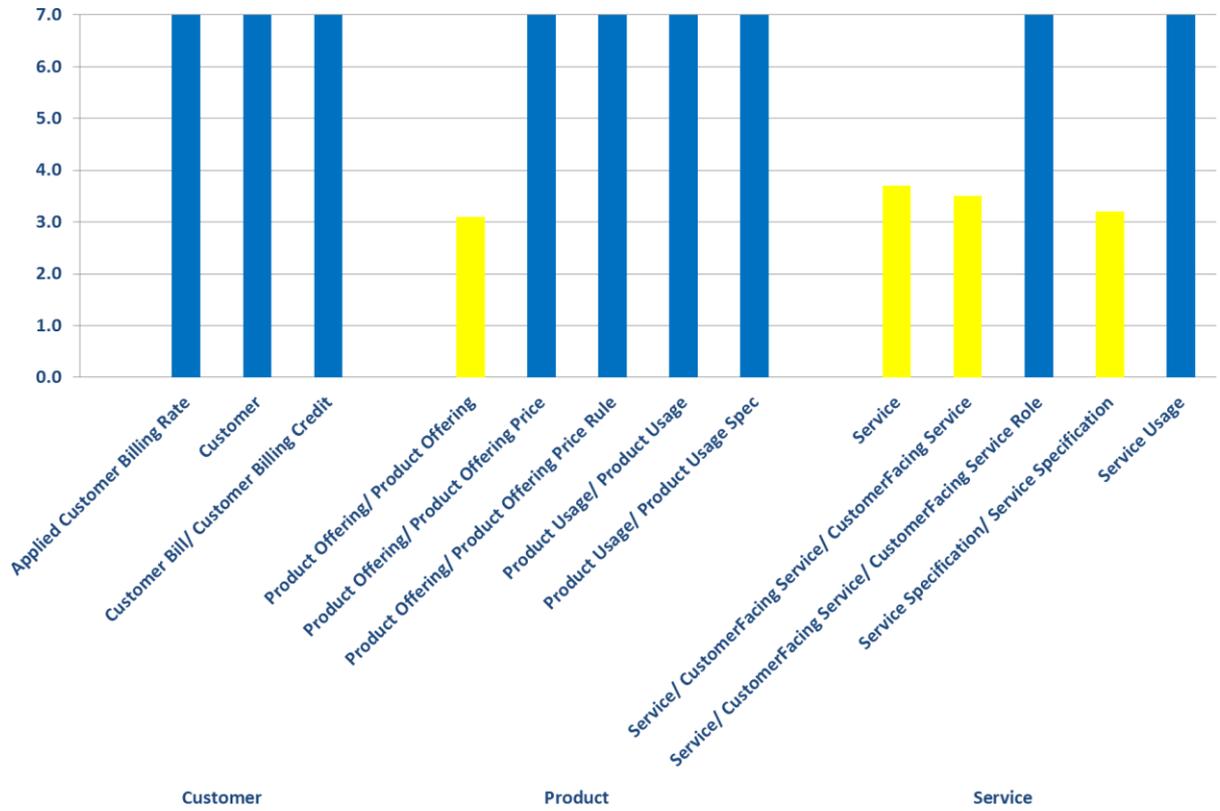
Figure 6.5 Information Framework: Conformance Result Summary Customer, Product & Service Domains

6.6   Information Framework – Detailed Conformance Result

The following table provides a more detailed breakdown of the scores awarded with some additional commentary.

Table 6.2 Information Framework: Detailed Conformance Result

Rancore Technologies Total Charge (RTTC) Product Information Framework (SID) R12.0 - Conformance Scores		
ABE	**Conformance Score**	**Comment**
Common Business Entities Domain		
Location/ Location	7.0	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Location/ Geographic Place/ Geographic Place	3.0	Core entity + 100% required attributes supported. No dependent entities supported.
Party/ Party	3.1	Core entity, required attributes, 10% of dependent entities supported.
Party/ Contact	7.0	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Policy/ Policy Framework	3.6	Core entity, required attributes, 60% of dependent entities supported.
Policy/ Policy Structure Entities/ Policy Action Entities	7.0	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.

Rancore Technologies Total Charge (RTTC) Product Information Framework (SID) R12.0 - Conformance Scores		
ABE	**Conformance Score**	**Comment**
Policy/ Policy Structure Entities/ Policy Condition Entities	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Policy/ Policy Structure Entities/ Policy Statement Entities	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Policy/ Policy Structure Entities/Policy Value Entities	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Policy/ Policy Structure Entities/ Policy Variable Entities	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Root Business Entities/ Root Business Entities	**3.8**	Core entity, required attributes, 80% of dependent entities supported.
Root Business Entities/ Characteristic/ Characteristic	**3.7**	Core entity, required attributes, 70% of dependent entities supported.
Root Business Entities/ Characteristic/ Characteristic Pricing	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Usage/ Usage	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.

Rancore Technologies Total Charge (RTTC) Product Information Framework (SID) R12.0 - Conformance Scores		
ABE	**Conformance Score**	**Comment**
Usage/ Usage Spec	**3.7**	Core entity, required attributes, 70% of dependent entities supported.
Users and Roles	**3.0**	Core entity + 100% required attributes supported. No dependent entities supported.
Customer Domain		
Applied Customer Billing Rate	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Customer	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Customer Bill/ Customer Billing Credit	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Product Domain		
Product Offering/ Product Offering	**3.1**	Core entity, required attributes, 10% of dependent entities supported.
Product Offering/ Product Offering Price	**7.0**	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.

**Rancore Technologies Total Charge (RTTC) Product Information Framework (SID) R12.0 - Conformance Scores**		
ABE	**Conformance Score**	**Comment**
Product Offering/ Product Offering Price Rule	7.0	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Product Usage/ Product Usage	7.0	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Product Usage/ Product Usage Spec	7.0	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
**Service Domain**		
Service	3.7	Core entity, required attributes, 70% of dependent entities supported.
Service/ CustomerFacing Service/ CustomerFacing Service	3.5	Core entity, required attributes, 50% of dependent entities supported.
Service/ CustomerFacing Service/ CustomerFacing Service Role	7.0	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.
Service Specification/ Service Specification	3.2	Core entity, required attributes, 20% of dependent entities supported.
Service Usage	7.0	Core entity, required attributes, dependent entities, required attributes of dependent entities, all attributes of the core entity, all attributes of dependent entities supported.