Introducing Telco Service & Analytics Manager Applications

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edocs, Inc., One Apple Hill Dr., Natick, MA 01760

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Preface

In This Section

Using this Manual

Welcome to Introducing edocs Telco Service & Analytics Manager Applications.

This manual covers the different components that make up Telco Service & Analytics Manager Applications along with an introduction to their principal features.

Before You Get Started

You should be familiar with the following:

- Your TSM architecture.
- Your TSM features.
- Programming Java and Java server pages.
- Designing or working with relational databases.
- Designing or working with extensible Markup Language (XML).

Who Should Read this Manual

This manual is for anybody who wants to learn more about Telco Service & Analytics Manager.

How this Manual is Organized

This manual contains the following chapters:

- **Introducing the edocs Telco Solutions**

  This chapter introduces Telco Service & Analytics Manager and its architecture.

  It contains information about:

  - Telco Service & Analytics Manager
  - Important Concepts
  - System architecture

- **What's New in this Version**

  This chapter covers the new and enhanced features of this version.

- **Main Functional Features**

  This chapter covers all of the functional features of Telco Service Manager (TSM).

- **Main Technical Features**

  This chapter covers the technical features of Telco Service Manager (TSM).

What Typographical Changes and Symbols Mean

This manual uses the following conventions:

TYPEFACE	MEANING	EXAMPLE
Italics	Manuals, topics or other important items	Refer to *Developing Connectors*.
Small Capitals	Software and Component names	Your application uses a database called the CID.
Fixed Width	File names, commands, paths, and on screen commands	Go to `//home/my file`

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If you received an edocs product installation CD, load it on your system and navigate from its root directory to the folder where the software installer resides for your operating system. You can run the installer from that location, or you can copy it to your file system and run it from there. The product documentation included with your CD is in the Documentation folder located in the root directory. The license key information for the products on the CD is included with the package materials shipped with the CD.

Finding the Information You Need

The product suite comes with comprehensive documentation set that covers all aspects of building solutions based on the edocs Telco Service & Analytics Manager. You should always read the release bulletin for late-breaking information.

Getting Started

If you are new to the edocs Telco Solutions, you should start by reading *Introducing Telco Service & Analytics Manager Applications*. This manual contains an overview of the various components along with the applications and their features. It introduces various concepts and components you must be familiar with before moving on to more specific documentation. Once you have finished, you can read the manual which covers different aspects of working with the application. At the beginning of each manual, you will find an introductory chapter which covers concepts and tasks.

Designing Your Solution

While reading *Introducing Telco Service & Analytics Manager Applications*, you should think about how the different components can address your solution's needs.

You can refer to *Developing Telco Service Manager (TSM)* for information about extending the object model, application security, and other design issues. The *CID Reference Guide* also gives you the information about how the information in your solution is managed and stored.

You can refer to *Developing Telco Analytics Manager (TAM)* for information about customizing the database, synchronizing data with TSM, loading data from external invoice files, and other design issues. The *CBU Reference Guide* also gives you the information about how the information in your solution is managed and stored. You should also read the section on integrating TAM with TSM in *Developing Telco Analytics Manager (TAM)*.

You can also read the introduction of *Developing Connectors* for information about integrating your solution.

Installing Telco Service & Analytics Manager Applications

You should start by reading the Release Bulletin. For detailed installation and configuring information, refer to *Installing Telco Service & Analytics Manager Applications*. This manual covers installing applications on one or more computers. It also contains the information you need to configure the different components you install.

You might also refer to *Developing Telco Service & Analytics Manager Applications* and *Developing Connectors* as these manuals contain information on customizing applications and working with other software.

If you are upgrading, be sure to read *Migrating Telco Service & Analytics Manager Applications*.

Building Your Solution

If you are designing and programming your solution, you have several different sources of information. If you are programming the user interface of the solution, you should read *Developing User Interfaces*. You also refer to the *BLM Specification* and *JSPF specification* for detailed information about programming the user interface. For configuring the various components, you refer to *Installing Telco Service & Analytics Manager Applications* and sections in other documents which deal with the component to configure.

If you are designing and programming TAM, you have several different sources of information. If you are programming the user interface of the solution, you should read *Developing Reports*. You also refer to the *QRA API Specification* and the *QRA Configuration File Reference Documentation* for detailed information about the different components you can use to build reports. For configuring the various components, you refer to *Installing Telco Service & Analytics Manager Applications* and sections in other documents which deal with the component to configure.

If you are working with the business logic of your solution, you should read *Developing Telco Service Manager (TSM)*. You can also refer to the *BLM Reference Guide* for more information about the design and structure of the BLM object model. For information about how this information is stored, you should refer to the *CID Reference Guide* along with the *CID Reference* documentation for your database. In order to develop your application, you most likely will need to install and run the Loopback Connector. This component mimics back-end applications for development purposes. For information about installing and running this component, refer to *Using the Loopback Connector*.

If you are working on the data warehouse side of TAM, you should read *Developing Telco Analytics Manager (TAM)*. For more information about the design and structure of the CBU, you should refer to the *CBU Reference Guide* along with the *CBU Reference* documentation for your database. You should also read *Developing Telco Analytics Manager (TAM)* for information about synchronizing data between the TAM and *Telco Service Manager (TSM)*. In this manual, you will also find information about loading data in both the CBU and the CID.

For more information about integrating your application, you should read *Building Connectors* to learn how Telco Service & Analytics Manager applications work with different software.

Integrating Your Solution

If you are involved in configuring your solution to work with Operation Support Software (OSS), you should read *Building Connectors*. This manual helps you understand the integration architecture and shows you how to build connectors to connect to today's market-leading OSS software. You can also read *Using the Loopback Connector* for information about a connector built for development purposes. Other manuals you can refer to for information about configuring your application include *Introducing Telco Service & Analytics Manager Applications, Developing Telco Analytics Manager (TAM),* and *Developing Telco Service Manager (TSM)*.

Managing Telco Service & Analytics Manager Applications

If you are responsible for managing Telco Service & Analytics Manager applications, you should read the *Installing Telco Service & Analytics Manager Applications* for information about configuring various components and information about working with different application servers. *Administrating Telco Service & Analytics Manager Applications* covers what you need to know about managing your solution at runtime. For information about OSS systems, you should read *Building Connectors*.

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Melbourne, Australia
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- What were you doing when the problem occurred?
- How did the system respond to the error?
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- If the system wrote information to a log file, please send us that log file.

If the system crashed or hung, please tell us.

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CHAPTER 1

Introducing the edocs Telco Solutions

In This Section

Introducing Telco Service & Analytics Manager

edocs's customer self-service (CSS) solution, Telco Service & Analytics Manager, enables communications service providers to deliver a personalized, self-service customer portal, providing online account management, e-Commerce and electronic bill analysis.

Telco Service & Analytics Manager allows consumers, business customers and POS employees to activate and manage subscriptions, buy new products and services, review, investigate and pay bills, resolve problems, and analyze every aspect of the service relationship using virtually any commercially available communications device.

The Telco Service Manager (TSM)

The Telco Service Manager (TSM) in the edocs Telco Solutions are:

- Telco Service Manager Channel Activator

  This application enables dealers and retail point-of-sale locations to acquire and activate new customer accounts online.

- Telco Service Manager Consumer Edition

  This application delivers self-service for consumers, allowing them to purchase and upgrade contracts online, purchase and personalize the delivery of value added services, view and pay bills, top-up a prepaid account, manage personal information, including handset phone book data and manage all aspects of their accounts directly.

- Telco Service Manager Business Edition

  This application delivers sales and activation reporting, customer support and general performance analysis for managers in the sales channel or channel managers within the service provider.

The Telco Analytics Manager (TAM)

The Telco Analytics Manager (TAM) in the edocs Telco Solutions are:

- Telco Analytics Manager Customer Analysis

  This application enables the analysis and presentation of user invoice and usage information.

Overview of Telco Service & Analytics Manager's Architecture

The Telco Service & Analytics Manager system architecture is based on the object model of a typical communications service provider. Telco Service & Analytics Manager provides quicker time-to-market and combines the benefits of a custom-built application with a generic solution. Based on market leading technologies and standards such as XML and Java, Telco Service & Analytics Manager not only provides the features you need, but also ensures an open and flexible architecture for your applications.

Telco Service & Analytics Manager runs as a Java application on any J2EE-compliant application server. Users can access the system through almost any commercially available electronic communications device – PC, voice (via a voice browser), interactive TV, WAP and GPRS handsets, PDA or any other handheld device. The application runs autonomously from the service providers' existing business and operational support systems, but is integrated with them to ensure that customer changes and other reference data are synchronized.

Telco Service & Analytics Manager offers features for the CSP or systems integrator. These features make it possible to customize various aspects of the application:

- JSP-based user interface, to incorporate a specific look-and-feel
- JSP/XML- based application workflow, to provide a unique user experience
- Java classes-based business logic, to extend the base functionality delivered with the application, and to enable integration of other systems directly into the application such as a specific security system, profiling system, churn detection system, and so on.
- Localization of the user interface, to enable users to view their accounts in their local language

Telco Service & Analytics Manager gives users a personalized experience that reflects their needs, such as:

- Individual look-and-feel, workflow, language, delivered features, etc.
- Multi-channel access - the application generates HTML or WML dynamically, based on both the user's profile and the device through which he or she accesses the system.

Telco Service & Analytics Manager provides a powerful security framework:

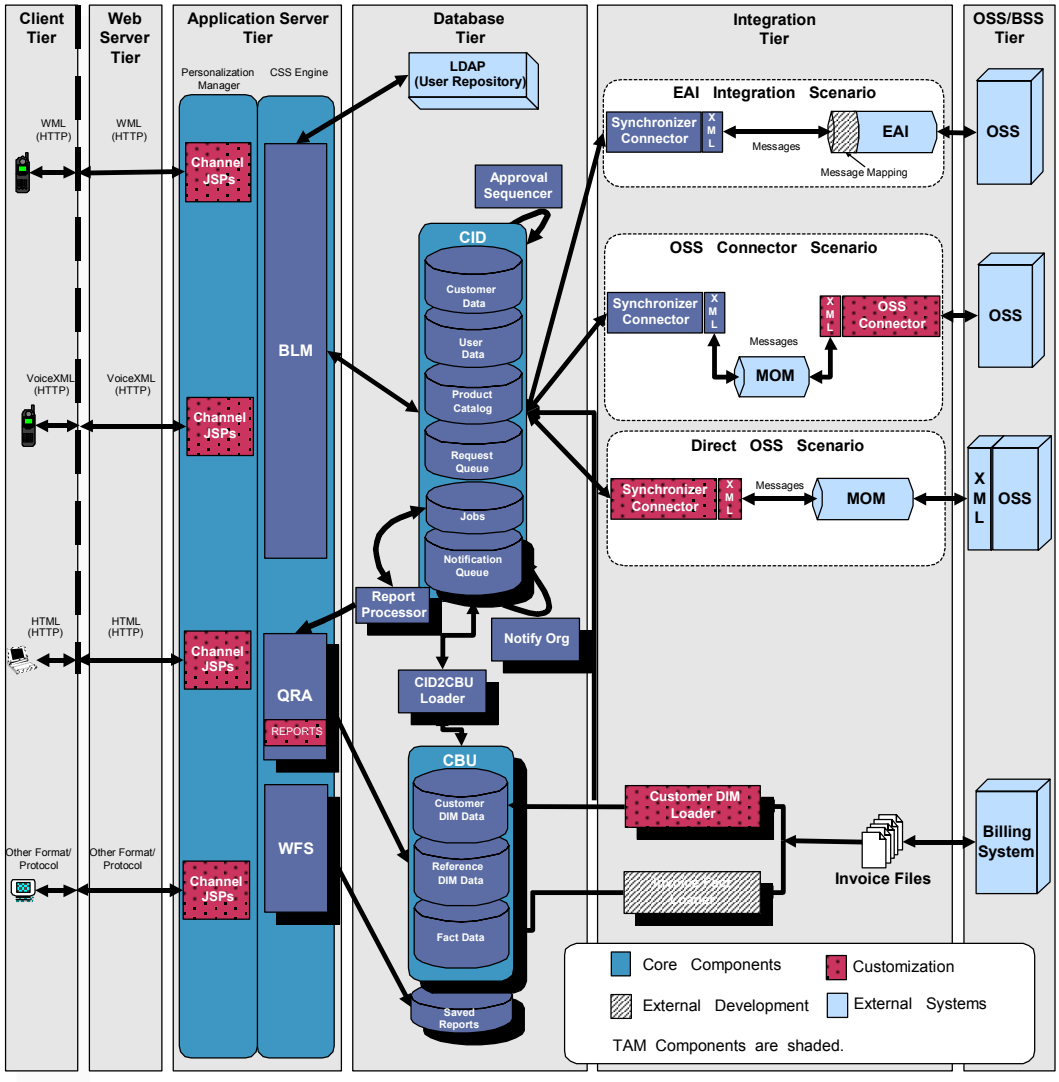
- Authentication of users
- Role management to control access to data and features

Overview of the Telco Service & Analytics Manager Components

The Telco Service & Analytics Manager system architecture is comprised of the following components:

- Personalization Manager
- CSS Engine
- Customer Interaction Datastore (CID)
- SmartLink (ISF)
- Communications and Billed Usage (CBU) database which contains customer billing and usage information for analysis
- Notification Framework (Notify Org) to synchronize the CBU with information in the CID
- Customer Dimension Loader (CustDim Loader) tool to load customer information into the CBU and CID
- Query, Reporting, and Analysis (QRA) Engine used to build reports using data in the CBU
- Web File System (WFS) to store data in a file system. In TAM, it is specifically used to save reports
- CID2CBU to load CID data into the CBU
- Report Processor to process reports in the background

This diagram shows the different components of Telco Service & Analytics Manager.



About the Personalization Manager

The Personalization Manager is part of the application presentation layer. This component gives communications service providers a framework to promote their corporate and product messages effectively, to ensure that they deliver a focused and personalized service to customers, regardless of the access device they use.

The Personalization Manager also simplifies and accelerates communications service providers and systems integrators' ability to customize their TSM. These features give the service provider the best of both worlds: customized functionality at the cost and implementation speed of a packaged product.

Telco Service & Analytics Manager uses Java Server Pages (JSPs) technology to display dynamic information to users and to receive requests and instructions from users. The Personalization Manager uses a JSP framework that allows customization of individual look-and-feel, workflow, language delivered, features available, and so on.

The Personalization Manager includes:

- Internet (WEB) application template with reference workflows
- A Sample Wireless Internet (WAP) application template
- The JavaServer Page Framework for Telco Service & Analytics Manager (JSPF) application framework
- The Presentation Logic Studio

The JSPF uses JSPs to build an application framework that provides seamless integration of the application JSPs and the CSS Engine. The application work flow along with different application settings are handled by using the Presentation Logic Studio.

The JSPF provides a number of key features:

- Easy customization of workflow, language, available features, and so on.
- Session management, form-handling and exception handling
- Separation of application code and user presentation, enabling parallel out sourcing of the operational and image aspects of site design

By using the JSPF as the foundation of your applications, you can separate the presentation logic from basic application tasks. The JSPF also reduces development time because you do not have to rewrite all of these basic tasks for the Personalization Manager JSPs. All of Telco Service & Analytics Manager’s Personalization Manager template applications use the JSPF.

For more information about the:

- Application templates and reference workflows, refer to *About the Personalization Manager Channels* in *Developing User Interfaces.*

- The JSPF and how to use it, refer to *Understanding the JSPF* in *Developing User Interfaces.*

- Presentation Logic Studio, refer to *Working With the Presentation Logic Studio* in *Developing User Interfaces.*

About the CSS Engine

The CSS Engine holds the core application logic of your application, both transactional logic, allowing customers to view and to make changes to their contract and other relationship data; and analytical logic, allowing enterprise customers and other users to analyze contract, billing, usage and other relationship data from a number of different perspectives.

The object model for customer self-service comprises a comprehensive suite of Java (J2EE) packages, each addressing a specific aspect of service delivery for the customer. The CSS Engine includes multiple parallel models of the customer's business hierarchy (for enterprise customers); a flexible service catalog designed to meet the extended personalization needs of 3G wireless services; and a detailed representation of the customer's mobile contract or prepaid account, as well as trouble ticketing; electronic billing; and application personalization options for each user. The CSS Engine also provides a set of secure data analysis objects to retrieve and build cost, usage, transactional and other analysis reports; and a persistent service-centric shopping cart supporting the selection, configuration and purchase of complex mobile service contracts, together with advanced enterprise features such as order templates, bulk ordering, and dedicated corporate offers.

The CSS Engine includes:

- The customizable Business Logic Manager (BLM)
- Set of APIs to manage information in the CID
- The Data Access Layer (DAL) that manages the handling of data in the CID
- The Web File System (WFS) to store data in a file system.
- The Query, Reporting and Analysis Engine (QRA) to retrieve analysis data from the CBU.

The Data Access Layer (DAL) is responsible for passing data between the physical data repositories and process and the Business Logic Manager and (indirectly) the SmartLink (ISF). Although data within the system can be regarded as being stored in a single location - the CID - the DAL allows a more flexible architecture.

The DAL is able to access any external data (for example: detailed billing) via standard SQL statements or by calling any specific Java API provided by the back end system. It manages the routing of data to and from the correct location, isolating the business logic from this complexity. If more servers are added, the complexity increases but the BLM is still protected by the DAL.

For more information about:

- The structure and organization of the BLM, refer to the *BLM Reference Guide*.

- The BLM APIs, refer to the *BLM API Reference Documentation*.

- Security and using LDAP or other methods of authentication, refer to *Managing Security* in *Developing Telco Service Manager (TSM)*.

- Configuring and customizing the behavior of the BLM, refer to *Developing Telco Service Manager (TSM)*.

- Working with the DAL and accessing external data sources, refer to Accessing External Data Sources in *Developing Telco Service Manager (TSM)*.

About the Customer Interaction Datastore

The Customer Interaction Datastore (CID) is a highly normalized relational database model, designed to reflect the needs and structure of the modern communications service provider. The database schema is constructed around an online transactional processing (OLTP) business model focused on the sale, delivery, support and management of communications products and services to business and consumer markets.

The CID is the reference repository for all data specific to customer self-service, such as a user's preferences for the presentation and formatting of the self-service portal, and descriptive text and images for the service catalog. In addition, the CID creates a data cache, holding data copied from the multiple back-office systems and stored locally in Telco Service & Analytics Manager. This asynchronous caching approach decouples self-service performance from back-office systems, improving responsiveness as well as protecting the service provider's mission-critical BSS/OSS and particularly billing systems from high volume Internet traffic.

The CID also has a component used to allow the approval of changes to information. This component is called the approval sequencer which is responsible for obtaining the required permission before submitting the changes for processing.

The CID includes:

- The Customer Interaction Datastore
- Set of administration tools
- Sample reference and customer data sets
- Approval Sequencer

For more information about:

- The structure and organization of the CID, refer to the *CID Reference Guide* and the *CID Reference Documentation* corresponding to your database.

- Using the administration tools, refer to *Administrating Telco Service & Analytics Manager Applications*.

- Sample data, refer to the *CID Reference Guide*.

- Working with the Approval Sequencer, refer to *Working with Approvals* in *Developing Telco Service Manager (TSM)*.

About the SmartLink (ISF)

The SmartLink (ISF) enables the Telco Service & Analytics Manager application to communicate, or integrate with the core service provider infrastructure, for instance billing platforms, Customer Relationship Management (CRM) software, and other business and operational support systems (BSS/OSS). This in turn allows the Customer Interaction Datastore to maintain a synchronized cache of semi-static customer and service data, as well as passing requests and responses between the various systems. This architecture guarantees protection for legacy systems from high volumes of Internet traffic while ensuring rapid response times for user interaction.

Because of the many different technological infrastructures deployed, the SmartLink (ISF) offers support for diverse environments. Example integration scenarios include:

- Enterprise Application Integration (EAI)
- Message Oriented Middleware
- Direct connection to legacy APIs

The SmartLink (ISF) includes:

- The Integration Logic Studio
- The Synchronizer Connector which manages the request queue in the CID
- The Connector template to be used as the foundation of an OSS Connector
- The Loopback Connector that receives standard messages from the SmartLink (ISF) and simulates the response from OSS systems.
- Set of administration tools

For more information about:

- The Integration Logic Studio, refer to *Working With the Integration Logic Studio* in *Developing Connectors*.

- The Synchronizer and Connector template, refer to *Developing Connectors*.

- Using the loopback connector, refer to *Using the Loopback Connector*.

- Using the set of administration tools, refer to *Administrating Telco Service & Analytics Manager Applications*.

About the CBU

The CBU database contains customers billing and usage information.

Users can analyze their invoices using:

- Reference dimensions such as date/time, tariff, and service
- Customer-specific information such as organization views, contracts, and billing accounts

The CBU also comes with built-in security based on roles and scopes. This type of security, which mirrors the security of your TSM, ensures the security and confidentiality of the information in the CBU. User access to the CBU depends on user authentication and the user's assigned roles and scopes.

The CBU is designed to allow users to analyze their own invoices and usage. It is not designed for analysis of the entire customer base.

For more information about:

- The structure and organization of the CBU, refer to the *CBU Reference Guide* and the *CBU Reference Documentation* corresponding to your database.

- Using the administration tools, refer to *Administrating Telco Service & Analytics Manager Applications*.

- Sample data, refer to the CBU demokit readme documentation. This documentation is located in `<home_dir>/samples/cbu/demokit` in a subdirectory corresponding to your database.

About the Notification Framework

Depending on how your TAM is integrated and the deployed features, the CBU must be regularly synchronized with the CID to ensure that the data is coherent.

This synchronization is achieved in a very similar manner to the synchronization with back-office systems – using an asynchronous request process called the CID2CBU loader. Notifications are created whenever a change is made to the CID that must be synchronized with the CBU.

For example, when a new contract is created, the contract record must be added to the CBU. The CID2CBU loader retrieves the Notification and updates the CBU accordingly.

For more information about:

- Activating Notification, refer to *Installing Telco Service & Analytics Manager Applications*.

- Running the CID2CBU Loader, refer to *Administrating Telco Service & Analytics Manager Applications*.

- Configuring the CID2CBU Loader, refer to *Installing Telco Service & Analytics Manager Applications*.

- Customizing the behavior of the CID2CBU Loader, refer to *Developing Telco Analytics Manager (TAM)*.

About the Query, Reporting, and Analysis Engine

The Query, Reporting and Analysis Engine (QRA) provides a secure, standard approach to retrieving analysis data from the CBU.

Data Providers are the key components of the QRA. Data Providers separate reports from the physical data repository, guaranteeing secure access, and allowing new reports to be designed and used without the need to understand the technical definition of the CBU schema. For within the Report Processors, Data Providers are effectively the source of analysis data.

Another important component is the Data Transformer. This component is responsible for transforming the raw data obtained by the Data Provider into tables and charts.

The QRA comes with:

- A complete API to manage reports
- A sample set of reports

For more information about:

- The structure and organization of the QRA, refer to the *Developing Reports*.

- The QRA APIs, refer to the *QRA API Reference Documentation*.

- Structure of the report definition file, refer to the *QRA Report Definition File Reference Documentation*.

- Saving report files, refer to *Developing Telco Analytics Manager (TAM)*.

About the Web File System

The Web File System (WFS) component works with your application server to allow users to store data in a file system.

When users analyze their accounts with reports, they may need to save the reports for future reference. They can use the features of this component to:

- Save reports
- List saved reports
- Open saved reports

For more information about:

- Using the WFS to manage reports, refer to *Developing Reports*.

- Using the WFS APIs, refer to the *WFS API Reference Documentation*.

- Administrating saved reports, refer to *Administrating Telco Service & Analytics Manager Applications*.

About the Customer Dimension Loader Framework

When the only available customer data are in invoices, both the CID and the CBU must be populated with them. This loading is achieved by a batch processing of invoice files built on standard SmartLink (ISF) components. The tool you use to do this is the CustDim Loader. CID and CBU customer legacy information (Customer, contracts and billing accounts) are updated at every Bill run.

Populating your CBU and CID can use one of the following modes:

- Event Mode
- Invoice Mode

For more information about:

- Loading policies of the CBU, refer to the *CBU Reference Guide*.

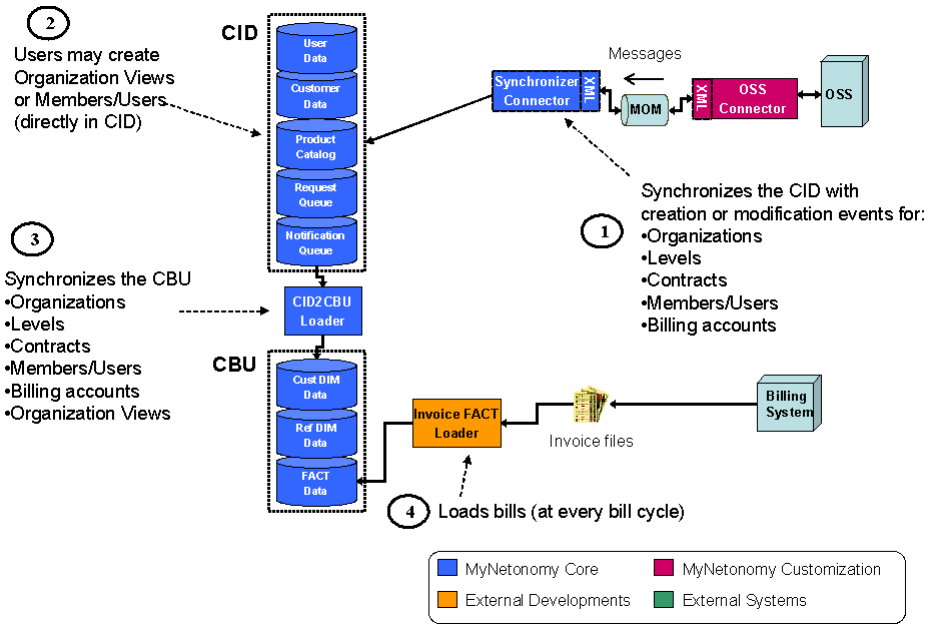
- Using the CustDim Loader, refer to *Developing Telco Analytics Manager (TAM)*.

- Configuring and customizing the CustDim Loader, refer to *Developing Telco Analytics Manager (TAM)*. You also need to refer to *Developing Connectors* for more information about using the Integration Logic Studio.

About Event Mode Population

If you want to deploy TSM features, you should synchronize the CID frequently with OSS customer modifications (ideally by using real time events sent by the OSS)

In this case, the notification framework synchronizes the CBU with the CID for all customer data modified and required for analysis.

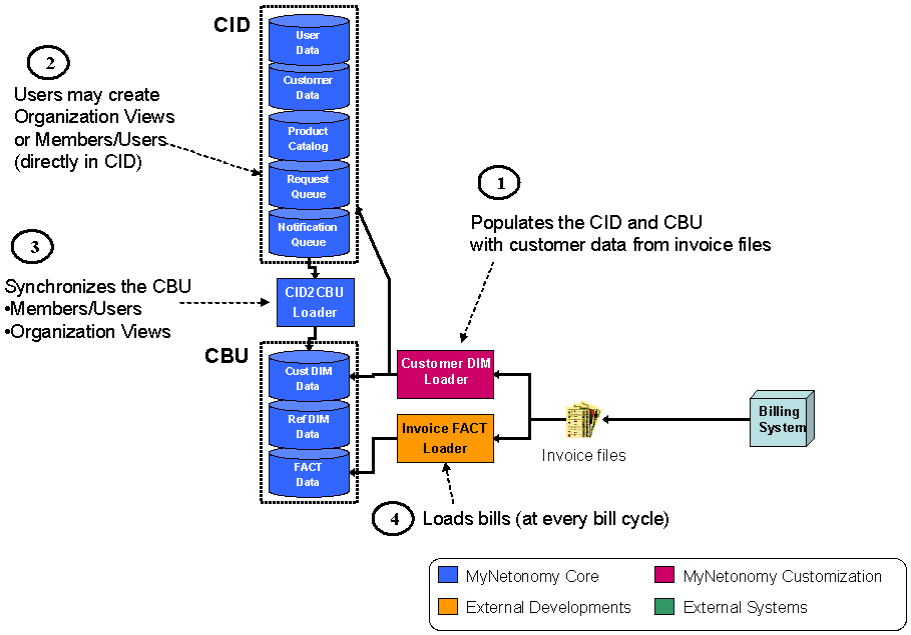


About Invoice Mode Population

If you are just interested in deploying the TAM, you could decide to only populate customer data from invoices.

In this case, the built-in CustDim Loader framework ensures extraction of customer information from invoice files and loads them both in the CID and in the CBU.

Nevertheless, if you want to deploy organization view management feature or managed users in the CID, the notification framework still synchronizes this information in the CBU.



About Background Report Processing

Reports scanning large volume of data with complex analyses may require some time to complete. This may lead to reports that take a long time to generate result and leave your users waiting for the results to be published. If reports take too long to process, you can send them to the background report processor then notify your users when their report is ready.

Depending on the report configuration and the application's specified maximum waiting period, reports that take too long are sent to the background report processor. When finished, this report processor notifies users that their report is ready for viewing.

For more information about:

- Configuring report execution mode refer to Developing Reports.

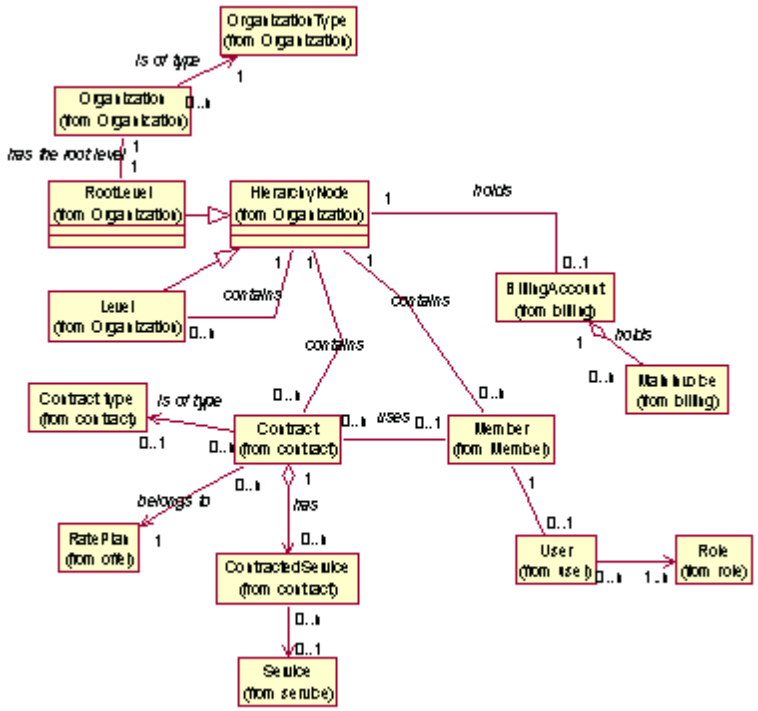
- Running the background report processor, refer to *Administrating Telco Service & Analytics Manager Applications*.

- Configuring the background report processor, refer to *Installing Telco Service & Analytics Manager Applications*

- Posting reports to the background report processor and viewing processed reports, refer to Developing *Telco Analytics Manager (TAM)*.

Overview of Telco Service Manager (TSM) Concepts

Object Model



An organization is a corporate or residential entity managed by Telco Service & Analytics Manager. The organization type specifies the type of the organization. For example, organizations may be one of the following:

- Residential customer
- Business customer
- Telco operator
- Dealer

A corporate organization may have a hierarchical structure. For instance a business customer may have departments or a dealer may have retail outlets (refer to the `HierarchyNode`, `Level` and RootLevel objects)

Member

A member designates a physical person. Members:

- May have one or more contracts
- May have an access to the Telco Service & Analytics Manager application (`user` object) to do the following:
  - manage their contracts
  - manage contracts of their organization (for business customers or families)
  - manage contracts of other organizations (dealer employee managing contracts subscribed by customers).

Typical Telco Service & Analytics Manager users include:

- Residential customers
- Business administrators (manage contracts of their organization)
- Business employees (manage only their own contracts)
- Dealer employees (manage contracts of customers)
- Telco employees (manage contracts of customers)

The scope of contracts managed by Telco Service & Analytics Manager users are defined by their assigned roles. These roles define what administrative rights they have. This is the way Telco Service & Analytics Manager manages contract security as well as access to any Telco Service & Analytics Manager object.

Possible scopes include (scopes may be cumulated):

- Inter organization scopes:
  - All objects of organizations of given organization types

    An example of this scope is a telco employee.
  - All objects of the organizations which were declared as being managed by the level of the user

    An example of this scope is a dealer employee.
  - All objects of the organizations which were declared as being managed by one of the levels of the organization of the user.
  - All objects of the organizations which were declared as being managed by the user

    An example of this scope is an account manager.
- Intra organization scopes:
  - All objects of the organization of the user
  - All objects related to, or below the level of the user

    An example of this scope is a business administrator.

- All objects related to the user

  An example of this scope is a business employee.
- All objects which were declared as being explicitly managed by the user

Contract

The Contract object can be considered as the core Telco Service & Analytics Manager object. This object defines the customer's service contract with the telco operator. The ContractedService object defines the options chosen by the customer for the contract (for example, call waiting).

A contract is always associated with a rate plan. This rate plan defines the tariffs (options, usage, and so on).

The Contract Type specifies the nature of the contract. Contract types include:

- Mobile prepaid
- Mobile postpaid
- Fixed line

Billing Account

A billing account defines:

- Payment information
- Which contracts are grouped together on the same invoice.

  The grouping of contracts is implicit through the customer hierarchy.

The billing account also holds invoices generated on a regular basis.

Extending Objects

If an object does not have an attribute you need, you can extend the object. These new attributes are called *additional attributes*.

For the member object, you can add groups of additional attributes. Each group may be set independently of others. Groups of information for a member can be seen as additional objects associated to the member object.

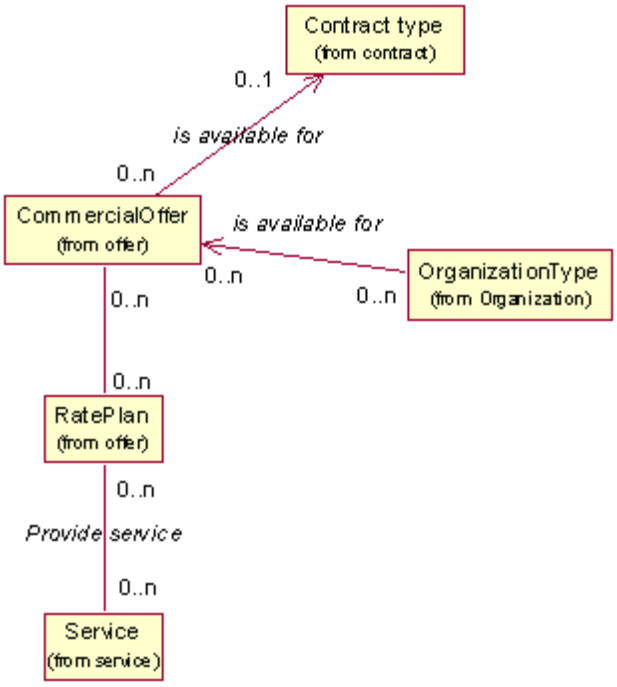
Persisting Objects

Organization, RootLevel, Level, BillingAccount, MainInvoice, Contract, and ContractedService objects are persisted in the Telco Service & Analytics Manager CID database and synchonized with the telco operator's backend systems.

Each Member and User object instance (and all related data) may be either:

- Synchronized with the backend systems
- Persisted in Telco Service & Analytics Manager CID database

Product Catalog



In order to propose rate plans and services to the users, Telco Service & Analytics Manager manages a product catalog.

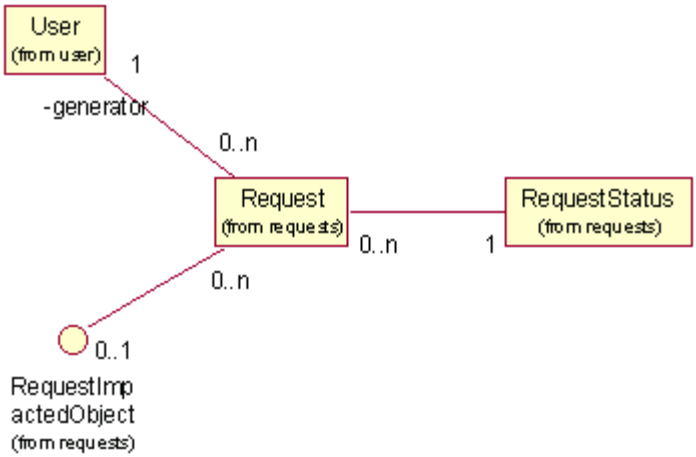
Each rate plan specifies the tariffs (subscription, usage, options) to be applied to the contract. A rate plan may include services. These included services may be mandatory and the others being optional.

Rate plans are packaged in commercial offers.

A commercial offer is dedicated to one contract type, and is available depending on the organization type.

Commercial offers can be public, or restricted to specific customers. This is called a dedicated offer and allows Telco Service & Analytics Manager to manage special negotiated tariffs for these customers.

Request Queue



Telco Service & Analytics Manager centralizes all of the user requests to be sent to the back end systems in the Request Queue.

Each request:

- Is generated by a Telco Service & Analytics Manager user
- Has a status. The status enables to follow the request's processing. Possible statuses are:
  - To be approved

    The request has to be approved before being submitted to the back end systems.
  - Not yet submitted

    The request is ready to be sent to the back end systems, and is waiting to be processed by the Synchronizer connector.
  - Submitted

    The request has been successfully sent to the back end systems.
  - Done

    The processing of the request by the back end systems was successful.
  - Failed

    The back end systems have failed to process the request.
  - Denied

    The request has been denied in the approval phase.
  - Submission in progress

The request is being processed by the Synchronizer connector, before being sent to the back end systems.

- Transport failed

  The Synchronizer connector failed to send the request to the back end systems.

- Acknowledged

  The back end systems have acknowledged the request.

- Impacts an object (for example, an add service requests impact the contract object)

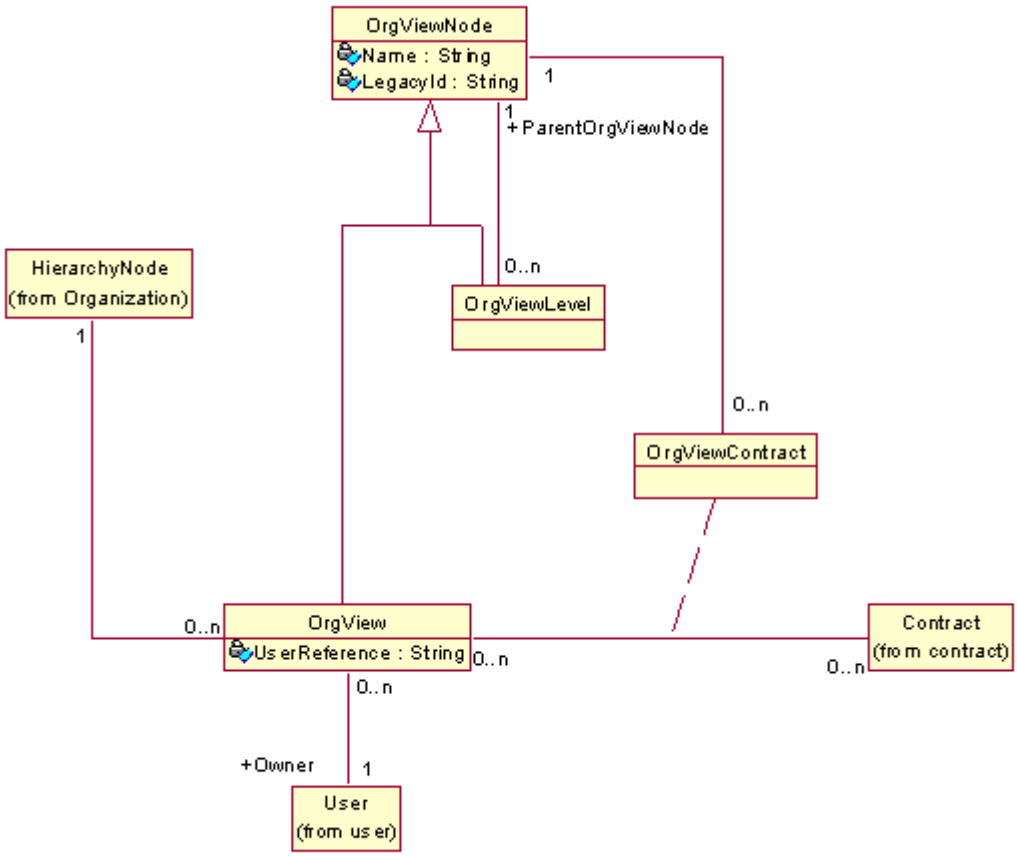
Overview of TAM Concepts

Object Model

The TAM allow users to analyze their invoice data via:

- Reference dimensions such as tariff, destination zone, time, and so on
- Customer dimension such as contracts, billing accounts, and so on

Users can also specify their own analysis dimensions by using the Organization View management feature. They can use this feature to build hierarchical structures and assign contracts to them. This way, their analysis dimensions correspond to the way they organize their business and not on how an OSS manages data.



Organization Views

An organization view can be associated at any level of the organization.

An organization view is a hierarchical structure with associated contract to any node of the organization view (including the organization view itself).

A contract can be associated with several organization views.

Inside an organization view, a contract can be associated to only one node of the organization view.

An organization view is associated to the user who owns it.

CHAPTER 2

What’s New in this Version

In This Section

What's New

Along with increasing the stability and performance, we have added some exciting new features that ease and accelerate your application development.

The new and enhanced features include:

- Expanded User Events
- Background Report Processing
- Message Persistence
- Presentation Logic Studio

New Features

The new features in this version include:

- Background Report Processing

  When users create reports, sometimes the complexity or the amount of data to be accessed can take a while to process and display. This version comes with a Report Processor which can process such reports in the background while users continue to use the application. When the report is ready, the application notifies the user that there is a report ready to view.

  You can fully customize how your application handles these reports by setting thresholds which can trigger automatic background processing or prompt the user to either wait for the report to finish or come back later to view the report when it is finished. Your users can also access pages to manage the reports they have submitted for processing.

- Presentation Logic Studio

  The PLS is a graphical tool which allows developers to model, design and visualize the page flows of an application. With the PLS, developers can concentrate on page flow design, validate links and ensure consistency. The tool also generates page flow documentation that is ready for publication and review.

  Another feature is the automatic import of existing applications which eases migration. Telco Service & Analytics Manager now comes with an application project template to ease the creation and design of new applications.

- SmartLink (ISF) Message Cache

  The SmartLink (ISF) message cache is a database you use to store SmartLink (ISF) messages for later use. This allows messages to be persisted during asynchronous exchange of information between connectors and OSS systems. This feature also allows Synchronizer connectors to update CID database by using acknowledgement messages and reconciliation between request and message instead of fully specified DO-like messages.

Enhanced Features

The enhanced features of this version include:

- Integration Logic Studio
  - Interactive graph overview to allow fast and efficient comprehension with a single glance.
  - Graphs now display tooltips on nodes and edges, and when available, graphical preview of referenced objects.
  - Copy/Paste operations now available through standard drag and drop operations.
  - Explorer items can now be searched using options (whole word, regular expression, etc.)
  - Users can now specify their preferences.

- User Events

  We have extended the user events to include:

  - QRA events.
  - Organization View user events.

- Logger framework

  The logger framework, based on log4j, has been adapted to allow full and easy integration with other applications that also rely on log4j as their logging framework.

CHAPTER 3

Main Functional Features

In This Section

About the Main Functional Features

This section summarizes some of the standard features of this version of Telco Service & Analytics Manager. This section is not an extensive list of all of Telco Service & Analytics Manager's features, but is an illustration of what you can do with Telco Service & Analytics Manager. These standard functions are included in the Telco Service & Analytics Manager Internet application template. You can use this template application as the basis for your own application.

Access to these features depends on the user's role and scope. This ensures that only authorized users can view information and make changes to objects.

The main features of Telco Service & Analytics Manager include:

- Organization management
- Hierarchy management
- Billing account management
- Order management
- Billing and Payment Presentment
- Contract Management
- Trouble ticketing
- Order documentation
- Member management
- Portal access management
- Object history
- E-Commerce
- User Activity tracking
- Request Management
- Organization View Management
- Report management

Organization Management

Create an organization

Users can create an organization of a given type.

For example, a user can create a residential or business customer (customer acquisition), or a dealer.

Guest users can create themselves as a customer (self acquisition).

Search for organizations

Users can search for an organization using pre-defined criteria. The returned organizations correspond to the ones matching the criteria and that the user has the right to view.

Update organization legal contact

Users can update the legal contact of the organization (identity for a residential entity or company name for a corporate entity and address)

Update organization information

Users can update the organization type, as well as the core (scoring value…) and additional attributes.

Set dedicated offers of a customer organization

Users can add or remove a customer organization's dedicated offers.

A dedicated offer defines a negotiated tariff between the customer (typically a business customer) and the telco operator.

Set the account managers of an organization

Users can add or remove an organization's account managers.

An organization’s account manager is the telco operator employee in charge of managing this organization (typically a large business customer).

Hierarchy Management

Browse hierarchy

Users can browse the hierarchy of an organization. They can browse the sub-levels starting from the root level, and, for each level, list the members, contracts or billing accounts attached to this level.

Search for levels

Users can search for a level using pre-defined criteria. The returned levels correspond to the ones matching the criteria and that the user has the right to view

Search for members

Users can search for a member using pre-defined criteria. The returned members correspond to the ones matching the criteria and that the user has the right to view

Search for contracts

Users can search for a contract using pre-defined criteria. The returned contracts correspond to the ones matching the criteria and that the user has the right to view.

Add a level

Users can add a level below a specified level.

Update level information

Users can update the core and additional attributes of a level.

Update level legal contact

Users can update the legal contact information (level name and address) of the level.

Move a level

Users can move a level in a hierarchy by changing its parent level.

Move a member

Users can move a member in the hierarchy by changing its level.

Move a contract

Users can move a contract in the hierarchy by changing its level.

Update the user of a contract

Users can update the user of a contract.

Update list of contracts explicitly managed by a user

Users can update (add, remove, or set) the list of contracts which are explicitly managed by another user.

Update list of members explicitly managed by a user

Users can update (add, remove, or set) the list of members which are explicitly managed by another user.

Billing Account Management

Add a billing account

Users can add a billing account to a level.

Update billing account information

Users can update the core and additional attributes of the billing account.

Update payment information

Users can update the payment information related to the billing account.

Update billing contact

Users can update the billing contact (level name and address) of the level holding the billing account.

Order Management

Prepare an order using a shopping cart

Users can add and remove any request item (order product, add contract…) in shopping carts. A shopping cart is an order being prepared and not yet submitted.

However, a creating a new organization (create organization request) must be a unique request and cannot be combined with other items in the same order.

Save a shopping cart

Users can save their shopping cart in order to submit it later.

Submit a shopping cart

Users can submit their shopping cart. This generates an order.

An order may be subject to approval.

Approve or deny an order

Specified users can approve or deny an order.

Depending on the approval policy, the order awaits approval until it is is approved or denied in its entirety. If approved, the order is sent to the telco operator's backend systems.

Order tracking

Users can track the progress of their order by checking the status of the requests contained in the order (refer to *Request management* - *View requests status*)

Billing and Payment Presentment

Search for invoices

Users can search for an invoice using pre-defined criteria. The returned invoices correspond to the ones matching the criteria and that the user has the right to view.

Browse invoice

Users can browse an invoice. They can

- View the invoice data (invoice number, invoice date, amount…)
- Browse the invoice line hierarchy starting from the invoice
- List the contract (invoice sections related to a contract), and for each sub-invoice:

  - View the sub-invoice data (amount…)

  - Browse the invoice line hierarchy starting from the sub-invoice

View invoice sections related to a contract

Users can list the sub-invoices of a contract even if they are in different invoices.

Search for contract invoice sections (contract sub-invoices)

Users can search for a sub-invoice using pre-defined criteria. The returned sub-invoices correspond to the ones matching the criteria and that the user has the right to view.

Search payments

Users can search for an invoice using pre-defined criteria. The returned invoices correspond to the ones matching the criteria and that the user has the right to view.

The search criteria cannot be changed.

Contract Management

Create a contract

Users can create a contract by specifying the following:

- Level owning the contract
- Contract type
- Rate plan
- Contract additional attributes
- Line number (optional)
- Optional services (any available service which is not a core service) along with their parameter values

Add a service

Users can add (sign up for) an optional service to a contract.

Add a service to a group of contracts (bulk add service)

Users can add (sign up for) an optional service to a group of contracts.

Order a one shot service

Users can order a one shot service for a contract.

Order a one shot service for a group of contracts (bulk order one shot service)

Users can order a one shot service for a group of contracts.

Replace [contracted] services by new ones

Users can replace some of the contracted optional services with new ones in the same transaction. This feature is typically used when there are incompatible services present.

Update parameters of a [contracted] service

Users can update the parameters of a contracted optional service (option).

Update parameters of a service for a group of contracts (bulk modify service)

Users can update the parameters of an optional service for a group of contracts.

Remove a [contracted] service

Users can remove (terminate) a contracted optional service (option).

Remove a service from a group of contracts (bulk remove service)

Users can remove an optional service from a group of contracts.

Update the rate plan

Users can update the rate plan of a contract.

Update the rate plan of a group of contracts (bulk change rate plan)

Users can update the rate plan of a group of contracts.

Migrate the contract

Users can migrate a contract (stored in CID or not) to another contract type (for example, migrate a prepaid contract to a postpaid contract). The user specifies the following:

- New contract type
- New rate plan
- New contract additional attributes

- Optional services (other than the core services) along with their parameter values
- The new contract's level if required
- The new user of the contact if required

Declare loss or theft of a mobile device

Users can declare the loss or theft of a mobile device such as a telephone.

This is only relevant in the mobile market. However the business logic does not control that the contract is in the proper market.

Update technical information of the contract (phone number…)

Users can update technical core (phone number…) and additional attributes of a contract.

Contract technical attributes are those related to the Line object.

During the contract creation process, additional technical attributes can only be set at the contract level, not at the line level.

Update contract information

Users can update contract core and additional attributes.

Manage the contract life cycle

Users can update the status of a contract, for example to activate, suspend, or deactivate the contract.

The statuses of a contract are configurable. By default, the status of a contract has no impact on the business logic.

View the usage information of a contract

Users can view usage information (pre-billing information such as number of units used or left in a package, or total call duration since last invoice) of a contract.

Recharge a prepaid contract

Users can recharge a prepaid contract by doing one of the following:

- Entering the number of a card already bought in a shop
- Buying a prepaid package online

Trouble Ticketing

Create a trouble ticket

Users can create a trouble ticket. The user specifies the following:

- Type of problem (optional)
- Details of the problem (optional)
- The related object (optional). Typically a contract, but it can also be an organization, a level, a member, or an invoice
- Contact information (optional): first name, last name, tel number, fax number, email address

Update a trouble ticket

Users can update the following:

- Type of problem
- Problem details
- Related object
- Contact information
- Trouble ticket status

  The list of possible statuses is configurable.
- Assignement note
- All additional attributes

Search for trouble tickets

Users can search for a trouble ticket using pre-defined criteria. The returned trouble tickets correspond to the ones matching the criteria and that the user has the right to view.

The search criteria cannot be changed.

Documentation Ordering

Users can order a specificed number of copies of a document (optionnaly with a specified enclosure) for themselves, or for another member, level or organization.

Member Management

Create member

Users can add a member to a level.

Update legal contact

Users can update the legal contact (identity and address) of a member.

Update member information

Users can update the member core and additional attributes.

Portal Access Management

Logging in

Users are authenticated by logging in into the Telco Service & Analytics Manager portal. They have to give their login and password.

Authentication may also be trusted. The user is authenticated by another authentication server. When accessing Telco Service & Analytics Manager portal, Telco Service & Analytics Manager trusts the authentication and automatically creates a session for the user.

Logging out

Users can log out from the Telco Service & Analytics Manager portal.

The session also expires after a set number of minutes of inactivity. Users will then have to log in again.

Create a login for a member

Users can create a login for members so they can access a Telco Service & Analytics Manager portal. The user enters login, an optional password, and a list of roles (administrative rights).

Enable or disable a login

Users can enable or disable the login of a member. This activates or suspends the access to the Telco Service & Analytics Manager portal's access for this member.

Update the administration rights of a user

Users can update the roles (administrative rights) assigned to a Telco Service & Analytics Manager portal user.

This is only possible if this member has access to the portal.

Update the password

Users can update the portal password of a member.

This is only possible if this member has access to the portal.

Update language

Users can update the language of a member.

As a result, when this member has a login giving him access to the portal, the Telco Service & Analytics Manager portal will be the specified language.

Since Telco Service & Analytics Manager supports Double Byte Character Set Languages, there is no limit to the languages which can be made available to portal users.

View Object History

Users can view the history of an object (organization, level, billing account, member, contract)

e-Commerce

Order product

Users can one or more products (for example, a handset or an accessory).

Telco Service & Analytics Manager does not check the availability of products.

User Activity tracking

Generate user event

User events are generated, to track users' activity.

Each user event is logged in the CID database.

User events are divided into the following categories:

- System user events.

  These events are automatically logged. These user events include:

  - Session events (login, logout, session expiration)

  - Submission of requests

- Custom user events.

  You can log your own user events from the JSPs.

Search user event

Users can search for a user event using pre-defined criteria. The returned user events correspond to the ones matching the criteria and that the user has the right to view.

Request Management

A request defines any update requested by a user. It can be part of an order or not.

View requests status

Users can search for a request using pre-defined criteria. The returned requests correspond to the ones matching the criteria and that the user has the right to view.

They can then check the status of returned requests.

Organization View Management

For all of these features, access and security depend on the organization view owner.

An organization view is locally managed in the CID and all modifications are immediately stored in it.

Create an organization view

Users can create a new organization view.

The new organization view is immediately stored in the CID and owned by the user.

Modify an organization view

Users can modify organization view attributes.

Remove an organization view

Users can remove an organization view. The entire hierarchy is immediately removed

Change organization view owner

Users can change the organization view owner

Download/Upload an organization view

Users can download an organization view in an XML format.

Users can upload a new or existing organization view specified in an XML file. Uploading an existing organization view replaces the entire existing hierarchy.

Set organization view hierarchy

Users can add, modify, move or remove a node of an organization view

Removing a node removes the node's sub hierarchy.

Set contracts in an organization view hierarchy

Users can add, move or remove a contract inside an existing organization view at any node.

Browse organization view hierarchy

Users can:

- Browse nodes and sub nodes
- Browse nodes contracts associations
- Search contracts below a node of an organization view (recursively or not).

Only visible contracts are returned by the search.

Report Management

List available Reports to execute

A user can list the reports available for execution.

Execute reports

Reports can be executed immediately or sent to the background report processor.

- On main invoices

  A user can execute reports on the global amounts in main invoices.
- On sub invoices

  A user can execute reports on the global amounts in sub invoices.
- On contract invoices

  A user can execute reports on the global amounts in contract invoices.
- On billed usage detail records

  A user can execute reports on billed usage detail records of one or several invoices
- On charge details

  A user can execute reports on charge details of one or several main invoices, sub invoices or contract invoices.

Save an executed report

A user can save an executed report.

The user enters a name and a unique code is automatically assigned to the saved report.

This saves the report definition, result data, prompt values, filters, and sorts.

List saved reports

A user can list the saved reports.

The saved reports are not secured since they are not linked to a member or level.

They can be secured in the JSP by using specific codes for the saved reports.

Remove a saved report

A user can remove a saved report.

These reports are permanently removed from the list of saved reports.

Rename a saved report

A user can rename a saved report.

View a saved report

A user can view a saved report. This saves the report definition, result data, prompt values, filters, and sorts.

CHAPTER 4

Main Technical Features

In This Section

Security

Telco Service & Analytics Manager manages data security in 2 different ways:

Ensuring a user manages the right information

- Portal account: Telco Service & Analytics Manager users must be identified by a login/password

  Guest users (unidentified users) can also interact with Telco Service & Analytics Manager applications, but only via limited workflows consisting of creating themselves as a new customer, or registering (they cannot access data of other customers)

- Each Telco Service & Analytics Manager user is assigned some administrative rights (roles) and has no access to objects which are outside of the scopes as defined by the roles.
- Some specific page flows or steps can be automatically forbidden when the user does not have the proper role.

Securing data between the client's browser and Telco Service & Analytics Manager

By implementing secure http (https), it is possible to encrypt and therefore secure data being exchanged between the client's browser and Telco Service & Analytics Manager.

Reloading Reference Data

At initialization, Telco Service & Analytics Manager loads all CID reference data in its internal cache. This is done for performance reasons.

The Telco Service & Analytics Manager solution administrator can update the Telco Service & Analytics Manager reference data by reloading the cache without stopping Telco Service & Analytics Manager portal and interrupting service.

Logger

You can use the Telco Service & Analytics Manager logger to create your own logs while your solution is running.

The common logger features are available for the different product components and each component can have its own specific logger configuration and output. You can log events in the following:

- Presentation Layer - includes the Personalization Manager, CSS Engine, QRA, and the WFS
- Synchronizer - The Synchronizer connector, SmartLink (ISF) components
- Connectors - Loopback and OSS Connectors
- CID2CBU Loader and CustDim loader

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