TM Forum Applications Framework (TAM)

The BSS/OSS Systems Landscape

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Executive Summary

This document provides the global telecom software industry with a frame of reference to understand the relationship of the multitude of operational systems typically found within a service provider or network operator. It is intended to be a practical, everyday working guide for those organizations who buy or sell operational systems to help position and navigate a complex landscape. It is not intended to be prescriptive so that operators are required to implement this approach. However it does provide a 'lens' to use to compare their current implementations with an idealized approach. The document can also be used by suppliers to help position their products in relation to a common reference framework.

TM Forum's vision is "To lead the emergence of lean and agile operators, able to compete in 21st century markets". The Lean Operator Program is thus TM Forum's flagship program and the New Generation Operations Systems and Software (NGOSS) technical roadmap is a key technical and process enabler of that program. The Telecom Applications Map forms the 4th major framework that comprises NGOSS.

Granularity is an important factor in the design of this Telecom Applications Map. The authors have taken an approach at the systems level based on commercially available products. Clearly these products have options and feature sets that could be used to develop a more granular level of abstraction, but the criteria used has been to examine the market and find at least 2 suppliers of commercial technology in any area of the Map.

Care has also been taken to align this map, wherever possible with other TM Forum publications, particularly the enhanced Telecom Operations Map® (eTOM) and the Shared Information/Data (SID) Model. Thus terminology used in this Map mirrors, as far as possible, eTOM parlance. For completeness, the Applications Map includes infrastructural software components as well as applications components.

Introduction

Welcome to the Telecom Applications Map (TAM). This document is intended as a working guide to help operators and their suppliers use a common reference map and language to navigate a complex systems landscape that is typically found in fixed, mobile and cable operators. Where the enhanced Telecom Operations Map® (eTOM) provides a frame of reference for telecom *processes* and the NGOSS Shared Information Data model (SID) provides a frame of reference for standardized *information language*, the Telecom Applications Map provides a frame of reference for telecom *applications*.

Release 1.0 of this document concentrated on the Operations (Fulfillment, Assurance, and Billing) segments of the eTOM primarily in the Resource Management, Service Management, and Customer Management layers. Release 2.x provided further detail in these layers as well as the Market / Sales, Product, Supplier / Partner, and Enterprise Management layers. Grouping some of the level 1 categories into an Operational Support & Readiness (OSR) eTOM segment was also introduced, along with the addition of supporting contracts for some of the level 1 categories.

Release 3.0 further unpacks the various applications and provides Level 2 and Level 3 application for the Market/Sales, Customer Management, Service Management and Resource Management domain. In addition to this the concept of SIP applications is also introduced, especially at the resource management layer. Service Oriented Architecture (SOA) concepts were taken in mind while restructuring the application domains. Mapping between the Telecom Applications Map and eTOM / SID will be addressed in a future release.

The Telecom Applications Map provides the bridge between the NGOSS framework building blocks (eTOM and SID) and real, deployable, potentially procurable applications by grouping together process functions and information data into recognized OSS and BSS applications or services.

No document like this can ever be 'right' in the sense that it represents a perfect systems infrastructure for an operator. What this document intends to give the industry is a common frame of reference that allows the various players who specify, procure, design and sell operation and business support systems to understand each other's viewpoints. It has been built up from observation of typical systems available in the industry today and will naturally evolve as these systems evolve.

Wherever possible, the Telecom Applications Map keeps to language already common in the industry or used in other TM Forum publications particularly the eTOM. It has been designed to be as generic as possible without losing touch with market reality and to be

familiar as possible to industry users, thus it uses the familiar layering concepts of the TMN model, enhanced to cover the management of *resources* rather than simply the *network*. Thus in this context, resources could be a variety of items such as network elements, sub-networks or servers.

The document is laid out against this layering approach and describes the principal functions of each layer and each system. For completeness, the TAM includes infrastructural systems, such as bus technology and business process management technology that are not strictly applications.

There are a number of benefits to the industry in using a common Telecom Applications Map:

- Common Application Language

The common language for information exchange within the industry will result in reduced investment risks and costs through industry alignment. The procurement process will be made easier by using a common map and application definition, and component license costs will be reduced through higher reusability and lower custom development. As the TAM is adopted by the industry, the market for suppliers based on operators procuring from the standard applications model will grow.

- Standard Application Requirements

A key deliverable of the TAM is an industry set of standard application requirements that will enable the development of reusable components leading to a more modular approach to application development. This reuse will result in lower costs through economies of scale. Similarly the component approach will encourage the adoptions and development of standard interfaces between components which will again reduce development costs.

- Enable Automation

The standard, deployable components that result from the adoption of the TAM will enable a higher degree of automation within the service providers' businesses which will in turn reduce human errors and improve operational efficiency. With solutions based on a standard application map it will be easier for organizations to change the way in which they work by adding or changing components within their support systems. Similarly, mergers and acquisitions will be easier to manage through the common understanding of applications delivered by the TAM's common language and the business integration points easier to identify.

The TAM has been developed using a product deployment and product implementation point of view to identify typical systems available in fixed, mobile, and cable operators today and assist the

various players who specify, procure, design and sell operation and business support systems to understand each other's viewpoints.

Assumptions used in the development of the Telecom Applications Map were:

An application is a set of one or more software artifacts consisting of well-defined functions, data, business flows, rules and interfaces. These artifacts include:

- Data Model for data used to interface to and within application
- Policies for governing external and internal application resources
- Flow Model for functionality with application
- Contract Specifications for (externally visible) interfaces to functionality with application

Applications are implementable as a deployable package and procurable in the system market place.

It should be noted that this definition is from a Telecom Applications Map viewpoint.

The definition for an application from the technology neutral architecture viewpoint is "An NGOSS Application is a container artifact which provides an encapsulation of the requirements, specification and implementations of designed functionality, from the perspective of Service Providers, needed to support a specific business goal within their operating environment."

Additional information regarding NGOSS terminology can be found in the NGOSS Technology Neutral Architecture suite of TMF053 documents, and in GB927 NGOSS Lifecycle Methodology.

In order to be an application, there must be at least two commercially-off-the-shelf (COTS) products in the market. This was verified by at least two service providers

OSS/BSS terminology was used in the general text, but was not used to differentiate functionalities nor separate areas on the TAM.

If a feature had its own context (could stand alone), and its own features and contracts, it became a level 2 application

Higher level applications contain core functionality that is shared with its next level applications or a compound application of its descendants with an additional functionality.

Leaf applications only contain specific functionality.

Supported contracts are typical and important, but are not a complete list. They will serve as requirements input to the TMF Interface Program.

The eTOM level 1 vertical segments, FAB, OSR and SIP, were used for the Customer, Service, Resource, and Supplier / Partner layers only.

The SID domain horizontals excluding the Common Business Entities (CBE) were used and the team “management” was added.

Used eTOM terminology when discussing business functions and SID terminology when discussing system data.

The following are open issues which will be addressed in the next release:

Terminology used is not always in alignment with eTOM, SID, or Lifecycle/TNA

Mapping TAM to eTOM and SID

TAM Application Short descriptions which will be released along with the TAM 3.0 poster

The Telecom Applications Map

The Telecom Applications Map has been designed to be of use by the entire spectrum of players in the telecom software value chain. It may be used for a variety of functions and allows both the operator and supplier communities worldwide to have a common frame of reference in describing both their current and future needs and intentions. For example, an operator could use the Map to model their current (as-is) OSS applications in a structured format; as well as developing a (to-be) future model and deriving a clear gap analysis. By using this common layout and nomenclature, the current and future landscape would be much easier for consultants, suppliers or system integrators to understand the situation and requirement.

Alternatively, a supplier may wish to use the Map to highlight the systems that they supply and the systems that they partner with other companies to deliver. It may be used to show both current and future portfolios. Investors or financial analysts may find the Map useful to describe the OSS market in terms of its growth, value etc. Others may find the Map a useful starting point in assembling directories of suppliers active in each segment of the Map.

Thus the Telecom Applications Map can be used across the entire telecom value chain as shown in figure 1 below:

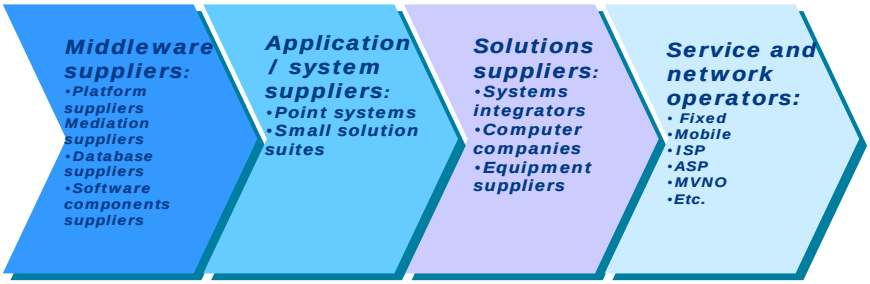

Figure 1: Telecom Value Chain

Wherever possible, TAM uses language already common in the industry and builds on the process and common information models

key to the TM Forum's NGOSS program especially the eTOM and the SID. It has been designed to be generic without losing touch with market reality and to be familiar to industry users, thus it uses the familiar layering concepts as those specified in the eTOM and SID.

The document is laid out against this layering approach and describes the principal functions of each layer. The Telecom Applications Map, shown in figure 2, is segmented by the primary eTOM end-to-end level 1 vertical process areas: Fulfillment, Assurance, & Billing (FAB), and Operational Support Readiness (OSR) functions along with the layering SID domains of Market/Sales, Product, Customer, Service, Resource, Supplier / Partner, and Enterprise. Each box on the map represents a level 1 TAM category.

The TAM also recognizes managed resources including network based resources; content servers Intelligent network platforms and related network control technologies such as element management systems as well as the OSS infrastructure fabric e.g. bus technology, business process management engines etc. The term OSS is used to cover all the systems that are used by a telecom operator, sometimes referred to as OSS and BSS.

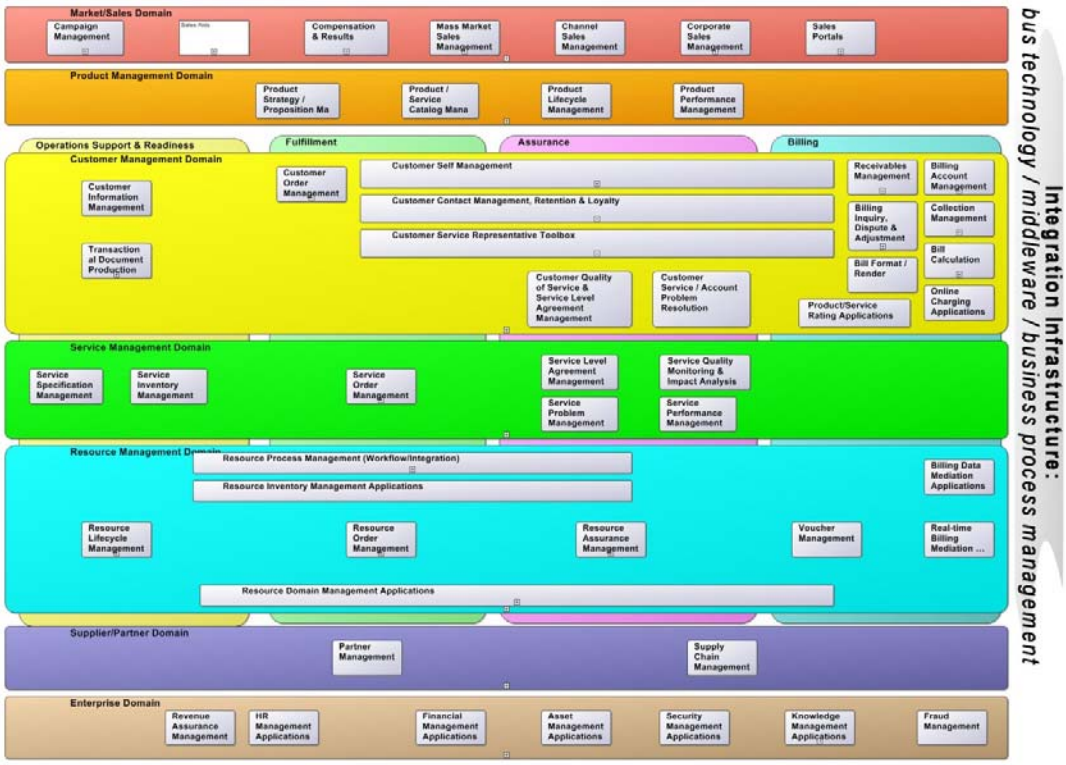

Figure 2: The Telecom Applications Map

The bulk of this document is used to describe the level 1 applications of each of the layers of the TAM. In some cases, level 1 applications

are broken down into level 2 applications where additional clarity would help the reader. Each application includes an overview description, a functionality description, and supporting contracts.

03.0 Market/Sales Management

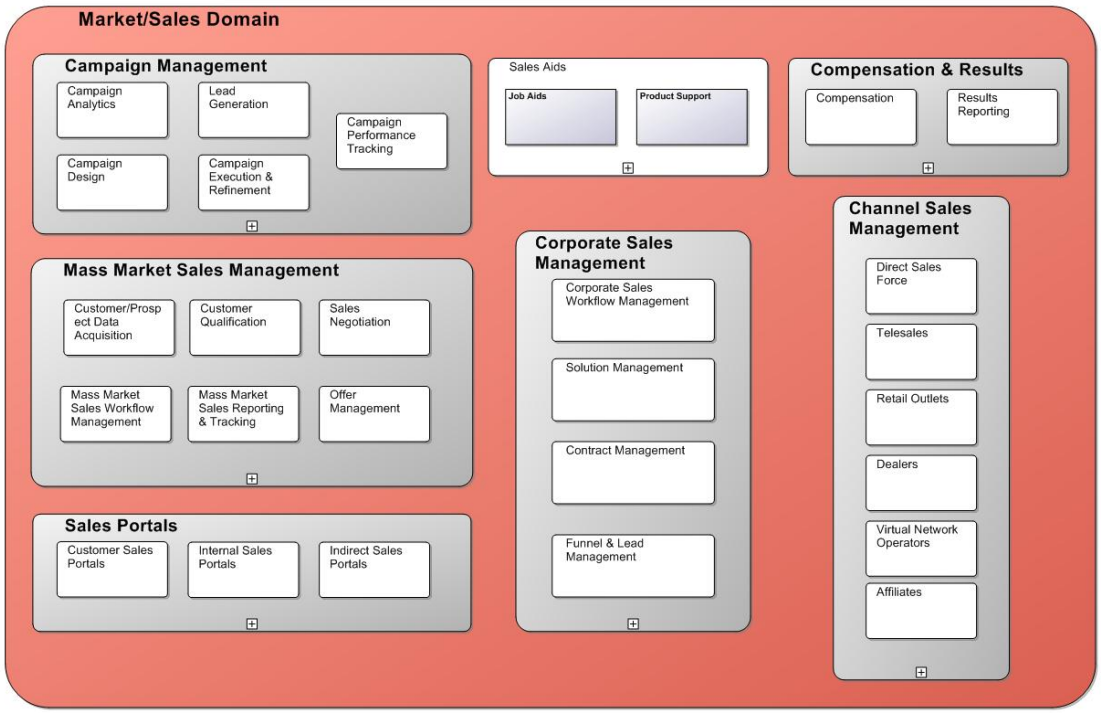

Figure 3: 3.0 Market/Sales Management

Description

The Market/Sales Domain includes data and contract operations that support the sales and marketing activities needed to gain business from customers and potential customers. On the Sales side, this includes sales contacts/leads/prospects through to the sales-force and sales statistics. Market includes market strategy and plans, market segments, competitors and their products, through to campaign formulation.

03.01 M/S Campaign Management

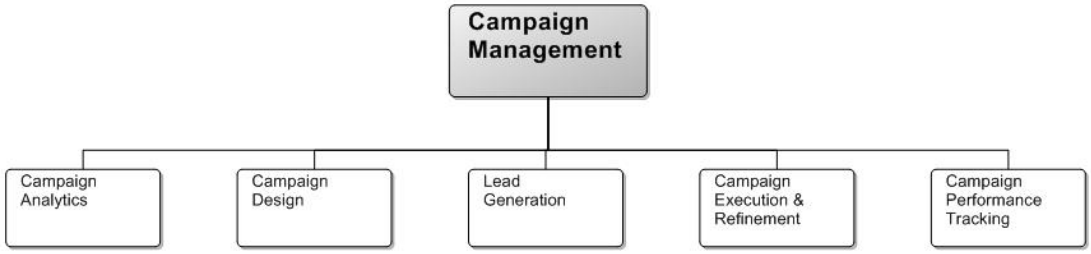

Figure 4: 03.01 M/S Campaign Management

Description

To Be Added

Campaign Management

Application Identifier: 03.01

Overview

The Campaign Management applications are responsible for managing the lifecycle of marketing campaigns, sometimes referred to as "closed loop marketing". Service Provider marketers need to respond to changing market environments with marketing initiatives that push highly targeted messages to increasingly focused segments. Marketers need an adaptable and flexible campaign management application that can adjust to evolving customer lifecycles with corresponding targeted marketing strategies. Marketers need to deliver coordinated outbound and inbound campaigns across all points of interaction- focusing marketing resources where the greatest potential value exists. The campaign management application needs to:

- Leverage a single, consistent view of customer data.
- Be highly usable, which increases marketing productivity and effectiveness.
- Provide valuable insight into marketing performance through analytics that enable marketers to continually adjust and improve marketing investments.

Functionality

The campaign management applications have the following capabilities:

- Campaign Analytics
- Campaign Design
- Campaign Execution & Refinement
- Performance Tracking

Supported Contracts

- Manage Business Intelligence
- Manage Dashboard
- Manage Predictive Analytics
- Send Recommendation(s)
- Consume Recommendation Success

Campaign Analytics

Application Identifier: 03.01.01

Overview

To Be Added

Functionality

The Campaign Analytics application provides quantitative tools to analyze customers and prospects to help design the right recommendations. Next generation applications also provide statistical analysis and modeling to optimize target markets and assist in self learning and optimization of campaigns based on the empirical analysis of past campaign execution. Marketers need to utilize a segment designer that allows quick identification of desired targets, as well as global profile management capabilities that allow new customer data attributes to be designed on the fly. The resulting profiles can be leveraged immediately for actions that include segmentation, personalization, and branching logic.

The campaign analytics feature benefits from the automation of essential campaign processes in the campaign management application and uses all the managed communications with customers across multiple channels, tracking responses and consolidates and reports campaign planning & execution performance. The campaign analytics features should be able to gather and analyze data from past campaign planning success and performance in a continuous loop and feed this data back into the campaign planning feature. Marketers need to construct meaningful market segments and base their campaign investments on valid assumptions and projections. Through Campaign Analytics, marketers need to build models to predict campaign response likelihood, determine customer retention risk or predict any user-defined customer behavior. Marketers can then leverage the model's predictions to determine which customers/prospects are most likely to display a particular behavior.

Supported Contracts

To Be Added

Campaign Design

Application Identifier: 03.01.02

Overview

To Be Added

Functionality

The Campaign Design application provides the necessary tools to design a campaign, taking into account customer and product information.

In this area, Campaign Design Applications should include the ability to assist:

- Marketing and sales managers explore installed base and historical customer data, and to mine that data for cross-sell and up-sell opportunities.
- Users can quickly create campaigns to push opportunities out to pre-defined sales territories using a coordinated sales methodology.
- Templated campaign creation: Many frequently used campaigns, segments, content templates, and their tracking metrics are pre-defined to step through campaign setup and execution, and yet customizable.
- Pre-defined execution channels and fulfillment include direct mail, email, fax, web, events, telesales and sales.

Supported Contracts

To Be Added

Lead Generation

Application Identifier: 03.01.03

Overview

To Be Added

Functionality

Lead Generation handles the generation of leads. A lead can be generated from many different sources and customer interactions including the result of a targeted marketing campaign. Potential customer information is obtained from external sources or from internally generated data.

Supported Contracts

To Be Added

Campaign Execution & Refinement

Application Identifier: 03.01.04

Overview

To Be Added

Functionality

Campaign Execution & Refinement provides the necessary tools to execute the campaign, and based on performance indicators collected, accept refinements to the campaign while still executing.

Campaign Execution & Refinement Applications should include:

- Permission-based controls to ensure that customers are always treated according to their preferences, no matter which interaction point you use.
- Users can quickly execute campaigns in their own terms to push opportunities out to their territories, along with a coordinated sales methodology. Integration to Sales Management Applications and Channel Sales Management Applications is needed.
- Integrated Workflow notifications ensure that approvals are in place as needed.
- Event triggers ensure that campaigns and campaign stages (waves) are executed at critical points in the customer lifecycle.
- Inbound and outbound campaign coordination for marketing control of the interactions that follow a campaign.
- Per statistics gathered via Campaign Performance Tracking, adjustments can be made to the Campaign while still in execution.

Supported Contracts

To Be Added

Campaign Performance Tracking

Application Identifier: 03.01.05

Overview

To Be Added

Functionality

Campaign Performance Tracking provides the necessary functionality to monitor the campaign performance in real time. This is done by providing a combination of real-time reporting and what-if modeling capabilities to continuously optimize campaigns by taking corrective action-even when campaigns are already underway. Functionality specifically includes:

- Real-time view into customizable segmentation schemes and key metrics.
- Dashboard views, alerts, and notifications provide marketing organizations with the insight and agility needed to protect and optimize marketing investments.
- Pre-built Marketing Insight reports.

Supported Contracts

To Be Added

03.02 M/S Sales Aids

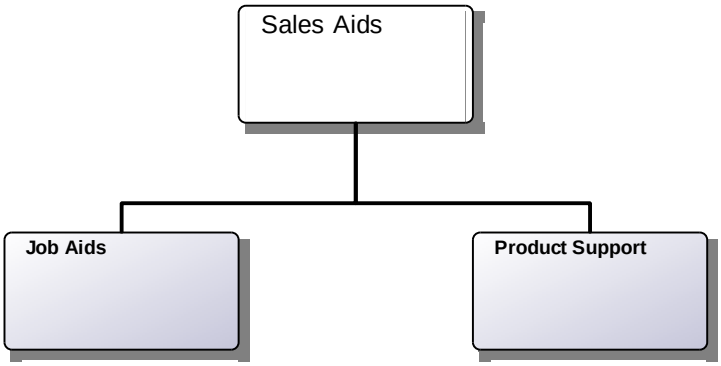

Figure 5: 03.02 M/S Sales Aids

Description

Please refer to the Sales Aids section under Knowledge Management in the Enterprise domain.

03.03 M/S Compensation & Results

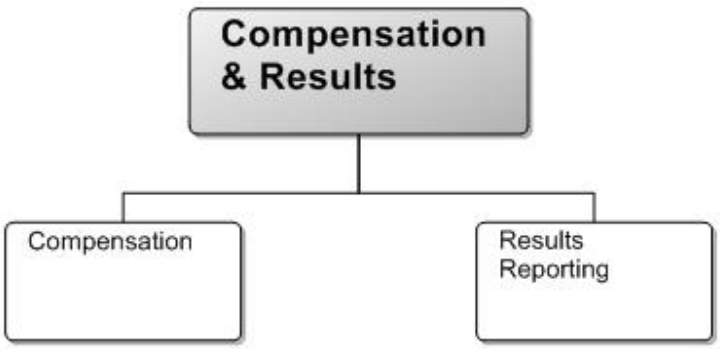

Figure 6: 03.03 M/S Compensation & Results

Description

To Be Added

Compensation & Results

Application Identifier: 03.03

Overview

The Compensation & Results application includes all functionality necessary to compensate a seller, from assignment of accounts, quotas, new sales and billed revenue to calculation of the compensation plans to results reporting.

Functionality

The sales force receives compensation for sales based on performance against quotas assigned, billed revenue, numbers of sales, or other events determined by business rules that change each year. This includes building the annual compensation plan and managing to it. Compensation & Results handles payment and reporting against performance, and also includes setting and managing sales quotas. It also handles the assignment of sales modules (i.e. sets of customers) to the sales staff, which is then rolled up into a sales hierarchy.

Supported Contracts

To Be Added

Compensation

Application Identifier: 03.03.01

Overview

To Be Added

Functionality

Compensation provides necessary functionality to determine compensation based on sales results across all sales channels, including internal as well as sales partners. Compensation is calculated based on results (billed results, sales volumes, etc.), for a specific customer, and based on Sales Assignment. This mapping of sales people to customers allows the calculation of compensation for each salesperson. Compensation calculations and business rules vary across services. These calculations are used by 1) sales management to track sales and 2) corporate headquarters accounts payable systems or company payroll systems to produce commission checks.

Supported Contracts

To Be Added

Results Reporting

Application Identifier: 03.03.02

Overview

To Be Added

Functionality

Results Reporting provides sales results versus sales forecast for the various sales teams.

Supported Contracts

To Be Added

03.04 M/S Channel Sales Management

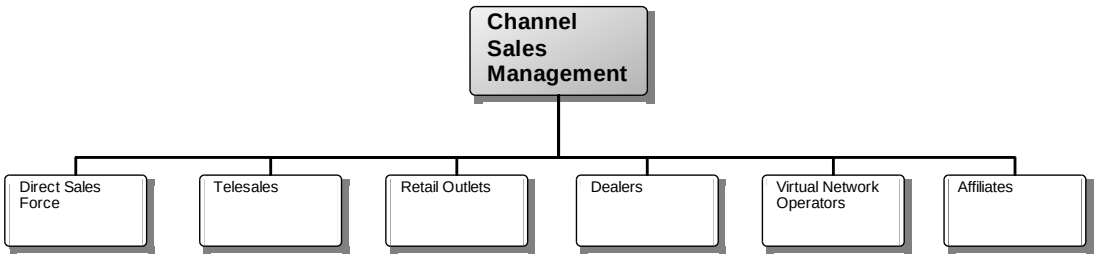

Figure 7: 03.04 M/S Channel Sales Management

Description

The Channel Sales Management application provides the necessary functionality to sell to a number of specific sales channels.

Area contains several level 2 applications, each supporting different channels. This application contains core functionality shared amongst level 2 applications, and functionality specific to each channel. This section is organized to reflect Common Functionality, then addresses the specificities of each channel:

Common Functionality

Although these different channels may require different user interface layers serving the specific needs for each channel, the core application logic and data store is common to all

channels to enable the 360 degree view irrespective of the channel being used. The Common Functionality section describes those core functionalities and supported contracts.

Channel Sales Management

Application Identifier: 03.04

Overview

The Channel Sales Management application provides the necessary functionality to sell to a number of specific sales channels.

Area contains several level 2 applications, each supporting different channels. This application contains core functionality shared amongst level 2 applications, and functionality specific to each channel. This section is organized to reflect Common Functionality, then addresses the specificities of each channel:

- Direct sales force (also known as field sales) – most handling corporate and medium sized businesses [see section]
- Telesales / ordering department – selling over the phone to consumers and small businesses
- Retail outlets – the Telco's branded retail stores, (mostly common in Wireless communication provides and mostly serving consumers and small businesses)
- Dealers – 3rd party retailers that sell the communications service provider's services, mostly to consumers
- VNOs – Virtual Network Operators, that sell their own branded services over the communications service provider's network
- Affiliates

Functionality

This functionality is common and must be provided in each channel depicted below.

- Create and promote leads.
- Create and promote contacts.
- Create and dispatch literature requests to customers.
- Lead Management: A lead is a person with an interest in the CSP's service offering(s). The lead, for example, may have requested information about the CSP's services. The direct sales application should provide the support and functionality CSP's need to efficiently move the lead through the relevant stages in the lead qualification phase of the sales cycle.
- Sales quotation

Supported Contracts

- Product catalog (catalog browsing, selection of products/services, quoting)
- Resource management/Inventory Management (e.g., phone numbers, SIM cards, equipment)

- Credit check service (check credit history of the customer)
- Address validation/completion service
- Workforce Management (scheduling and installation)
- Fulfillment management (shipping)
- Billing/Accounts Receivable (creation of billing profile, payment and deposit handling)

Direct Sales Force

Application Identifier: 03.04.01

Overview

The Direct Sales Force application is used by CSR's, Field Sales, Sales Administrators, Analysts and Managers to generate/qualify sales opportunities, generate revenue, maintain and optimize the sales process, territories, quotas, view forecasts.

As a Customer Service Representative (CSR), you have first contact with potential customers. Incoming telephone calls and emails enable you to capture customer information and qualify leads according to the guidelines set by your company (cf Customer Information Management). If the lead satisfies your criteria, you can promote that lead to the status of a contact, and an opportunity. Sales opportunities are dispatched to sales representatives in the field to pursue if the size of the sale has the potential to exceed agreed monetary thresholds. If not, you can respond directly to customer inquiries by creating and dispatching literature requests and/or sales quotations. Orders are submitted for processing when you receive acceptance for the contract that has been negotiated with the customer (cf. Order Management).

A user of the Direct Sales application can have one of the following roles:

- Customer Service Representative (CSR). As a CSR or agent, you generate and qualify sales opportunities and dispatch leads to field sales representatives. Your primary method of communication with the customer is by phone and email.
- Field Sales Representative. As a field sales representative, you create and manage customer accounts, develop sales opportunities, and generate revenue.
- Sales Administrator. As a Sales Administrator, you manage the design and maintenance of the overall sales process and stages in the sales cycle according to business requirements.
- Sales Analyst. As a Sales Analyst, you manage sales territories and quotas and generate sales forecasts and pipeline analyses.
- Sales Manager. As a Sales Manager, you define sales territories, and manage the sales process and forecasting.

Functionality

Create and dispatch opportunities to relevant employees/sales personnel.

Create and dispatch sales quotes to legal, finance, sales manager for approval. Campaign execution: A campaign is a planned marketing effort to promote a single product or range of products. The direct sales application should enable the capture of details of the

campaign promotion, such as the duration of it and the products, pricing strategy, and media channels you want to use.

Forecast Analysis: This feature should enable data analysis of your sales pipeline and predict the revenue that will result when opportunities are won and deals are finalized. Forecasts are either Sales forecasts, which one can apply to anticipate the consumer demand for and consumption of the CSP's product range and the revenue the CSP expects to result. There are also Order forecasts, which enables CSP's to determine whether the supply required is available to meet expected consumption levels. This should integrate to logistics systems for auto-replenishment and order management applications.

Opportunity & Quote Management

Territory Management: A direct sales application can structure sales territories to assist structuring of the CSP's sales organization. For example, CSP's should be able to organize territories by geography, industry, named accounts, service lines, or opportunities. One should also be able to compress many territories into a single territory. You can assign territory-specific roles to your sales employees as members of a team. A single employee can perform many roles within a territory, or one or more roles in other territories. If required, you can structure territories according to a parent-child hierarchy.

Supported Contracts

Typical contracts for a Direct Sales application are to Document Design or electronic document generation applications, and Enterprise Management applications for legal & regulatory approval.

Telesales

Application Identifier: 03.04.02

Overview

Some Communication Service Providers use the customer service call center agents as a sales channel and allow them to sell and order services for customers who are calling in (reactive sales). Other Communication Service Providers have a dedicated call center for taking orders that is separate from the customer service call center. The Telesales call center does both reactive and proactive sales efforts.

An application geared for Telesales should provide the following benefits:

- Quick time-to-market for new and advanced services Improved quality of service and minimum faulty orders
- Increased customer satisfaction and loyalty
- Reduced churn Benefits from the Telesales agent's perspective
- Simplified application flow Shorter training time
- Shorten calls
- Complete visibility to order status at all times
- Open, standards-based integration capabilities leverages current investments
- Faster response time to business needs

Functionality

An application for telesales agents should provide the following capabilities:

- 360 view of the customer, including full customer details, recent interactions, pending activities, history
- Complete order capture, negotiation and activation capabilities (see section 6.2 for detailed functionality list)
- Order tracking capabilities
- Ability to create action items when follow up activities are required
- Multimedia integration (CTI, Predictive dialer, Email)
- Scripting
- Cross sell/up sell recommendations

Supported Contracts

To Be Added

Retail Outlets

Application Identifier: 03.04.03

Overview

One of the primary sales channels for Wireless Communication Service Providers is the provider's own retail stores. Currently, other communications sectors rely less on this channel due to the fact that non-Wireless services typically need to be physically installed on the customer's premises, whereas in wireless communications the customer typically gets services instantly at the retail store/point of sale. Non-wireless services providers may use retail outlets as a means to complete an order (e.g., for customers that want to pick up a DSL modem from a retail outlet to complete their order in order to avoid payment of shipping costs).Retail stores are considered an extension of the call center in the sense that existing customers may walk in and ask for assistance in customer service issues (e.g., billing, how to operate their handset, etc.).

In other words, Retail Stores are not only used as Point of Sale but also used as Point of Service.

Functionality

Retail store agents require an application that exposes most of the functionality used by call center agents (Telesales and customer service), and also have additional processes that are unique to the retail environment (for example, handset loans and repairs). A retail application should therefore include the following functionality:

- Complete customer information management capabilities
- Customer contact and retention management capabilities
- Order capture and negotiation capabilities
- Specific to retail stores, order management should be capable of supporting contract printing, integration with a locally installed cash management/cash register and a retail inventory system for order completion. Billing management activities
- Problem resolution Specific to retail stores, problem resolution should be capable of handling handset repairs, including reverse logistics and advance exchange.

In addition, retail stores may also require the following additional clients:

- A self service kiosk, located in the store, to allow customers that are in the store to lookup information about products, services, promotions, etc., access and pay their bills, or even start configuring a product while waiting in line.
- Handheld device used by sales agents in the store, to allow them to help customers with information about products and services, and to allow them to configure a quote for the customer. The quote/configured offer can, in turn, be transferred to the agent "behind the counter" for completion of the order.

Supported Contracts

Potential interface areas:

- Most of the CRM applications
- Cash management system
- Inventory management system / ERP
- Accounts Receivables/Billing
- Spares Management / Logistics / Reverse Logistics applications

Dealers

Application Identifier: 03.04.04

Overview

Dealers are 3rd party retailers that sell the services of the Communication Service Provider and get commission for those sales. Dealers vary in size and can range from a country wide retail chain to a local retail shop in a rural area. Some dealers sell the services of multiple Communication Service Providers and some are exclusive to one Communication Service Provider. Dealers focus on acquiring new customers and upgrading existing customers. Most dealers are only a Point of Sale and not a Point of Service (as opposed to the Communication Service Provider's owned retail stores). The dealer's main focus is to acquire new customers or upgrade existing customers. The main need for a dealers online application is to make them self sufficient and avoid the need for them to call the call center on behalf of a customer to activate their handset.

Functionality

An application for dealers should include the following capabilities:

- Customer acquisition (customer creation and new order for products and services for the newly created customer)Lookup existing customer details by mobile number
- Upgrade customer's products/services
- View dealer commission statements
- View products, services and promotions data
- View other communications from the Communication Service Provider

- "Data fencing" - a security feature that will allow dealers to view only the customers that they sold to (in order to prevent solicitation of other customers to increase commission)

Supported Contracts

Potential interface areas:

- CRM
- Commissions management
- Knowledge management system
- Product catalog

Virtual Network Operators

Application Identifier: 03.04.05

Overview

Virtual network operators are typically service providers that do not own their own network but sell communications services under their own brand on top of another service provider's network. Some VNOs also do not own their own Business Support Systems (BSS) and "lease" these systems from the network provider that provides their network services. Such VNOs are the focus of this section. The network provider that "leases" the business support systems to the VNO should therefore provide a separate online application for the VNO agents to be able to manage their customers, and handle fulfillment, assurance and billing issues for these customers.

Functionality

An online application that will allow VNOs to manage their customers' lifecycle should include the following capabilities:

- Customer information management capabilities
- Customer contact and retention management capabilities Order capture and negotiation capabilities
- Billing management activities
- Receivables and Collection activities
- Problem resolution
- "Data fencing" - a security feature that will allow the VNO agents to view only the VNO's customers. In some cases, the network provider will use the same BSS environment to serve several VNOs (multi tenancy)
- "VNO Personalization" - in cases where the network provider serves multiple VNOs under the same BSS environment (multi tenancy) the user interface of each VNO needs to be "personalized" to the VNO business (look and feel, business flow, etc.)

Supported Contracts

To Be Added

Affiliates

Application Identifier: 03.04.06

Overview

Some service providers have affiliate companies that may feed in orders. An example could be a Wireless Communication Service Provider that has an affiliate Wireline Communication Service Provider that wants to bundle its Wireline services with the affiliate's wireless services. When the affiliate sells the bundle, it will need to notify the wireless service provider of the sale, and the wireless service provider may need to assist in completing the order.

Functionality

An application to support the above flow should include the following capabilities:

- Mass service/product pre activation
- Mass transaction feed of new orders Activation of service/product sold by affiliate
- Registration of pre activated service/product

Supported Contracts

Potential interface areas:

- Partner Revenue Settlement System
- Inventory/warehouse management/supply chain

03.05 M/S Corporate Sales Management

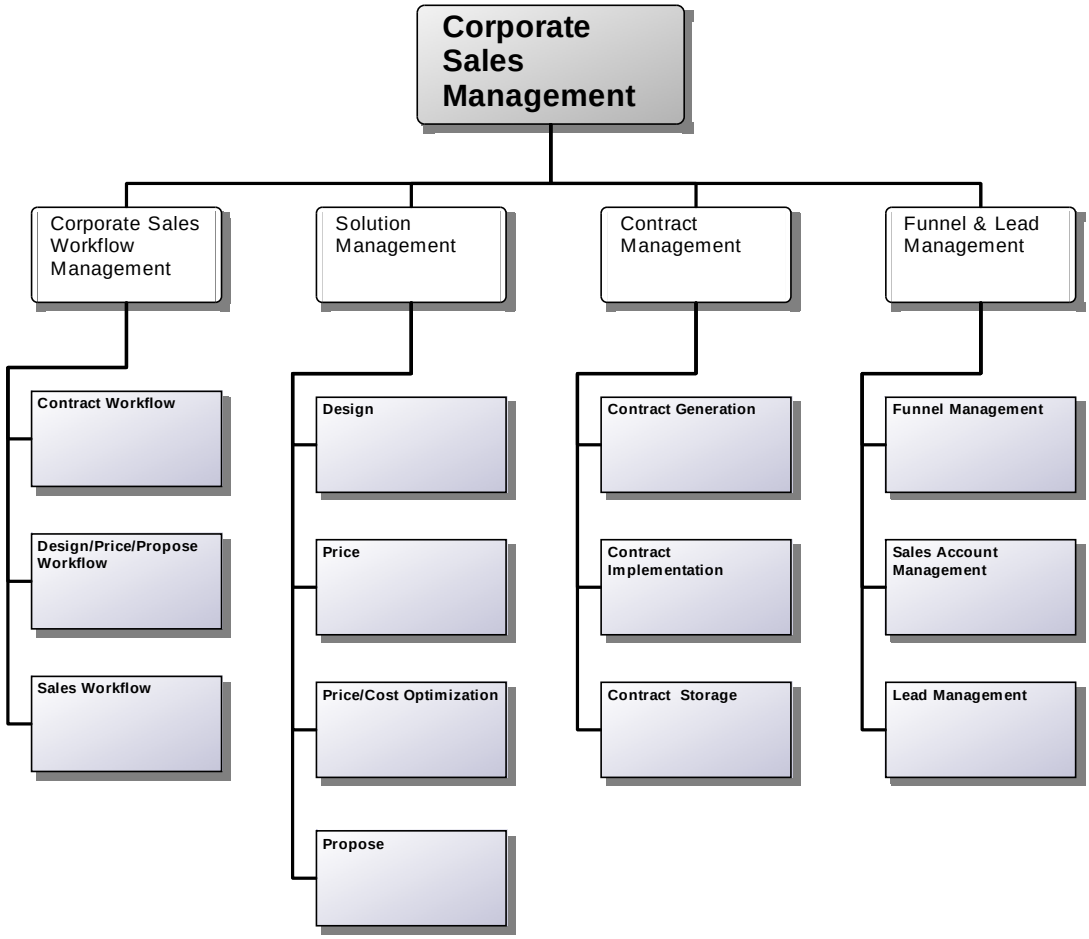

Figure 8: 03.05 M/S Corporate Sales Management

Description

The Corporate Sales Management application provides the necessary functionality to manage the sale to a medium to large business customer.

Note: Given convergence occurring in the industry in the area of products and customer classification, along with the need to manage relationships across corporate and mass market customer segments, it is expected that at some point significant aspects of the Corporate and Mass Market Sales Management applications will come together into a single set of applications.

Corporate Sales Management

Application Identifier: 03.05

Overview

The Corporate Sales Management application provides the necessary functionality to manage the sale to a medium to large business customer.

Note: Given convergence occurring in the industry in the area of products and customer classification, along with the need to manage relationships across corporate and mass market customer segments, it is expected that at some point significant aspects of the Corporate and Mass Market Sales Management applications will come together into a single set of applications.

Functionality

Corporate Sales Management includes the following:

- Management of sales accounts, including the handling of leads and funnels.
- The design, price, propose lifecycle.
- This could include responding to RFIs, RFBs, etc., as well as a number of iterations on the Design/Price/Propose lifecycle.

Negotiation and closure on a formal contract with the customer. The end result could be a customer contract with zero or more actual orders.

Supported Contracts

To Be Added

Corporate Sales Workflow Management

Application Identifier: 03.05.01

Overview

To Be Added

Functionality

Corporate Sales Workflow provides the workflow between multiple sales systems, and hands off the control of workflow to other domains / functional areas when Sales Workflow is complete.

Corporate Sales Workflow provides configurable workflow within and between sales systems, handing off control to other domains / functional areas (such as order fulfillment, billing) when the Sales Workflow is complete.

Supported Contracts

To Be Added

Contract Workflow

Application Identifier: 03.05.01.01

Overview

To Be Added

Functionality

The Contract Workflow provides the necessary workflow to manage the handling of contracts. Custom contracts are routed to management and/or legal for approval. After a customer signs a contract, there is workflow for countersignature, contract capture into a repository, and contract implementation (in the billing domain).

Supported Contracts

To Be Added

Design/Price/Propose Workflow

Application Identifier: 03.05.01.02

Overview

To Be Added

Functionality

Design/Price/Propose workflow provides the necessary workflow for the sales design, pricing and proposal processes to provide solutions that meet the customer's needs and requirements. Workflow in the design step can be technical in nature, such as routing requirements to a designer so that the design can be created, or routing a design to an expert to check its validity. It can also be business focused, such as getting approval for custom pricing or proposal support for an RFP (Request for Proposal).

Supported Contracts

To Be Added

Sales Workflow

Application Identifier: 03.05.01.03

Overview

To Be Added

Functionality

While the sales process for a small business can be completed by one person during the course of one phone call, the sales process for a large deal can involve multiple teams, steps and approvals. Sales workflow is used to route tasks to the right people for their attention, and can be used to flag a jeopardy when they are not addressed on time. It can route a lead or an opportunity to the responsible AE (Account Executive), technical design work, or pricing/contract approvals.

Supported Contracts

To Be Added

Solution Management

Application Identifier: 03.05.02

Overview

To Be Added

Functionality

Solution Management provides management of the sales solution from the initial designing of the solution to pricing of the solution using both Tariff and custom prices through to proposal creation.

Supported Contracts

To Be Added

Design

Application Identifier: 03.05.02.01

Overview

To Be Added

Functionality

The Solution Management's Design function is concerned with the translation of customer requirements into products & services and the quantity of products and services at each location. Design obtains base product and services from the product catalog.

Supported Contracts

To Be Added

Price

Application Identifier: 03.05.02.02

Overview

To Be Added

Functionality

The Solution Management's Price function is concerned with assuring that the designs are priced consistent with pricing used for billing. The product catalog provides an initial price base for the components that are in the solution. Rules and guidelines are provided as to standard levels of discounts that can be provided to the customer. Special discount arrangements can be obtained by following an escalation process. There is workflow functionality to help manage discount escalation.

Supported Contracts

To Be Added

Price/Cost Optimization

Application Identifier: 03.05.02.03

Overview

To Be Added

Functionality

Price Optimization enables sales to effectively segment customers, generate recommendations for price decreases and increases, and set negotiation guidelines. This includes the application of non-standard pricing.

Supported Contracts

To Be Added

Propose

Application Identifier: 03.05.02.04

Overview

To Be Added

Functionality

A customer can receive multiple proposals showing different designs and pricing options. Once the customer agrees to a proposal, a contract is created that reflects the terms of the proposal. Sometimes the contract and proposal are generated in parallel. The Propose function generates appropriate proposal documents based on a given design & pricing option and the customer's specified requirements.

Supported Contracts

To Be Added

Contract Management

Application Identifier: 03.05.03

Overview

To Be Added

Functionality

Contract Management handles the creation of the customer's contract and any associated service level agreements, including approval of custom language, customer contract sign-off, appropriate counter signature and contract expiration. Elements of the contract will flow through to ordering, assurance, and billing processes.

Supported Contracts

To Be Added

Contract Generation

Application Identifier: 03.05.03.01

Overview

To Be Added

Functionality

Contract Generation maintains predefined contract options and templates that are maintained for different services. Pricing information (which includes negotiated rates and discounts) is passed to the contract generation process. The Sales team will work with the customer to select available contract service elements, and generate a contract as well as appropriate service level agreements (SLAs). Service provider representatives and the Customer may be required to sign the contract before service can be ordered.

Supported Contracts

To Be Added

Contract Implementation

Application Identifier: 03.05.03.02

Overview

To Be Added

Functionality

Contract implementation establishes service commitments for assurance and covers the actual loading of contracted prices and discounts into the billers, It also establishes the initial billing account.

Supported Contracts

To Be Added

Contract Storage

Application Identifier: 03.05.03.04

Overview

To Be Added

Functionality

Contract Storage addresses the storage of contract metadata, contract text documents and signed scanned document images, where appropriate. The data and documents are stored for historical reference, legal requirements, as well as retrieval and search capabilities.

Supported Contracts

To Be Added

Funnel & Lead Management

Application Identifier: 03.05.04

Overview

To Be Added

Functionality

Funnel and Lead management provides the necessary functionality to:

- manage leads
- manage interactions between leads and various campaigns being executed
- manage the conversion of leads into opportunities
- manage opportunities down the funnel to closure
- forecast revenue against those opportunities, measured against quota and territories as appropriate

Supported Contracts

To Be Added

Funnel Management

Application Identifier: 03.05.04.01

Overview

To Be Added

Functionality

Funnel Management handles the creation, assignment, tracking and management of leads and opportunities. Funnel Management consists of activities such as receiving the leads generated from leads generation, assigning sales personnel to leads, and tracking & qualifying the leads. It also tracks the quality of leads (as well as the campaigns which generated them) by noting which leads are converted to actual sales after being worked. Funnel reports are used to roll up information derived from the funnel process for Lead management.

Once a lead is qualified, it is considered an opportunity, which is worked further down the sales funnel through to either success (sale) or loss/disqualification (no sale). Various activities are tracked in the course of managing opportunities, such as forecasting revenues, generating quotes, updating account plans, scheduling sales calls, etc. Opportunities can also be auto-generated from expiring contracts. Forecasting and Metric reporting is also included in this function.

Supported Contracts

To Be Added

Sales Account Management

Application Identifier: 03.05.04.03

Overview

To Be Added

Functionality

Sales Account Management allows sales organizations to manage customer accounts in several ways, including account activity planning, building account plans, stakeholder and influencer mapping, key buying criteria, territory management, monitoring of projected versus actual billed revenues throughout the account hierarchy, and managing sales representatives assigned to the account(s).

Account management can be associated with compensation, to ensure appropriate revenue recognition, as well as to monitor performance against sales targets (quotas). Due to the sensitivity of sales information, account management facilitates data fencing, ensuring sales representatives and management can view & edit information based on their specific territory, sales team, and organizational profiles.

Supported Contracts

Enterprise PIM (outlook, lotus), mobile email applications, LDAP,

Lead Management

Application Identifier: 03.05.04.02

Overview

To Be Added

Functionality

Lead Management assigns leads to the appropriate Sales Account manager as well as manages relationships between leads and various campaigns.

Supported Contracts

To Be Added

03.06 M/S Mass Market Sales Management

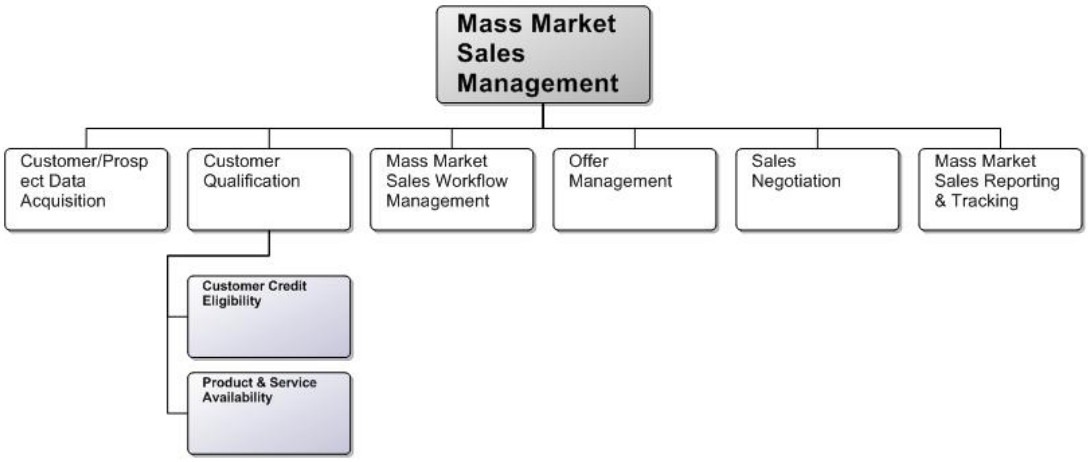

Figure 9: 03.06 M/S Mass Market Sales Management

Description

To Be Added

Mass Market Sales Management

Application Identifier: 03.06

Overview

The Mass Market Sales Management application provides the necessary functionality to manage the sale to a residential or small business customer.

Note: Given convergence occurring in the industry in the area of products and customer classification, along with the need to manage relationships across corporate and mass market customer segments, it is expected that at some point significant aspects of the Corporate and Mass Market Sales Management applications will come together into a single set of applications.

Functionality

Mass Market Sales Management includes the following:

- Collection of data about the customer
- Qualification of the customer
- Management of personalized offers to the customer
- Negotiation of the actual sale

- Sales reporting & tracking

Supported Contracts

To Be Added

Customer/Prospect Data Acquisition

Application Identifier: 03.06.01

Overview

To Be Added

Functionality

Customer/Prospect Data Acquisition obtains all necessary information to make a sale. The prospect could be a new or current customer. Customer/Prospect Data Acquisition includes information about the service location, billing address, demographic information about the customer, any existing products and services the customer currently has, as well as the customer's needs (requirements).

Supported Contracts

To Be Added

Customer Qualification

Application Identifier: 03.06.02

Overview

To Be Added

Functionality

Customer Qualification provides necessary functionality to consider the customer's credit as well as product eligibility and product availability at the customer location.

Supported Contracts

To Be Added

Customer Credit Eligibility

Application Identifier: 03.06.02.01

Overview

To Be Added

Functionality

Customer Credit Eligibility looks at the credit of the customer, considering the payment history with the service provider as well as the credit scores with external credit agencies. This will likely be implemented via a series of contracts to service provider billing systems as well as appropriate external credit agencies along with applied business rules.

Supported Contracts

To Be Added

Product & Service Availability

Application Identifier: 03.06.02.02

Overview

To Be Added

Functionality

Product Availability provides necessary functionality to see what products are generally available in the customer area, as well as what products are being marketed by the service provider.

As appropriate, Service Availability checks are also done, where based on the customer service location, service feasibility checks are done to assure the product/service can actually be provided to the customer. This implies that the customer location is clearly established.

As appropriate, consideration of the customer's current product & service subscription is considered as part of what can be further provided to him, including bundling, product eligibility, etc.

Supported Contracts

To Be Added

Mass Market Sales Workflow Management

Application Identifier: 03.06.03

Overview

To Be Added

Functionality

The Mass Market Sales Workflow Management application provides necessary customizable workflow across the entire Mass Market Sales Management suite of functionality.

Supported Contracts

To Be Added

Offer Management

Application Identifier: 03.06.04

Overview

To Be Added

Functionality

Offer Management provides the necessary functionality to provide the customer personalized offers, taking into account the customer location, needs, current products, as well as the service provider's products, sales emphasis and targets, etc.

Offer Management might include some additional "discovery" with the customer, and can occur at any time during an interaction between a customer and the service provider.

Supported Contracts

To Be Added

Sales Negotiation

Application Identifier: 03.06.05

Overview

To Be Added

Functionality

Sales Negotiation provides the necessary functionality to negotiate the sale by providing multiple quotations as needed, taking into account the customer data, customer qualification, and offers made. Functionality includes access to products, product pricing, scheduling of appointments if a dispatch is necessary, etc.

Sales Negotiation generates an order request.

Supported Contracts

To Be Added

Mass Market Sales Reporting & Tracking

Application Identifier: 03.06.06

Overview

To Be Added

Functionality

Mass Market Sales Reporting & Tracking monitors sales performance at various levels from all sales channels. It includes the quotas and results against those quotas from an individual level up to a company level per service provider organizational composition. Since the information is highly sensitive, authorization mechanisms shall be in place.

Supported Contracts

To Be Added

03.07 M/S Sales Portals

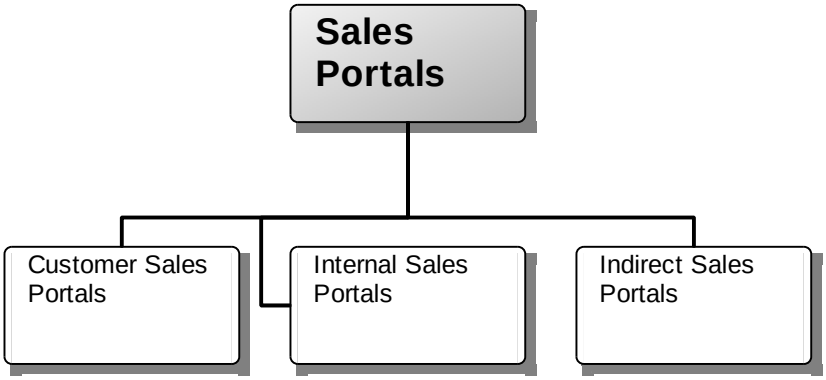

Figure 10: 03.07 M/S Sales Portals

Description

To Be Added

Sales Portals

Application Identifier: 03.07

Overview

Sales Portals provides a single entry place for sellers to access various sales tools.

Functionality

Provides a single entry place for sellers to access various sales tools.

Supported Contracts

To Be Added

Customer Sales Portals

Application Identifier: 03.07.01

Overview

To Be Added

Functionality

Customer Sales Portals provides access to appropriate sales tools for potential or existing customers.

Supported Contracts

To Be Added

Internal Sales Portals

Application Identifier: 03.07.02

Overview

To Be Added

Functionality

Internal Sales Portals provides appropriate sales tools to sales groups "internal" to the service provider.

Supported Contracts

To Be Added

Indirect Sales Portals

Application Identifier: 03.07.03

Overview

To Be Added

Functionality

Indirect Sales Portals provides appropriate sales tools to companies selling the service provider's products (e.g., affiliates, VNO's, dealers)

Supported Contracts

To Be Added

04.0 Product Management Domain

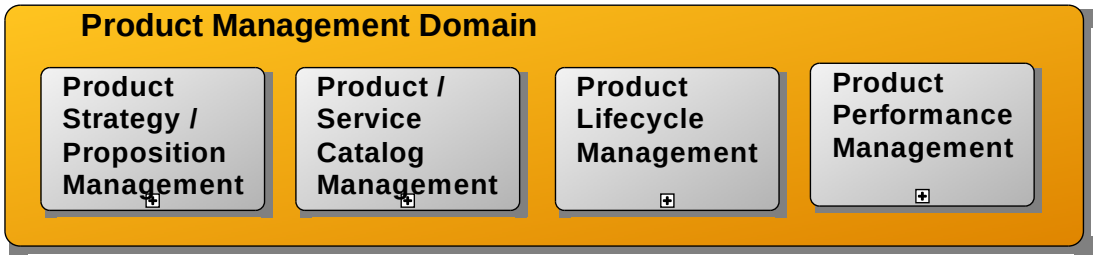

Figure 11: 04.0 Product Management Domain

Description

Product Management is the organization's approach to the process of developing, managing and marketing its products offerings to the customer. Product Management is about identifying what products to sell, what they are comprised of, who they are sold to, how they are sold, supported and serviced, how they perform in the market and how they are managed through to retirement. Product Management contains four key facets:

- Product Strategy / Proposition Management
- Product Catalog Management
- Product Lifecycle Management
- Product Performance Management

04.01 Product Strategy / Proposition Management

Figure 12: 04.01 Product Strategy / Proposition Management

Description

Product Strategy is an action plan for meeting the objectives of an operating strategy via the products sold to the marketplace. Product Propositions are ideas on how the strategy will be realized through products sold within specific target markets. Product Strategy / Proposition Management is therefore the ability to capture and manage the detail of a company's strategy and resulting propositions, that then drive what products they will develop, deliver and sell. This capability allows the management of this information at the enterprise level, across the different operating groups and market units within which the enterprise operates. Finally, it provides the ability to link the product propositions to the actual sellable products in order to track how the product strategy is actually be delivered into the marketplace.

The ability to hold this information enables downstream performance reporting to validate or negate a company's product strategy and underlying propositions.

Product Strategy / Proposition Management

Application Identifier: 04.01

Overview

Product Strategy is an action plan for meeting the objectives of an operating strategy via the products sold to the marketplace. Product Propositions are ideas on how the strategy will be realized through products sold within specific target markets. Product Strategy / Proposition Management is therefore the ability to capture and manage the detail of a company's strategy and resulting propositions, that then drive what products they will develop, deliver and sell. This capability allows the management of this information at the enterprise level, across the different operating groups and market units within which the enterprise operates. Finally, it provides the ability to link the product propositions to the actual sellable products in order to track how the product strategy is actually be delivered into the marketplace.

The ability to hold this information enables downstream performance reporting to validate or negate a company's product strategy and underlying propositions.

Functionality

Key application functions include:

- Capture and manage details of the strategy
- Organize the propositions by operations (e.g., which operating groups are delivering which propositions and where are the crossovers)
- Link strategy to propositions
- Link propositions to products
- Project manage the delivery of strategy through propositions through products
- Enable performance reporting of the strategy, driven by the performance of the underlying products

Supported Contracts

To be added

04.02 Product / Service Catalog Management

Figure 13: 04.02 Product / Service Catalog Management

Description

The definition of a product is an item that satisfies a market's want or need. Product / Service Catalog Management is the ability to create and maintain products that can be sold to customers in the target market. More specifically, it is the ability to explicitly model the structure of a product, then create and centrally manage the instances (or "catalog") of products based upon that structure. Products are not always discreet, single items. A product can be a number of components associated together and sold as a single purchasable entity. Therefore the product may be comprised of multiple components, tangible or intangible, such as services, features, devices, etc, that are "assembled" together to form a single sellable entity. Some of the components within a product will be enabled by shared / common / reusable services (e.g., location finder). Some of the components within a product will be enabled by shared / common / reusable resources (e.g., network exchange). These underlying services and resources may be managed by different parts of the organization.

The Product Management organization is typically responsible for managing the Product / Service Catalogue through the assembly and update of products utilizing available components.

Product / Service Catalog Management

Application Identifier: 04.02

Overview

The definition of a product is an item that satisfies a market's want or need. Product / Service Catalog Management is the ability to create and maintain products that can be sold to customers in the target market. More specifically, it is the ability to explicitly model the structure of a product, then create and centrally manage the instances (or "catalog") of products based upon that structure. Products are not always discreet, single items. A product can be a number of components associated together and sold as a single purchasable entity. Therefore the product may be comprised of multiple components, tangible or intangible, such as services, features, devices, etc, that are "assembled" together to form a single sellable entity. Some of the components within a product will be enabled by shared / common / reusable services (e.g., location finder). Some of the components within a product will be enabled by shared / common / reusable resources (e.g., network exchange). These underlying services and resources may be managed by different parts of the organization.

The Product Management organization is typically responsible for managing the Product / Service Catalogue through the assembly and update of products utilizing available components.

Functionality

Key application functions of Product / Service Catalog Management are thus:

- Contain the complete data model for the product structure entities and the relationships that govern the behavior of a product and its underlying components
- Create and maintain product instances based on the common product structure, to form the centralized product catalog
- Create and maintain the different components that can comprise a product
- Create and maintain the parent / child / peer relationships between components to formulate the complete product instance
- Reuse components in different product instances
- Create and maintain the logical representation of services
- Create and maintain the relationships between components and their underlying services and resources
- Provide the complete master view of the product instances to external functions / applications / etc
- End-to-end Product Data Management, which includes the activities and tools to manage and retain data on all products for a given enterprise. While a data repository is key to supporting these activities, collaboration workspaces are also generally in use in this area as well. These tend to be highly configurable information repositories, and are also generally supported by role based workflow engines. Navigation and search capabilities are prevalent in this area as well. The functional groupings here may include (but will not be limited to):
    - Product detailed specifications
    - Product Bill of Materials (BOM)
    - Contractual information
    - Product historical information
    - Document management
    - Configuration management
    - Engineering change management
    - Interoperability and data integration with Product Catalog

The diagram below illustrates the key data categories that comprise the product model in a product / service catalog and the relationship that data has to other applications:

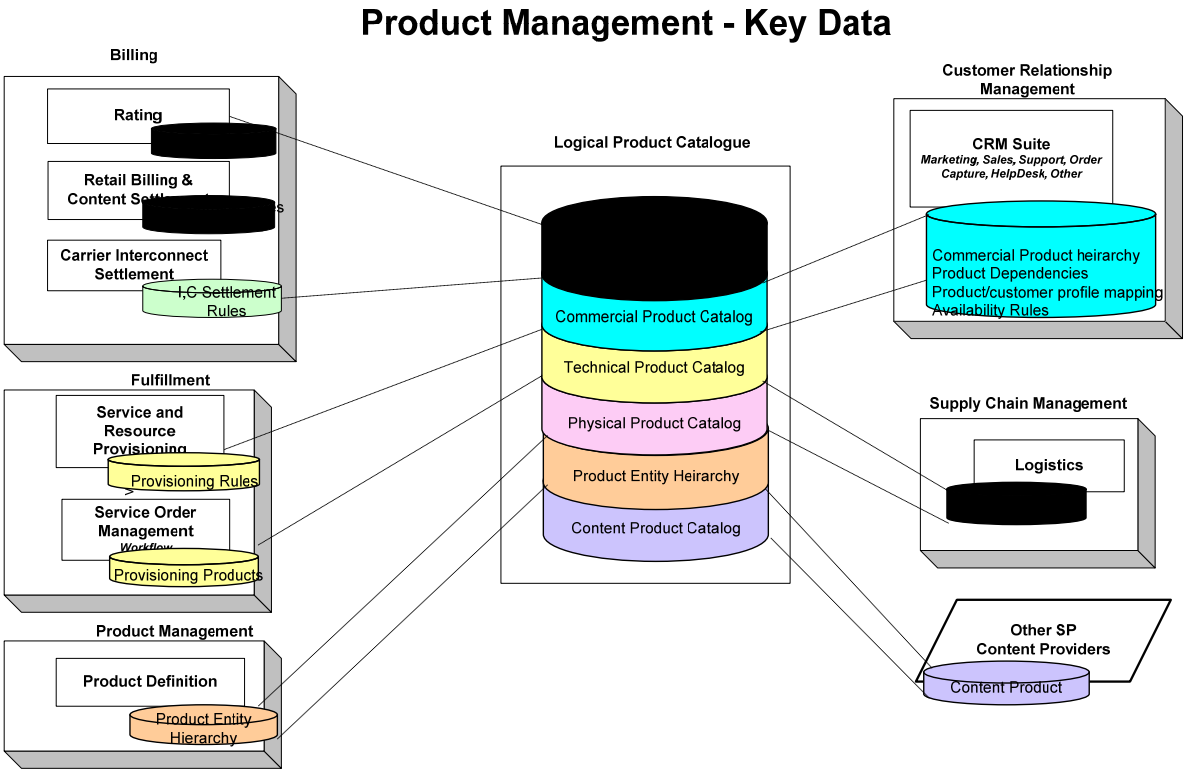

Figure 14: Product Catalog Applications

Typical Product Management applications may contain the following functions:

- Products and services offered
- Product business hierarchy
- Commercial product hierarchy
- Rules relating to offers including pre-requisites and embellishment options, relationships with other offers and parameters
- Product/customer profile mapping
- Availability Rules
- Product / Service validity period
- Lifecycle of a product/ offer including its projected replacement date
- Service levels available.

The financial catalog typically contains:

- Rating attributes
- Tariff information
- Settlement information
- Service level information

- Billing and settlement attributes
- Tax rules (not customer specific)
- One time charges
- Recurring charges
- Settlement rules
- Discount information
- Contractual matters relating to offer (e.g. revenue sharing arrangements, service level agreements)
- Product Cost
- The Technical catalogue typically contains: Provisioning Information necessary to build the workflow to provision the services e.g. sequence in which service should be provisioned.

The Physical catalogue typically contains: Physical equipment to be provided as part of an offering

The Product entity catalogue typically defines the relationship of a product / service to another product / service for the purpose of locating the products across the distributed databases. E.g. includes parent / child relationship of the hierarchy using a common reference ID for each of the product catalog locations.

Application services that should be available from the Product / Service Catalog Management capability of Product Management include the following:

Supported Contracts

(Note: In this context the term Service is being used as an application service (i.e. API) and not the SID definition of Service as it pertains to telecommunications.)

- Get product offering/component effective duration: Retrieves product effective date information from the catalog based on input unique ID or other search criteria for product offering or product component.
- Get product offering/component sales availability duration: Retrieves product sales availability date information from the catalog based on input unique ID or other search criteria for product offering or product component.
- Get product offering/component characteristics: Retrieves product characteristic content information from the catalog based on input unique ID or other search criteria for product offering or product component, in addition to criteria to identify a characteristic.
- Get product offering/component characteristic duration: Retrieves product offering/component characteristic duration information from the catalog based on input unique ID or other search criteria for product offering or product component, in addition to criteria to identify a characteristic.
- Get product offering/component characteristic version: Retrieves product offering/component characteristic version information based on input unique ID or other search criteria for product offering or product component. Can be applied against prior or future versions of product offering/component characteristics.
- Get product offering/component pricing: Retrieves product offering/component pricing information based on input unique ID or other search criteria for product offering or product component.

- Get product offering/component costing: Retrieves product offering/component cost information based on input unique ID or other search criteria for product offering or product component.
- Get product offering/component description: Retrieves product offering/component descriptive information based on input unique ID or other search criteria for product offering or product component.
- Get product offering/component structure: Retrieves product offering/component structural information (such as related/child product offering/components) based on input unique ID or other search criteria for product offering or product component.
- Get entities where product/component used: Retrieves other entities within the catalog (i.e. Tariffs, Discounts) based on input unique ID or other search criteria for product offering or product component.
- Get master product offering/component ID: Retrieves product catalog master ID based on input unique related ID or other search criteria for product offering or product component. This service is used to maintain product offering/component synchronization between other systems.
- Get campaigns which relate to product offering/component offering: Retrieves Campaigns within the catalog based on input unique ID or other search criteria for product offering or product component.
- Get discounts which relate to product offering/component offering: Retrieves Discounts within the catalog based on input unique ID or other search criteria for product offering or product component.
- Check operational compatibility (between product offering/component): Determines whether two product offering/components are compatible from an operational standpoint, based on input of multiple input unique IDs or other search criteria for product offerings or product components.
- Check customer compatibility (between product offerings/components and customer): Determines whether a customer and a product offering/component are compatible based on input of input unique ID or other search criteria for product offerings or product components and customer attributes.
- Get product offering/component SLA: Retrieves Service Level Agreement from the catalog based on input unique ID or other search criteria for product offering or product component.
- Get product offering/component BOM: Retrieves Bill of Materials list from the catalog based on input unique ID or other search criteria for product offering or product component.
- Get available product offering/component contracts: Retrieves associated Contracts from the catalog based on input unique ID or other search criteria for product offering or product component.

04.03 Product Lifecycle Management

Figure 15: 04.03 Product Lifecycle Management

Description

Product Lifecycle Management (PLM) is responsible for the managing the entire lifecycle of the product and its underlying components. This includes all of the processes required to design, build, deploy, maintain and ultimately retire the product. Product Lifecycle Management includes those activities and tools used to define new products and updates to existing products. Generally these activities require a significant degree of collaboration, often across multiple geographic locations. This could even include the gathering of customer needs/preferences and mapping those to current and future product capabilities. There will also be a significant use of project and program management activities and tools to satisfy these functional areas.

Product Lifecycle Management

Application Identifier: 04.03

Overview

Product Lifecycle Management (PLM) is responsible for the managing the entire lifecycle of the product and its underlying components. This includes all of the processes required to design, build, deploy, maintain and ultimately retire the product. Product Lifecycle Management includes those activities and tools used to define new products and updates to existing products. Generally these activities require a significant degree of collaboration, often across multiple geographic locations. This could even include the gathering of customer needs/preferences and mapping those to current and future product capabilities. There will also be a significant use of project and program management activities and tools to satisfy these functional areas.

Functionality

A PLM application should support the following major functions:

- Solicit product requirements
- Model products
- Provide detailed product specifications
- Introduce new products
- Manage existing products
- Obsolesce/retire products
- Implement marketing & offer strategies

Supported Contracts

Application services that should be available from the PLM capability of Product management include the following:

(Note: In this context the term Service is being used as an application service (i.e. API, Web Service) and not the SID definition of Service as it pertains to telecommunications.)

- Get product lifecycle state: Retrieves the current lifecycle state for the product offering or product component based on input unique ID or other search criteria for product offering or product component.
- Get prior lifecycle state: Retrieves the previous lifecycle state for the product offering or product component based on input unique ID or other search criteria for product offering or product component.
- Get next lifecycle state: Retrieves the next lifecycle state for the product offering or product component based on input unique ID or other search criteria for product offering or product component.
- Get lifecycle state owner/group: Retrieves information about the person or group responsible for the current lifecycle state of the product offering or product component based on input unique ID or other search criteria for product offering or product component.
- Get lifecycle state expiration: Retrieves the expiration of the current lifecycle state for the product offering or product component based on input unique ID or other search criteria for product offering or product component.
- Get lifecycle state jeopardy/SLA: Retrieves the jeopardy/timeout information for the current lifecycle state for the product offering or product component based on input unique ID or other search criteria for product offering or product component.

04.04 Product Performance Management

Figure 16: 04.04 Product Performance Management

Description

Product Performance Management includes the activities and tools that gather and analyze data regarding the efficacy of the product strategy, propositions and products based upon their performance in the marketplace.

Product Performance Management

Application Identifier: 04.04

Overview

Product Performance Management includes the activities and tools that gather and analyze data regarding the efficacy of the product strategy, propositions and products based upon their performance in the marketplace.

Functionality

Performance factors typically gathered as part of Product Performance Management include:

- Product campaign tracking
- Product revenue reporting
- Product cost reporting
- Product capacity analysis
- Product Cost Management includes the activities and tools used to
- Optimize product inventory
- Determine product/component sourcing

The information yielded from Product Performance Management will aid the organization in making Product Lifecycle Management and Product Data Management decisions, specifically what changes to make to the product definition and / or what to do with the product in its lifecycle.

Supported Contracts

To be added

05.0 Customer Management Domain

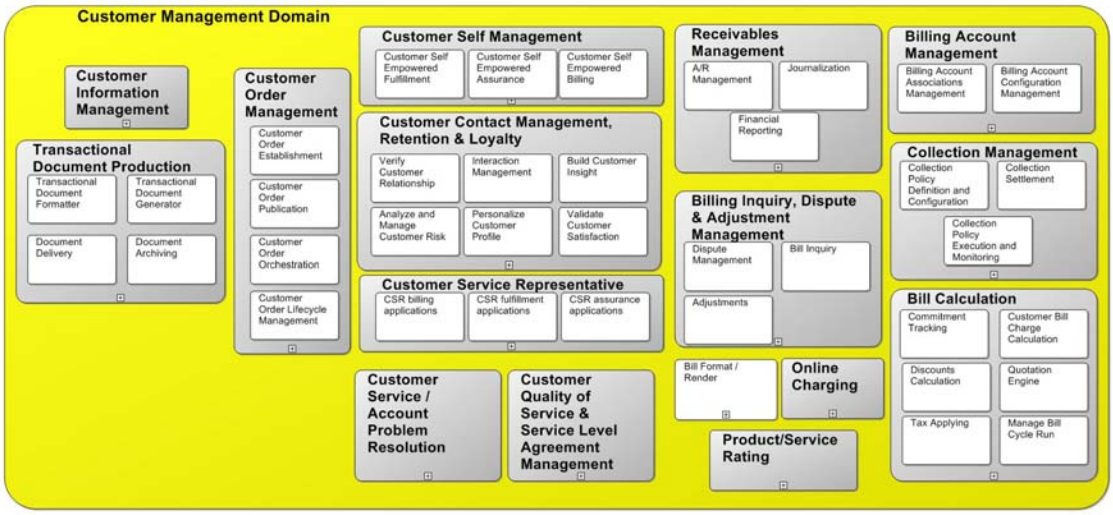

Figure 17: 05.0 Customer Management Domain

Description

Customer Relationship Management (CRM) processes and functions are defined by the eTOM (TMF GB 921) as the process grouping that considers the fundamental knowledge of customers needs and includes all functionalities necessary for the acquisition, enhancement and retention of a relationship with a customer.

The customer as defined by the e-TOM e-business reference model is responsible for ordering, using and (usually) paying for service products. The customer may represent an end-customer, where the product provided by the value network is consumed, or a wholesale customer that resells the product provided, generally with some added value. The customer may also be a corporate customer that potentially has many contact people, departments, sites, services and billing accounts with the service provider.

CRM encompasses the end to end lifecycle of the customer, from customer initiation/acquisition, sales, ordering and service activation, customer care and support, proactive campaigns, cross sell/up sell and retention/loyalty. CRM needs to involve all the touch points and channels to the customer, including contact center, retail stores, dealers, self service, and field service, as well as via any media (phone, face to face, web, mobile device, Chat, Email, SMS, mail, the customer's bill, etc.).

As an example, the following diagram describes the typical work flow of customer service representatives (CSRs) of Communication Service Providers (Diagram Figure 7: Typical work flow of Customer Service Representatives).

Another significant component of CRM evolves around marketing activities. This includes retention management, cross-selling, up-selling and direct marketing for the purpose of selling to customers. CRM also includes the collection of customer information and its application to personalize, customize and integrate delivery of service to a customer, as well as to identify opportunities for increasing the value of the customer to the enterprise.

In the Telecom Applications Map, a number of systems and applications provide these functions. Typically an operator may have the following applications:

05.01 Customer Information Management

Figure 18: 05.01 Customer Information Management

Description

Customer Information Management is a core piece of any CRM solution. This is an application that is used by all users across all channels, to allow creation, update, lookup/search and view of customer information. Customer Information includes, but is not limited to, the following:

Customer Information Management

Application Identifier: 05.01

Overview

Customer Information Management is a core piece of any CRM solution. This is an application that is used by all users across all channels, to allow creation, update, lookup/search and view of customer information. Customer Information includes, but is not limited to, the following:

Functionality

- Customer name
- Contact persons for this customer
- Account managers for this customer

- Customer Addresses (residence, billing, etc.)
- Customer contact phone numbers (landline, mobile, fax, etc.)
- Customer organizational hierarchy (relevant for household, business and corporate customers)
- The customer's existing products/services (linked to Customer Order Management)
- The customer's billing accounts (linked to Billing Account Management). The CRM application should be capable of linking multiple Billing Accounts that may be managed by different billing systems (e.g., for different lines of business
- The customer's current and past orders (linked to Customer Order Management)
- The customer's current and past trouble tickets (linked to Customer Service / Account problem resolution)
- The customer's interactions with the Service Provider via all channels (This is related to the Customer Contact Management Retention & Loyalty)

Supported Contracts

To Be Added

05.02 Transactional Document Production

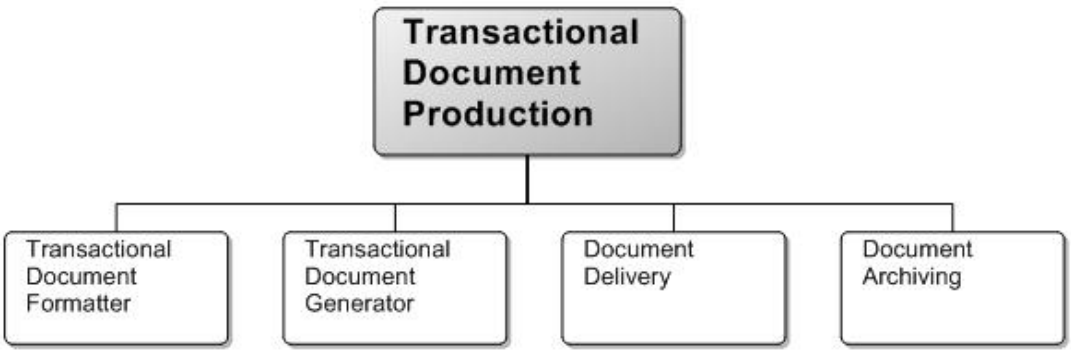

Figure 19: Transactional Document Production

Description

Transactional Document Production applications can be used in the telecommunications activities that require bills, invoices, letters and statements to be created for subscribers. It can be deployed by any organization that provides these services.

Transactional Document Production applications can process numeric, text and image content into print-ready and web-ready streams that can be reproduced using a predefined template on a variety of media. For instance, telecommunications companies can process

data from a billing system into standard industry print streams to produce paper bills.

Transactional Document Production

Application Identifier: 05.02

Overview

Transactional Document Production applications can be used in the telecommunications activities that require bills, invoices, letters and statements to be created for subscribers. It can be deployed by any organization that provides these services.

Transactional Document Production applications can process numeric, text and image content into print-ready and web-ready streams that can be reproduced using a predefined template on a variety of media. For instance, telecommunications companies can process data from a billing system into standard industry print streams to produce paper bills.

Functionality

A Transactional Document Production system has the following features:

- Transactional Document Formatter – used to develop a transactional document such as a bill or letter by specifying the format template, the data input source specification, and the associated runtime rules that ties the data input to the format template.
- Transactional Document Generator - processes extract files provided by other modules (typically Billing) to produce an intermediate data format.
- Document Archiving – used to store compressed transactional document for future retrieval e.g. by customer care, self care or reprint.
- Document Delivery – This is the final runtime executable that creates the desired print, web, PDF, XML or ASCII print files from the document production engine.

Supported Contracts

Consumed Contracts

- Billing application
- Receivables Management
- Customer Information Management
- Campaign Management
- Order Management
- Selling
- Collections Management

Exposed Contracts

- Document print fulfillment
- Electronic Bill Presentment and Payment (EBPP)
- CSR
- External Electronic Data Processing (EEDP)
- Email systems
- External offline storage systems

Transactional Document Formatter

Application Identifier: 05.02.01

Overview

To Be Added

Functionality

The Transactional Document Formatter is used to:

- Develop and maintain the bill or letter template
- Develop and maintain business rules for the template usage
- Define the data input source specification for run time production
- Define the binding rules between the input data and the template format
- Define and maintain resources (font, colors, images and language) for the template

Supported Contracts

To Be Added

Transactional Document Generator

Application Identifier: 05.02.02

Overview

To Be Added

Functionality

The Transactional Document Generator function:

- Formats document information in the customer selected or default format
- Incorporates marketing messages
- Displays tax id numbers and other legally mandated information in accordance with region specific requirements
- Aggregates multiple accounts, and generates an appropriate invoice/billing statement (if a billing statement).
- Formats section legends (summary, call detail, etc) based on regulatory requirements.
- Sends data to downstream interfaces, such as finance, warehouse, etc.

Supported Contracts

To Be Added

Document Delivery

Application Identifier: 05.02.03

Overview

To Be Added

Functionality

The purpose of Document Delivery is to take the output of Transactional Document Generator, and make it available via paper, CD-ROM, DVD, EDI, electronic, etc, as specified by the customer.

Supported Contracts

To Be Added

Document Archiving

Application Identifier: 05.02.04

Overview

To Be Added

Functionality

Document Archiving is used to store compressed transactional documents for future retrieval e.g. by customer care, self care or reprint. Functionality includes:

- Compression and storage of transactional document data
- Retrieval mechanisms for external systems. External systems can be customer care, self care or offline storage systems.
- Archive maintenance and administrative functions. Typical documents are stored online for short periods. Maintenance implies offloading to external storage depending on retention periods.

Supported Contracts

To Be Added

05.03 Customer Order Management

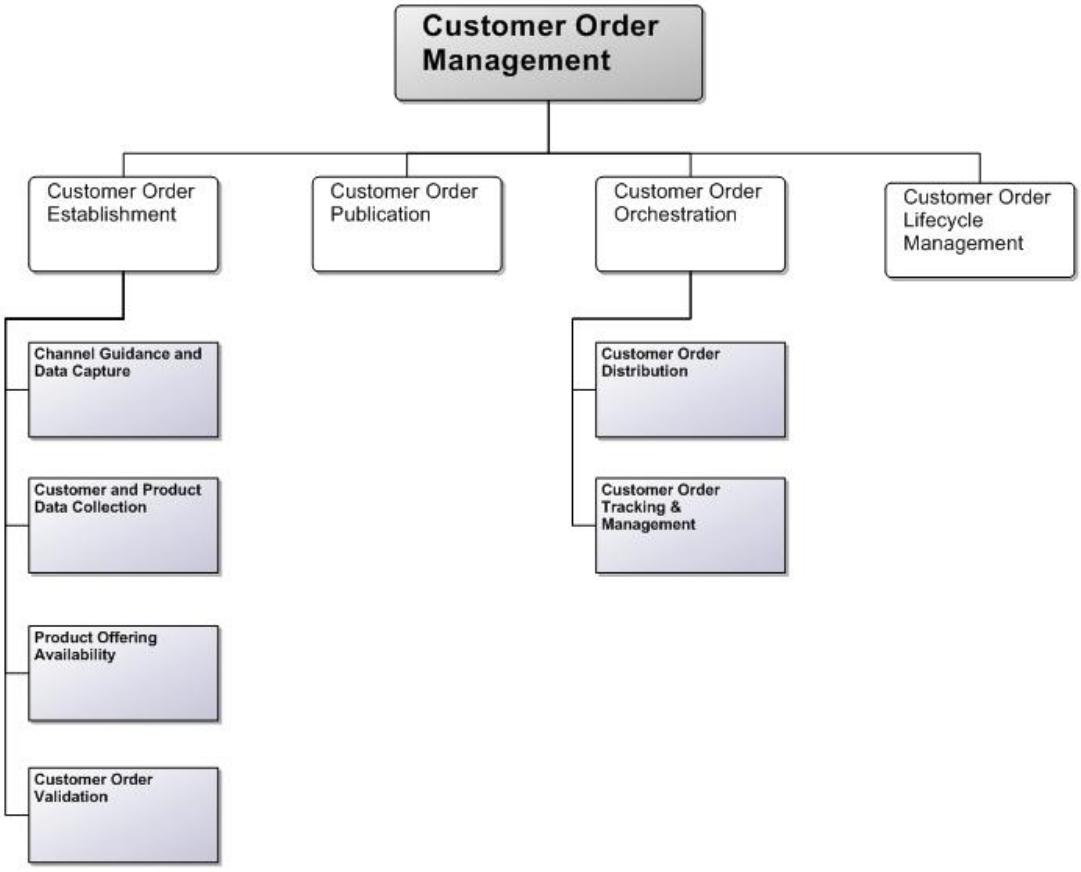

Figure 20: 05.03 Customer Order Management

Description

To Be Added

Customer Order Management

Application Identifier: 05.03

Overview

Customer Order Management applications manage the end to end lifecycle of a customer request for products. This includes order establishment (step guiding, data collection and validation), order publication as well as order orchestration and overall lifecycle management. A customer request pertain also already purchased product(s). Thus the Customer Order Management application handles order requests to suspend, resume, change ownership, amend, add, change and discontinue existing ordered products. Customer Order Management application should support repackaging of the purchased offers into alternate product offering (may require sales/contract negotiation). Customer Order Management applications typically serve all the customer touch points / channels, including call center, retail, self service, dealers, affiliates, etc. The order may be initiated by any channel and visible to the other channels if needed.

Functionality

Customer Order Management applications provide the following key functionality:

- Customer Order Establishment
- Customer Order Publication
- Customer Order Orchestration
- Customer Order Lifecycle Management

Supported Contracts

- Customer Information Management
- Product Catalog
- Provisioning Request (on Product Orders) and notification tracking
- Channels (Self Service, Retail, Dealers, etc.)
- Billing / Collection / Receivables
- Service Resource Management
- Workforce management
- Inventory Management / Network Discovery engine
- Credit Bureau Service
- Address Validation and Completion
- Serviceability check request (on Product orders)
- Intelligent Network (for prepaid activation)
- General Ledger
- Document Management (search scanned contracts and product literature)

Customer Order Establishment

Application Identifier: 05.03.01

Overview

To Be Added

Functionality

The Customer Order Establishment application is responsible for the acquisition of an order. Orders can be formed interactively stepwise, complete request response or batch.

In interactive stepwise mode, the order establishment application is guiding a front end channels through the required steps to form a valid order. In a request response mode, the order establishment is checking the order request and responds accordingly.

Customer Order Establishment includes:

- Channel guidance and data capture - guide the channel for the captured information required and receive the captured information (applies for interactive stepwise mode only)
- Customer and Product data Collection
- Product Offering Availability
- Customer Order Validation

Supported Contracts

To Be Added

Channel Guidance and Data Capture

Application Identifier: 05.03.01.01

Overview

Channel Guidance and Data Capture leads the specific channel front ending application with the captured information required. For each information element it can provide a list of valid options to select from (e.g. list of products available for the customer, list of options to select from a product). Finally it receives the captured information and publishes it.

Functionality

The Channel guidance and data capture functionality includes:

- Step guidance – guide the channel with the specific information items to be collected (e.g. customer identification, required product / order and the pertinent data for the order).
- Validation guidance – for each information element, may provide set of valid input
- Captured information reception – receive the captured data from the channel. Take care of persistence using Customer Order Lifecycle Management.
- Customer search - search the existing customer base using various criteria (name, address, subscriber number, equipment id, billing account number, etc.) and find the customer record to add the order (using Customer Information Management).
- Customer registration – register a new customer if this is a new customer (using Customer Information Management).
- Product catalog browsing – identify products available for purchase by a given customer, provide relevant information (e.g. cost, requirements, configurable attributes) to the customer. This information will be used in the step guidance.

- Ordered product versioning – identify product information that were applicable at the original ordering time.

Supported Contracts

To Be Added

Customer and Product Data Collection

Application Identifier: 05.03.01.02

Overview

To Be Added

Functionality

The Customer and Product Data Collection Application gathers customer and product data to aid in verification and issuance of a complete and valid customer order.

This application handles inter product dependency. It identifies product dependency, binds new order to purchased product or point to the dependent product required.

Supported Contracts

To Be Added

Product Offering Availability

Application Identifier: 05.03.01.03

Overview

To Be Added

Functionality

The Product Offering Availability application validates:

- Eligibility
- Serviceability

Eligibility: Business criteria determining if the offer is valid for this customer. (e.g. credit class limitations, customer type).

Serviceability: the product or products specified on the customer order request are available in the customer's area, and optionally at the specified customer location.

Supported Contracts

To Be Added

Customer Order Validation

Application Identifier: 05.03.01.04

Overview

To Be Added

Functionality

The Customer Order Validation application validates the customer order request based on contract, catalog, provisioning, and billing rules. It also includes address validation and due date confirmation.

Supported Contracts

To Be Added

Customer Order Publication

Application Identifier: 05.03.02

Overview

To Be Added

Functionality

The Customer Order Publication application issues valid and complete customer orders, and stores the order into an appropriate data store. As part of order publication, additional data might be obtained or derived to support downstream functions that are not provided by the ordering agent or customer.

Supported Contracts

To Be Added

Customer Order Orchestration

Application Identifier: 05.03.03

Overview

To Be Added

Functionality

The Customer Order Orchestration application provides workflow and orchestration capability across Customer Order Management. This application will have the ability to either orchestrate via triggering another application to retrieve the order request from a common data repository or distribute the customer order and/or order requests. This application also provides functionality to track and manage the overall customer order.

It also allows for the submission of a retro-active order with a past effective date (e.g. retroactive price plan change) and the handling of manual intervention requests (for order fallouts).

Supported Contracts

To Be Added

Customer Order Distribution

Application Identifier: 05.03.03.01

Overview

To Be Added

Functionality

The Customer Order Distribution application decomposes the customer order into product order requests (e.g. bundle decomposition). It may also decompose the product order into service orders requests and then distributes each request to appropriate Service Order Management applications.

Supported Contracts

To Be Added

Customer Order Tracking & Management

Application Identifier: 05.03.03.02

Overview

To Be Added

Functionality

The Customer Order Tracking & Management application performs the following:

- Oversees the transfer of the distributed requests to appropriate internal factories, affiliates or partners.
- Tracks the various distributed orders until completed.
- Provides status on overall customer order.
- Raises jeopardies as appropriate if specified dates and milestones are not met and escalates jeopardies to appropriate management levels.
- Create and manage customer order worklists. This can include the need to contact the customer to inform them of a change in the customer order.
- Completes the customer order when all distributed orders have been completed.
- Sequences distributed order provisioning if required.
- Buffers - Submit an order to be processed at a future date
- Notifies billing and maintenance when order has been completed.

The above capabilities needs to be provided in both an ability to query in real time as well as a publish/subscribe mechanism to enable the use of the information wherever required.

The Customer Order Tracking & Management overlooks the orders as a whole and provides:

- Maintaining order pool requiring manual intervention
- Grouping of order actions if appropriate so they can be executed synchronously.

Supported Contracts

To Be Added

Customer Order Lifecycle Management

Application Identifier: 05.03.04

Overview

To Be Added

Functionality

- Maintain pending orders - Save the order/quote for future processing (in case the customer is not sure they want to go through with the order at this point)
- Maintain order versioning
- Tracking & Logging – Track changes made to purchased product
- Order Change Management – Amend pending order resulted from customer change requests or provisioning system limitation, revalidate the order.
- Order Cancelation – The application can optionally support Cancel for order completed by Service Order Management (this capability is dependent on the Service Order Management system's ability to roll back service provisioning).
- Ordering Business rules – Centralized business rules for ordering (eligibility, compatibility).
- Ordering Activity Governance – Govern the control of the order amongst the ordering channels. This allows keeping the order data consistency, sharing the order data among order application channels and alternating the control between them.

Supported Contracts

To Be Added

05.04 Customer Self Management

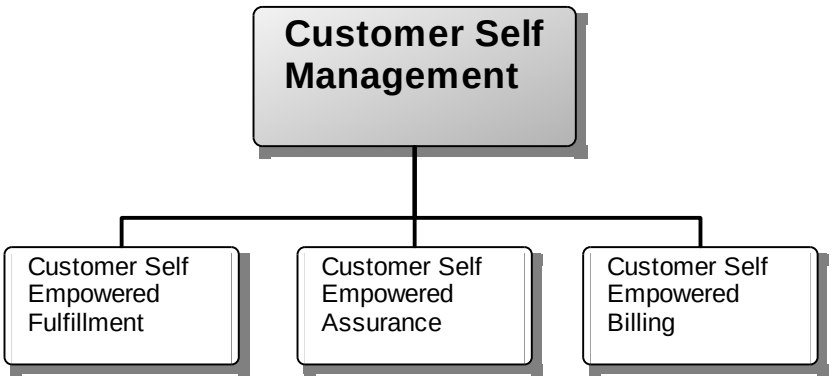

Figure 21: 05.04 Customer Self Management

Description

Customer self empowered applications provide an internet technology driven interface to the customer to undertake a variety of business functions directly for themselves. These applications interact to provide fully automated service or assisted service over various customers touch points. Although customer self management applications primarily trigger functionality defined in the rest of the CRM, Service Management and Resource Management applications, they should also contain functionality specific to customer self empowerment. As service providers shift to multidimensional services, new business realities require self service systems to support the following criteria:

- One-and-done fulfillment across service portfolio (cf. Order Management Applications)
- Multi-disciplinary customer service (cf. Customer Service / Account Problem resolution applications)
- Sync multi-channel interoperability
- Total convergent self directed billing (view/pay/dispute all) (cf. Front Office Customer Billing Management applications)
- Reconciliation interoperability· Personalization and usability
- Visualization of SLAs across subscribed services (cf. Customer Service / Account Problem resolution applications)
- Portfolio driven guided selling (cf. Product Catalogue, Product Lifecycle Management applications)
- Leveraging the 360 degree customer view (cf. Customer Information Management Application)

- Customer self management applications enable service providers to increase profitability across the organization by optimizing the customer experience and maximizing the efficiency of business operations through:
- Rapid order-to-activation mechanism across service portfolio
- Commodity like enablement for telecom services (rapid introduction; easy amendment; cross bundling)

- Universal platform supporting multiple users (consumers; business; dealers) and multiple LOBs (wire line; wireless; IPTV) though single point of contact
- Reducing costs through operating efficiencies

These operations expect to gain more customer loyalty, service stickiness and ARPU for the service provider. A primordial factor for increasing ARPU through self empowered systems is high usability. High usability requires channel agnostic consistency and seamless customer experience leveraging functionality that is driven from sporadic backend systems. For that, self empowered systems should provide integration readiness through several vehicles:

- Pre-integrated self service system including stand-alone web framework or integration front end with a portal engine
- Self services layer exposing atomic Webservices/APIs for reuse by multiple systems across the architectural environment
- Portlets driven connectivity exposing data and services interoperability through a portal engine or web application.

Typically the portal to the customer is via a web-based interface. Customer self care is increasingly popular with both customers and operators as it usually provides access to information 24 hours a day, 7 days a week and does not have the frustration of waiting for a free call agent. Customer self-care systems can take a number of forms from a controlled 'secure window' application into the underlying OSS systems used internally by the operator for the customer to view and pay his invoices to a complete portal where the customer can manage his entire relationship with the operator. Customer Self Management applications need to provide a level of security to protect both the customer's data and the integrity of the underlying systems. They should also be capable of providing single sign on capabilities to access Business and Operational Support Systems.

In functional terms customer self-management generally provides a comprehensive collection of self-service functionality supporting all stages of the customer life cycle, Registration and fulfillment, Assurance and Billing Management activities. As the various features provided for customer lifecycle management are often portlet type applications that are integrated to a CSP's overall customer self management portal, the self management applications can be broken down into 3 major applications:

- Customer Self Empowered Fulfillment Applications
- Customer Self Empowered Assurance Applications
- Customer Self Empowered Billing Applications

These will be discussed in more detail in the following sections.

Customer Self Management

Application Identifier: 05.04

Overview

Customer self empowered applications provide an internet technology driven interface to the customer to undertake a variety of business functions directly for themselves. These applications interact to provide fully automated service or assisted service over various customers touch points. Although customer self management applications primarily trigger functionality defined in the rest of the CRM, Service Management and Resource Management applications, they should also contain functionality specific to customer self empowerment. As service providers shift to multidimensional services, new business realities require self service systems to support the following criteria:

- One-and-done fulfillment across service portfolio (cf. Order Management Applications)
- Multi-disciplinary customer service (cf. Customer Service / Account Problem resolution applications)
- Sync multi-channel interoperability
- Total convergent self directed billing (view/pay/dispute all) (cf. Front Office Customer Billing Management applications)
- Reconciliation interoperability
- Personalization and usability
- Visualization of SLAs across subscribed services (cf. Customer Service / Account Problem resolution applications)
- Portfolio driven guided selling (cf. Product Catalogue, Product Lifecycle Management applications)
- Leveraging the 360 degree customer view (cf. Customer Information Management Application)

Customer self management applications enable service providers to increase profitability across the organization by optimizing the customer experience and maximizing the efficiency of business operations through:

- Rapid order-to-activation mechanism across service portfolio
- Commodity like enablement for telecom services (rapid introduction; easy amendment; cross bundling)
- Universal platform supporting multiple users (consumers; business; dealers) and multiple LOBs (wire line; wireless; IPTV) though single point of contact
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- Portlets driven connectivity exposing data and services interoperability through a portal engine or web application.

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Functionality

In functional terms customer self-management generally provides a comprehensive collection of self-service functionality supporting all stages of the customer life cycle, Registration and fulfillment, Assurance and Billing Management activities. As the various features provided for customer lifecycle management are often portlet type applications that are integrated to a CSP's overall customer self management portal, the self management applications can be broken down into 3 major applications:

- Customer Self Empowered Fulfillment Applications
- Customer Self Empowered Assurance Applications
- Customer Self Empowered Billing Applications

These will be discussed in more detail in the following sections.

Supported Contracts

To Be Added

Customer Self Empowered Fulfillment

Application Identifier: 05.04.01

Overview

Customer self empowered fulfillment applications provide an internet technology driven interface to the customer to undertake a variety of fulfillment functions directly for themselves. These applications interact to provide fully automated service or assisted service over all customer self management touch points. These applications tend enable rapid order-to-activation while reducing operating costs through improved efficiency and integrated flow-through-fulfillment. Today's communications products and services carry commodity oriented attributes requiring easy activation, amendment and consumption, rapid and comprehensive introduction to customers while bringing together customer consumption interests and service provider's business interests in a seamless and consistent manner.

It is assumed that the user is not as savvy as the employee at the call center. The customer experience should support a simple flow that capitalizes from the advanced application flows defined by the order management applications (cf. Order Management Applications).

Functionality

In functional terms customer self-empowered fulfillment generally provides a comprehensive collection of self-service functionality supporting all stages of the customer facing fulfillment cycle, including

- Product Catalogue and Offerings browsing (versioning driven)
- Guided selling driven view for offer eligibility
- Shopping cart driven order management:
  - Check Availability
  - Check Eligibility
  - Check Compatibility
  - Quote Price

- Order Status
- Payment capture
- Installation preferences capture
- SLA preferences capture
- Account creation for anonymous user

- Assigned products maintenance
- Rate plans amendment
- Alerts and notifications setting
- Access to Knowledge Management database & solutions to common problems
- Access to Call center agents
- Reports on fulfillment and SLA aspects

Corporate customers should benefit from additional features as required for their daily tasks:

- Bulk ordering
- Customer hierarchy driven ordering
- Mass changes (activation; configuration)
- Eligibility management for the business customer admin
- Organizational approval process
- Equipment management (allocation; activation)

Supported Contracts

- Order Management
- Billing Management
- Customer Service / Account Problem Resolution
- Service Problem Resolution for Order exception handling
- Customer Information Management
- Knowledge Management
- SLA Dashboard
- Activation and Provisioning
- Resource Management

Customer Self Empowered Assurance

Application Identifier: 05.04.02

Overview

Customer self empowered assurance applications provide an internet technology driven interface to the customer to undertake a variety of assurance functions directly for themselves. These applications interact to provide fully automated service or assisted service over customers touch points. These applications create enablement for customers

to assure the service level that they benefit from their service provider.

Functionality

Self empowered assurance applications include the following features:

- Account management (such as contact attributes)
- Self registration to online services
- Service requests management:
- Service request submission
- Service request amendment
- Service request closure
- Users management
- Alerts and notifications setting
- Address book management
- Access to Knowledge Management database & solutions to common problems
- Access to call center agents
- Reports on service requests and SLA across services

Corporate customers should benefit from additional features as required for their daily tasks:

- Users and roles management
- Mass changes
- Contacts management
- Customer hierarchy driven service requests
- Organizational approval flow

Supported Contracts

- Order Management
- Billing Management
- Customer Service / Account Problem Resolution
- Service Problem Resolution for trouble ticket handling
- Customer Information Management
- Knowledge Management
- SLA Dashboard (for incident and entitlement tracking)
- Activation and Provisioning
- Resource Management

Customer Self Empowered Billing

Application Identifier: 05.04.03

Overview

Customer self empowered billing applications provide an internet technology driven interface to the customer to undertake a variety of billing functions directly for themselves. These applications interact to provide fully automated service or assisted service over customers touch points. Customer self empowered billing applications enable the service providers cost reduction through the following operational efficiencies:

- Replacing paper bills with paperless bills
- Converging the multi- disciplinary billing operations
- Deflecting bill queries calls from the contact center to the web
- Automating the dispute resolution process
- Reducing days sales outstanding (DSO)
- Reducing requests for bill prints
- Reduction in professional personnel providing analytics for business customers
- Reduction in interest loss due to delayed payments

Functionality

Self empowered billing applications include the following web based features:

- Bill view
- Unbilled charges view
- Usage view
- Payment capture
- Dispute capture and resolution
- Usage and charges comparison
- Penalties view
- Address book driven usage view
- Split statement for demarcation between calls

- Calls assignment for classification of usage
- Reports on usage and charges

Corporate customers should benefit from additional features as required for their daily tasks:

- Cost center analysis
- Customer hierarchies driven billing operations
- Organizational reports on usage and charges
- Organizational approval process (such as for payments and disputes)

Supported Contracts

To Be Added

05.05 Customer Contact Management, Retention & Loyalty

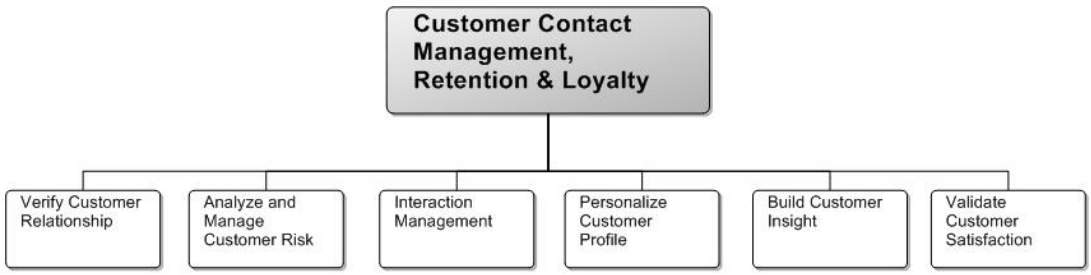

Figure 22: 05.05 Customer Contact Management, Retention & Loyalty

Description

Customer contact management, retention and loyalty applications are a varied group of functions that are generally sold as part of a Customer Relationship Management (CRM) suite of applications. These applications allow an operator create, update and view the customer's information (names, addresses, phone numbers, organizational hierarchy), record and view all customer interactions across different communication channels and department, so that whoever is speaking to a customer can see the history of issues that have concerned that customer, be they order issues, billing enquiries or service problems. More sophisticated systems allow capabilities to highlight customers as risk of switching to an alternative carrier (churn indicator) and provide comparisons with other operator's service packages to allow customer care agents to try to persuade a customer that their current operator can provide the best value for money. These indicators can be provided via integration to business intelligence platforms.

Customer Contact Management, Retention & Loyalty

Application Identifier: 05.05

Overview

Customer contact management, retention and loyalty applications are a varied group of functions that are generally sold as part of a Customer Relationship Management (CRM) suite of applications. These applications allow an operator create, update and view the customer's information (names, addresses, phone numbers, organizational hierarchy), record and view all customer interactions across different communication channels and department, so that whoever is speaking to a customer can see the history of issues that have concerned that customer, be they order issues, billing enquiries or service problems. More sophisticated systems allow capabilities to highlight customers as risk of switching to an alternative carrier (churn indicator) and provide comparisons with other operator's service packages to allow customer care agents to try to persuade a customer that their current operator can provide the best value for money. These indicators can be provided via integration to business intelligence platforms.

Functionality

In general, the functions provided by this application suite are:

- Verify Customer Relationship. The purpose of this function is to verify that the customer is who they claim they are. The application verifies the identity of the customer and issues a unique Identifier and Authentication information. This function may also be used to 'clean-up' duplicates of customer identifying information that may exist within the organization.
- Interaction Management - Provide single point of user access to end to end business processes for Customer Acquisition and Management, Order Capture, Customer Service, Customer and Account Management, Trouble ticketing, Billing and Collections, Billing, Disputes, rate plan analysis. This function is used by customers directly (via self service) or by people dealing with customers (assisted service)
- Build Customer Insight - The purpose of this function is to ensure that Service Provider and the customer feel confident that the relationship is founded on up-to-date, accurate and legally compliant information. The Service Provider will incorporate into the customer profile, all relevant information gathered through all contacts with the customer (usage pattern, demographics, life stage, household, community of interest, business direction). Customer and market information from other sources may be gathered, which will build a better understanding of the customer. Customer Information must be made available to any process that needs to access it. This customer information will be used to continually refine the means and style of interaction, and the solution sets and customer experience offered. This functionality can usually be offered via script management tools.
- Analyze and Manage Customer Risk - The purpose of this function is to ensure that Risk analysis is based on information collected from all processes and that consistent risk assessment is used across the Enterprise. Its purpose is also to track and improve Operations, target and win the right customers, improves Sales Conversion rate. It determines the credit risk, fraud risk, influence risk, and churn risk. It identifies treatments to manage these risks and focuses on using customer information. This function is usually best served through integration with Business Intelligence platforms, with feeds provided by Charging, Collections, Accounts Receivable, and Prepaid Balance Management applications.
- Personalize Customer Profile for Retention & Loyalty - The purpose of this function is to provide the personalization opportunities for customers that will encourage them not to switch to another Service Provider. Personalization allows delivery of services that more closely match the customer's need. Collection of Personalization

Information also discourages switching since the customer would have to build up the same personalized experience with the next Service Provider. Typical Personalization would be enforcing customer communications through the customer preferred communication channel, provide cross-selling and up-selling recommendations based on customer interests and leveraging the information gathered to help the operator build a more intimate relationship with the customer.

- Validate Customer Satisfaction - The purpose of this function is to validate that predicted/expected value is delivered by the product/service and that the after-sales processes (billing and assurance) are initialized. It validates that the customer is capable of realizing maximum value from the operation or use of the solution and that intense Provider involvement is no longer needed to manage the product/service. This process ensures that the customer is satisfied and that the product/service that was actually delivered meets original or updated expectations and agreements and that the product/service is operable by the customer.

Supported Contracts

- Application should support integration to Media Management: Voice (CTI), Email, Chat, Collaboration Tools
- Application should support integration to Knowledge Management
- Application should support integration to Quality Monitoring (ensure that the customer experience is being met)
- Application should support integration to Workforce Management & Scheduling

Verify Customer Relationship

Application Identifier: 05.05.01

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Analyze and Manage Customer Risk

Application Identifier: 05.05.02

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Interaction Management

Application Identifier: 05.05.03

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Personalize Customer Profile

Application Identifier: 05.05.04

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Build Customer Insight

Application Identifier: 05.05.05

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Validate Customer Satisfaction

Application Identifier: 05.05.06

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

05.06 Customer Service Representative Toolbox

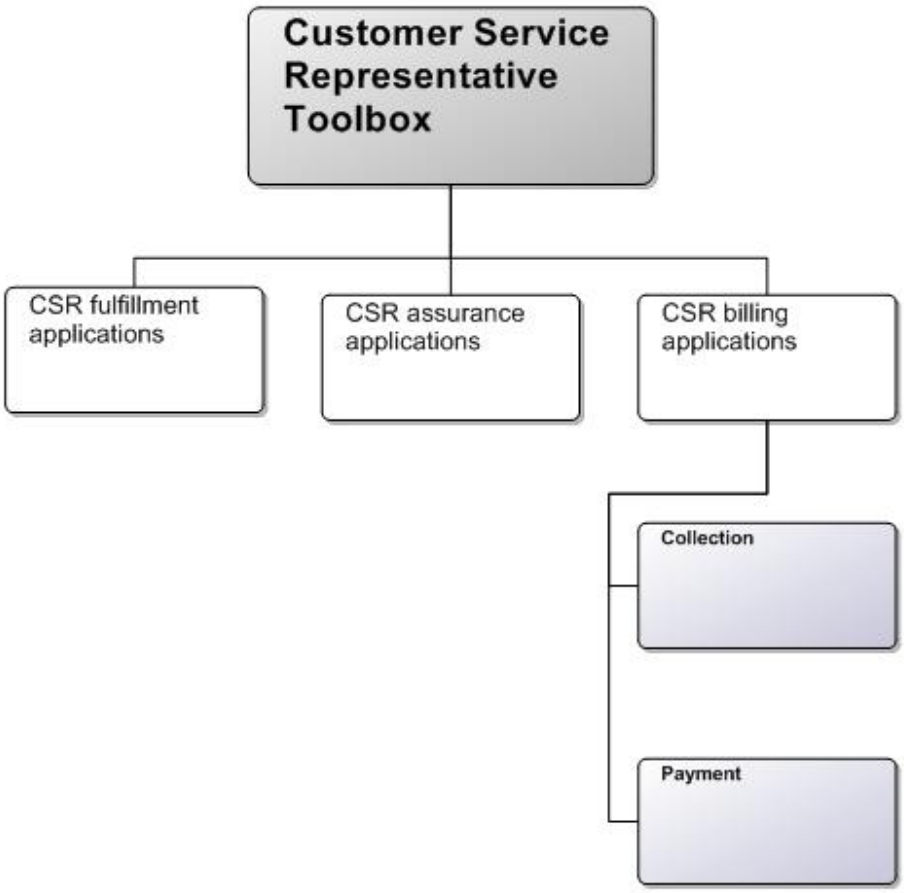

Figure 23: 05.06 Customer Service Representative Toolbox

Description

Customer Service Representatives (CSRs) play critical roles in shaping the customer experience. CSRs are increasingly expected to drive not just service and satisfaction, but revenue opportunities through customer interactions, as well as handle interactions across multiple channels – email, web chat or phone. CSRs need the right information at the right time, every time, to handle interactions quickly and effectively. CSRs must be empowered with the tools necessary to efficiently and effectively handle every interaction the right way, in a personalized manner.

The CSR toolbox addresses this need for rich interactions with the customer, comprising of applications from the Fulfillment, Assurance and Billing domains. The CSR toolbox provides additional functionality in a common look and feel across the applications – and is not simply a convoluted assembly of applications and processes across siloed systems.

The CSR toolbox is optimized to the CSR's needs; the user interface and controls provide easy access to key customer information whenever needed. It integrates all of the disparate, siloed applications the CSR needs to work with. It delivers real time, always-in-context guidance to the CSR during an interaction, as well as navigates the CSR through business processes as they move field by field across different systems and interaction

steps.

Customer Service Representative Toolbox

Application Identifier: 05.06

Overview

Customer Service Representatives (CSRs) play critical roles in shaping the customer experience. CSRs are increasingly expected to drive not just service and satisfaction, but revenue opportunities through customer interactions, as well as handle interactions across multiple channels – email, web chat or phone. CSRs need the right information at the right time, every time, to handle interactions quickly and effectively. CSRs must be empowered with the tools necessary to efficiently and effectively handle every interaction the right way, in a personalized manner.

The CSR toolbox addresses this need for rich interactions with the customer, comprising of applications from the Fulfillment, Assurance and Billing domains. The CSR toolbox provides additional functionality in a common look and feel across the applications – and is not simply a convoluted assembly of applications and processes across siloed systems.

The CSR toolbox is optimized to the CSR's needs; the user interface and controls provide easy access to key customer information whenever needed. It integrates all of the disparate, siloed applications the CSR needs to work with. It delivers real time, always-in-context guidance to the CSR during an interaction, as well as navigates the CSR through business processes as they move field by field across different systems and interaction steps.

Functionality

- Single sign-on – Provides single sign-on across applications in the toolbox.
- Centralized data entry – Updates information in one system and automatically populates it to all other systems (if there is a need to overcome data duplication).
- Customer information dashboard – Displays relevant customer information, such as name, account and lifetime value on a persistent customer dashboard.
- In-Context, configurable, workflow-driven navigation – Through means such as configurable business processes, automatically drives the CSR workflow and screen navigation according to the context of the customer interaction and other customer profile information across all applications used.
- CSR guidance – Complementary to in-context, configurable navigation, CSR guidance intelligently guides the CSR through the interaction. Guidance can span any subject—cross-sell, up-sell, retention, service and support, quality or training

Note that any mixture of the above two functions can coexist.

- Embedded actions – Embedding desktop controls with APIs or service calls to other systems as a means to process activities such as invoice generation, device activation, and other back-office activities.
- Launch in-context Common Actions – Configurable, short-cut buttons that launch key applications and functions for streamlining actions a CSR commonly performs. (e.g. create a case, prepare an order, update an address)
- Conversational scripting – Displays recommended text and scripting to guide agents in specific conversations/dialogue tailored to each customer interaction. Also provides branching based on customer answers.

Supported Contracts

To Be Added

CSR fulfillment

Application Identifier: 05.06.01

Overview

A CSR fulfillment application provides front end support for the application flows defined by the order management applications (cf. Order Management Applications).

Note: Since CSRs are required to perform sales activities, it is expected that in a future TAM version this application will encompass front end applications from the sales domain as well.

Functionality

CSR fulfillment functionality includes taking care of a single order, assisting orders initiated in other channels, handling pool of orders globally, and exception handling, reporting and analyzing the ordering activities. This includes:

- Product Catalogue and Offerings browsing (versioning driven)
- Order Capture and Negotiation
- Order take-over & relinquish – the ability to take over governance on orders handles in other channels (e.g. self service) amend and relinquish while preserving all the captured data.
- Assigned products maintenance
- Manage monitor and track specific order – CSR access to a specific order
- Error resolution – View pool of orders resulted in error / stuck orders and enable the CSR to act accordingly (e.g. resend the request, notify the user with recommended action)
- Jeopardy notifications – View jeopardy notifications queue and enable the CSR to act accordingly (e.g. notify customer on due date delay)
- Orders administration – View all outstanding orders, progress and history displays
- Business / Financial / Operational reporting

Supported Contracts

- Order Management
- Product Catalogue

CSR assurance

Application Identifier: 05.06.02

Overview

It is expected that future versions of TAM will encompass the front end of the assurance applications: Customer QoS/SLA Management and Customer Service/Account Problem Resolution.

Functionality

To be added.

Supported Contracts

To Be Added

CSR billing

Application Identifier: 05.06.03

Overview

A CSR billing application provides front end functionality for the CSR in their day to day billing related activities.

Functionality

CSR billing functionalities includes:

- Billing Inquiry Dispute & Adjustment Management
- Payment
- Collection

Note: It is expected that future TAM version will incorporate the Billing Account Management into the same framework.

Supported Contracts

To Be Added

Collection

Application Identifier: 05.06.03.01

Overview

To Be Added

Functionality

The purpose of collection application is to support the customer service representative (CSR) in collection activities. Most of the collection activities are executed automatically through Collection Management. The functionality includes:

- Collection inquiries – query treatment path and collection history
- Perform manual collection activities (e.g. make call)
- Payment arrangement settlement with the customer
- Issue write-offs
- Manual intervention in collection treatment
    - Force account into collection / Stop collection treatment
    - Change collection policy

- Pause / Resume collection treatment

- Collection agent reassignment– Change the agent responsible for a specific collection activity.

Supported Contracts

To Be Added

Payment

Application Identifier: 05.06.03.02

Overview

To Be Added

Functionality

The purpose of payment application is to accept customer payment via the customer service representative (CSR). Payments are handled by Receivable Management. The functionality includes:

- Immediate payment of balance / specific invoice using existing or new pay means
- Prepaid recharge using vouchers / other pay means

Supported Contracts

To Be Added

05.07 Customer Quality of Service & Service Level Agreement Management

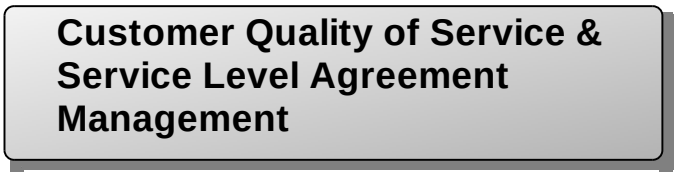

Figure 24: 05.07 Customer Quality of Service & Service Level Agreement Management

Description

Customer Quality of Service (QoS) and / Service Level Agreement (SLA) Management(Contract and SLA Management) is a set of functions, possibly residing in

more than one application, that assist operators in ensuring that their customers get the level of service for which they are paying. This area is specifically implemented to enable the operator to 'see' the service through the eyes of the customer, i.e. customer perceived quality. This is not to be confused with the related set of functions and applications that exist at the service management and resource management layers to help operational managers understand the performance of services and network resources respectively. Customer QOS functions aim to measure the customer perceived quality of service. An example of this is the approach taken to measure voice or video service quality as perceived by a human being. This is known as Mean Opinion Scoring and makes an objective measure of customer perceived quality using technologies that simulate the human ear and human perception. Such measures may be required by legislators or be published in league tables. Certainly operators who believe that good quality services enable them to retain and delight customers take this area of QOS management seriously. QOS measurements may be applied either on a per customer basis; against a group of customers (e.g. a corporate account) or across an entire service. It may be applied where one operator is retailing another operator's wholesale service (e.g. Mobile Virtual Network Operators)If QOS applications measure the actual level of service being offered, SLA management applications (Contract Management) provide the ability to compare actual QOS with the pre-agreed level of service promised and flag any jeopardizes encountered. This is particularly important where service level guarantees (SLG's) have been contractually offered - the primary purpose of the SLA management application(s) is to ensure that the operator knows at any time which services to which customers may potentially or actually be in breach of a service level guarantee.

Customer Quality of Service & Service Level Agreement Management

Application Identifier: 05.08

Overview

Customer Quality of Service (QoS) and / Service Level Agreement (SLA) Management(Contract and SLA Management) is a set of functions, possibly residing in more than one application, that assist operators in ensuring that their customers get the level of service for which they are paying. This area is specifically implemented to enable the operator to 'see' the service through the eyes of the customer, i.e. customer perceived quality. This is not to be confused with the related set of functions and applications that exist at the service management and resource management layers to help operational managers understand the performance of services and network resources respectively. Customer QOS functions aim to measure the customer perceived quality of service. An example of this is the approach taken to measure voice or video service quality as perceived by a human being. This is known as Mean Opinion Scoring and makes an objective measure of customer perceived quality using technologies that simulate the human ear and human perception. Such measures may be required by legislators or be published in league tables. Certainly operators who believe that good quality services enable them to retain and delight customers take this area of QOS management seriously. QOS measurements may be applied either on a per customer basis; against a group of customers (e.g. a corporate account) or across an entire service. It may be applied where one operator is retailing another operator's wholesale service (e.g. Mobile Virtual Network Operators)If QOS applications measure the actual level of service being offered, SLA management applications (Contract Management) provide the ability to compare actual QOS with the pre-agreed level of service promised and flag any jeopardizes encountered. This is particularly important where service level guarantees (SLG's) have been contractually offered - the primary purpose of the SLA management application(s) is to ensure that the operator knows at any time which services to which customers may potentially or actually be in breach of a service level guarantee.

Functionality

Specific functions of this application area are:

- Document Contractual SLA obligations - the purpose of this function is to document contracts and contract terms (entitlements) signed with the customer and provide automated monitoring of the potential or actual breaches to the terms of the SLA. Escalation hierarchy should be defined for automatic notifications of the potential or actual breaches
- Measure perceived QoS - the purpose of this function is to measure or estimate the actual quality of service being received by the customer against pre-set thresholds.
- Manage QoS/SLA Violation - the purpose of this function is to ensure that the customer and the relevant internal processes are informed of service quality degradations and violations and that action is undertaken to resolve the degradation or violation. Analyzes all the information related to a QoS/SLA degradation or violation and takes the appropriate actions when a soft threshold is crossed or the agreed QoS is violated. Follows up the actions to ensure that the customer is satisfied with the resolution of the problem. Ensures that the customer is informed of any planned maintenance or other scheduled events likely to impact delivery of the customer's service.
- Manage Reporting - the purpose of this function is to report on the customer's QoS performance, to manage the production and presentation of reports to the customer on service levels in the form and at the times agreed with the customer, to prepare reports for internal processes and respond to specific inquiries on the performance of the customer service.

Supported Contracts

- E.g., Network Performance Management

05.08 Customer Service / Account Problem Resolution

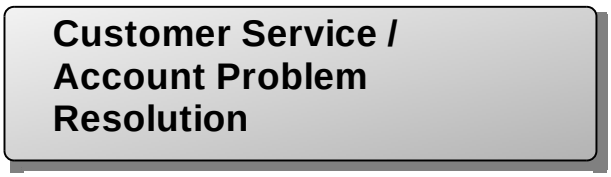

Figure 25: 05.08 Customer Service / Account Problem Resolution

Description

Customer Problem Resolution applications (trouble ticketing) handle the processes of dealing with customers affected by a service related or billing related problem. These functions are closely related to Service Problem Resolution, Customer Billing Management, and Resource Problem Resolution. These can be seen as a distributed set of related applications, ideally built around common data and functions. Each layer has a

different perspective and takes a different view of the same data using the same information model (see TMF GB922 - the Shared Information and Data Model). Customer Problem Resolution applications are mainly concerned with how the problem would affect the operator's relationship with the customer with the goal of minimizing any adverse effect on this relationship.

The current trend is to integrate trouble ticketing with both service level and network level problem-reporting systems. Trouble ticketing applications would act as an initiation source for Service Problem Resolution applications or Resource Problem Resolution applications based on specific business rules.

Customer Service / Account Problem Resolution

Application Identifier: 05.08

Overview

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The current trend is to integrate trouble ticketing with both service level and network level problem-reporting systems. Trouble ticketing applications would act as an initiation source for Service Problem Resolution applications or Resource Problem Resolution applications based on specific business rules.

Functionality

Typical application functions supported are

- Verify Customer Relationship - verify that the customer is who they claim they are and they own the products that they are reporting the problem with.
- Problem Reception - receive and acknowledge the problem report. Accurately timestamp the problem. Raise appropriate Trouble Ticket and record problem symptoms.
- Specifically for billing problems (e.g., dispute of a charge on a bill), the application needs to also capture the details of the bill (e.g., bill id, charge code, amount in dispute, etc.). This "context" of the complaint will be "carried" with the trouble ticket through its resolution, thereby relieving the second tier support from looking up that information. Also, once the second tier support approves the dispute, the application should automate the billing notification.
- Verify the customer's SLA's for support (support hours, maintenance agreements, frequency, for example). Activate any incident related SLA's.
- Evaluate & Qualify Problem - determine the nature of a problem that has been reported by a customer and whether the customer is using the service properly. There will be testing to fit or translate customer information into service information for diagnosis. If there is a problem notification, a resource problem notification or a service-affecting event report (alarms, etc.) the Evaluate & Quality Problem functions may analyze this information and translate these problems into their impact on

customers. These processes will make the necessary reports to inform the Problem Handling processes about the estimated time to restore service. Also the Customer QoS/SLA Management applications will be informed about the problem's impact on the service performance.

- Plan & Assign Resolution - identify the necessary steps in order to activate the different units that will be involved to fix the problem.
- Track & Manage Resolution - ensure that the whole resolution is completed according to the established plan. Automated notifications and escalation procedures are established to effectively monitor any deviation to the resolution plan.
- Close & Report - certify the recovery of the normal service performance. These processes will perform the necessary testing to achieve this purpose and make the necessary reports about the problem that occurred, the root cause and the activities carried out for restoration. It also will issue the trouble clearance report to inform other CRM applications.
- Updating Billing systems if appropriate- reimburse the affected customer for the service problems they have endured.
- Advising other OSS systems if appropriate.

Supported Contracts

- Service Problem Resolution Applications
- Correlation & Root Cause Analysis
- Resource Problem Management
- Service Performance Management
- Service Quality monitoring
- Resource performance management
- Billing

05.09 Receivables Management

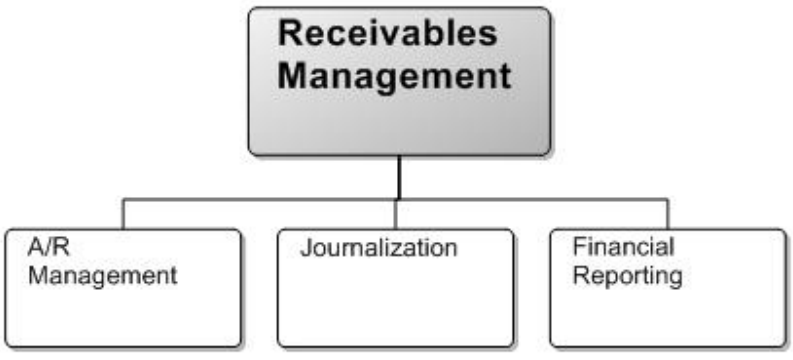

Figure 26: 05.09 Receivables Management

Description

The purpose of this application is to automate and manage the processing of financial transactions affecting the customer's financial account. Furthermore this process is meant to match these transactions with the services/invoices delivered to this customer. This is a legal requirement in some countries e.g. as required by the Sarbanes-Oxley Act in the USA.

Receivables Management

Application Identifier: 05.09

Overview

The purpose of this application is to automate and manage the processing of financial transactions affecting the customer's financial account. Furthermore this process is meant to match these transactions with the services/invoices delivered to this customer. This is a legal requirement in some countries e.g. as required by the Sarbanes-Oxley Act in the USA.

Functionality

Receivables Management functionality includes the following:

- A/R Management
- Journalization
- Financial Reporting

Supported Contracts

- Billing
- Customer Information Management
- Order Management
- External Credit Bureau Databases
- Accounts Receivable
- Collections
- External General Ledger
- External Accounts Payable

A/R Management

Application Identifier: 05.09.01

Overview

To Be Added

Functionality

The purpose of A/R Management is to maintain the outstanding balance or receivable, including consideration of the age of the outstanding balance (e.g. 30, 60, 90, ... days).

A/R Management interacts with billing on bill cycle run. A/R management also manages payment and financial activities. It includes:

- Invoice charges from Billing - manages the connection between Accounts Receivable and Billing. This process posts invoice charges in Accounts Receivable based on billed charges. It can be invoked by any billing system. Invoice charges accepts information on new charges and credits billed to customers, and updates their account balance accordingly.
- Payment management - Payment Management receives customer payments and applies them to customer accounts. Payment Management accepts payments from various sources. It posts them to customer accounts and applies the funds to unpaid invoices It also performs payment-related activities, such as:
  - Payment / Deposits
  - Back-outs of payments
  - Transfers of funds between accounts

- Financial Account Management – Financial Account Management supports the financial activities that relate to customer accounts. These activities includes:
  - Refunds
  - Disputes
  - Adjustments / Credits
  - Write-offs.
- Bill preparation - AR calculates and sends to the Bill Calculation application the required information for accounts that are going to be processed. This information includes:
  - Financial activity information to be presented on the customer bill.
  - Credits and fees, such as Late Payment Fees (LPF), dishonored checks for which invoicing should bill the customer.

Supported Contracts

To Be Added

Journalization

Application Identifier: 05.09.02

Overview

To Be Added

Functionality

The Journalization Application is responsible for analyzing and translating financial activities into journal records. Specifically, Journalization assigns financial codes to the transactions received from billing, online adjustment, remittance, refund, and collection processes. This application accumulates journal entries and maps them to the GL transaction based on appropriate geographical accounting principles for sending downstream to the corporate general ledger.

Supported Contracts

To Be Added

Financial Reporting

Application Identifier: 05.09.03

Overview

To Be Added

Functionality

Financial Reporting comprises a set of reports presenting summaries of the financial activities of customer accounts. It includes a set of debt aging reports and proof & balance reports. Furthermore, this application provides tax information to Corporate Tax in support of tax compliance. Financial Reporting also prepares account revenue details to be gathered into data warehouse to facilitate decision support. Some of the data includes account number, dollar amount, product / service, adjustment amount and payment amount as well as all of the revenue and charges to be journalized.

Supported Contracts

To Be Added

05.10 Billing Inquiry, Dispute & Adjustment Management

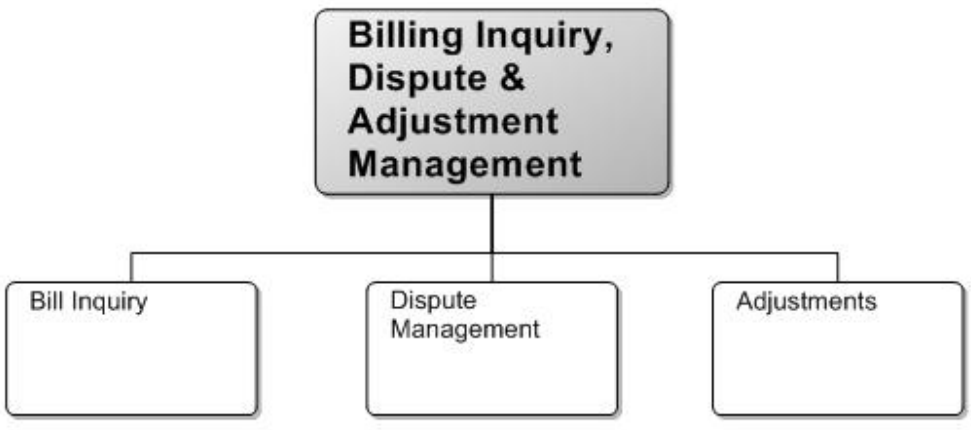

Figure 27: 05.10 Billing Inquiry, Dispute & Adjustment Management

Description

This is a front end application for managing billing inquiries and billing disputes. Billing inquiries are provided by Invoicing. Open dispute cases can be handled by Case Management system or internally. The financial activities are performed by Receivables Management.

Billing Inquiry, Dispute & Adjustment Management

Application Identifier: 05.10

Overview

This is a front end application for managing billing inquiries and billing disputes. Billing inquiries are provided by Invoicing. Open dispute cases can be handled by Case Management system or internally. The financial activities are performed by Receivables Management.

Functionality

Application functionality includes:

- Handling of billing inquiries, including the ability to view billing account and financial information.
- Handling of disputed charges, including the opening, managing, tracking, and resolution of the dispute, which may include an adjustment.

Supported Contracts

To Be Added

Bill Inquiry

Application Identifier: 05.10.01

Overview

To Be Added

Functionality

The purpose of Bill Inquiry is to provide the capabilities to view customer billing account and financial information to answer a query on a bill. Query types may include the following:

- Balance, statement
- List all invoices
- View exact bill image
- List all charges per invoice
- View unbilled charges
- Generate bill on demand
- View usage summary and details (billed and non-billed)

Supported Contracts

To Be Added

Dispute Management

Application Identifier: 05.10.02

Overview

To Be Added

Functionality

When a customer questions a charge, account representatives work with the customer to resolve the disputed charge. Open disputes are entered into the dispute management system where an audit process keeps track of its progress until it's closed. An agreed-upon adjustment with notations is entered pending research and approval.

Supported Contracts

To Be Added

Adjustments

Application Identifier: 05.10.03

Overview

To Be Added

Functionality

The purpose of Adjustments is to adjust customer's account balance based on the result of a detailed assessment or dispute. Possible adjustments may include tax adjustments, account/invoice/charge level adjustment, good will adjustment as well as refund or credits.

All adjustments are made based on schedule of authorization polices. The customer service representative (CSR) can also consider the history and nature of previous dispute & adjustment requests made by the customer.

Supported Contracts

To Be Added

05.11 Bill Format / Render

Figure 28: 05.11 Bill Format / Render

Description

Bill Format / Render formats the invoice and/or statement based on specified options, and then makes it available in appropriate media types. Example outputs can include paper, electronic, DVD, etc.

See Transactional Document Production for more information.

05.12 Product/Service Rating

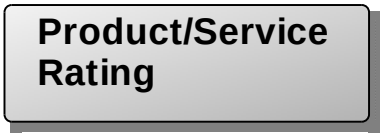

Figure 29: 05.12 Product/Service Rating

Description

The Product/Service Rating application calculates the customer specific charges (recurring, one time, usage), discounts, and optionally taxes (when required on charge level, otherwise tax calculation is performed as part of Bill Calculation).

The rating application accepts either:

- Events / records that have been collected, translated, correlated, assembled, and guided to customer, product and to customer account for usage / content consumption calculation
- Customer and Order/Product information for recurring and onetime charges.

Rating applications should be able to process events in a real time or batch mode and must support pre-paid, post-paid and pay-it-now payment options.

The rating application must consider various factors such as customer information, product information, price plan and event (e.g. call record, order information, content consumption) details.

Product/Service Rating

Application Identifier: 05.12

Overview

The Product/Service Rating application calculates the customer specific charges (recurring, one time, usage), discounts, and optionally taxes (when required on charge level, otherwise tax calculation is performed as part of Bill Calculation).

The rating application accepts either:

- Events / records that have been collected, translated, correlated, assembled, and guided to customer, product and to customer account for usage / content consumption calculation
- Customer and Order/Product information for recurring and onetime charges.

Rating applications should be able to process events in a real time or batch mode and must support pre-paid, post-paid and pay-it-now payment options.

The rating application must consider various factors such as customer information, product information, price plan and event (e.g. call record, order information, content consumption) details.

Functionality

The main functions of rating applications are:

- Charge calculation of one time and recurring charges
- Rating of usage events
- Apply charge level discounts and optionally taxes
- Support of price plans composed of arbitrary mathematical computation of any Customer / Product / Order and event details
- Pro rating of recurring charges
- Rerating - Recalculation of charges based on information received later (e.g. from the Service Level Agreement function, delayed CDR file arrival)
- Keep flexible accumulators of usage data (e.g. used allowance)
- Fire notifications upon accumulators reaching a configured threshold (e.g. spending limit support)
- Advice of charge
    - o Provide estimated charge for a usage request (e.g. content)
    - o Provide estimated unit of consumption (e.g. time or volume) for given monetary amount (e.g. voice call minutes for $1 balance)
- Advice of rate – Provide the rate in effect for a usage request (e.g. 0.3Euro per minute for a voice call)

Non functional requirements:

- Throughput – Rating application must support high transaction volume
- Accuracy – Precision level shall be maintained for small charges
- Fast new price plan deployment – Quick introduction of new price plan based on new business requirement

Additional requirements by online charging application:

- High availability – Online-Charging application requires high availability of 99.999% application up-time from the rating function
- Low latency - Responses to requests should be given in very low latency to satisfy Online Charging application

The online non functional requirements are normally associated with high deployment costs. Hence typical installations of convergent billing applications would include distinct deployments of rating applications for online and offline charging.

Supported Contracts

To Be Added

05.13 Billing Account Management

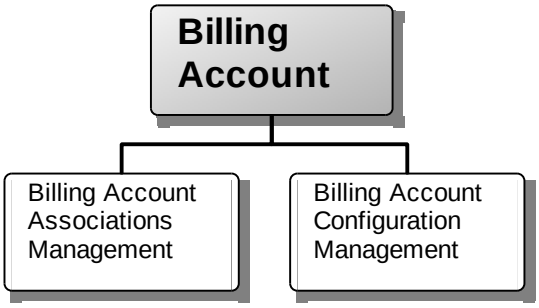

Figure 30: 05.13 Billing Account Management

Description

The purpose of Billing Account Management is to provide all functionality necessary to manage a customer's billing account.

Billing Account Management

Application Identifier: 05.13

Overview

The purpose of Billing Account Management is to provide all functionality necessary to manage a customer's billing account.

Functionality

Billing Account Management functionality includes management of the following:

- Billing Account Configuration Management
- Billing Account Association Management

Supported Contracts

To Be Added

Billing Account Associations Management

Application Identifier: 05.13.01

Overview

To Be Added

Functionality

The Billing Account Associations Management provides the ability to relate a customer's billing account to other entities in a billing system. Billing Account Associations creation can also be automated through other application posting. Those associations are used in usage guiding, usage rating, periodic bill calculation and production.

Those associations would enable:

Price plan determination – associate a charge record with the appropriate price plan.

- Shared allowances community – link a charge record to shared allowance if exists
- Charge distribution to pay means –identify the related prepaid or postpaid billing account for a given charge (recurring, one time, usage)
- Replenishment relation – support automatic replenishment of prepaid billing account from postpaid billing account
- Billing statement association – identify what charges are to be included in the statement.
- Charge association to billing account – associate incurred charge to the billing account liable for its payment
- Reporting – grouping charges/statement/accounts for the purpose of creating a report

Supported Contracts

To Be Added

Billing Account Configuration Management

Application Identifier: 05.13.02

Overview

To Be Added

Functionality

Billing Account Configuration Management provides the ability to create and modify billing accounts based on various account constructs. Account creation can also be automated with orders received. This application also provides the ability to update specific billing account information such as customer bill periods, bill media options, etc.

Supported Contracts

To Be Added

05.14 Collection Management

Figure 31: 05.14 Collection Management

Description

To Be Added

Collection Management

Application Identifier: 05.14

Overview

The Collections Management application provides necessary functionality to manage customer accounts where there is an outstanding balance. It allows handling of each account individually, based on customer value and financial history using configurable policies. The collection management application supports the collection lifecycle activities including: collection decision making, selection of collection policy, collection execution - automating the collection treatment flow, monitoring the collection process and collection settlement negotiation. The collection application keeps track of collection status and history.

The collections treatment flow can perform a number of activities including issuance of treatment notices and collection letters.

Functionality

Collections Management functionality includes:

- Collection policy definition and configuration for overdue accounts
- Collection policy execution and monitoring for overdue accounts
- Collection settlement negotiation

- Full visibility to the customer's collection status and history

Supported Contracts

- Billing
- Customer Information Management
- Order Management
- Issue Service Management / Activation / Provisioning requests via customer management
- External Credit Bureau Databases
- Accounts Receivable
- Predictive Dialers
- Collection Agencies
- Collectors

Collection Policy Definition and Configuration

Application Identifier: 05.14.01

Overview

Collection Policy defines a path of collection activities to be executed in escalated order. A set of rules classify customer accounts and associates them to the appropriate collection policy.

Functionality

Functionality includes the following:

- Assembly of collection steps into collection flows
- Collection rules definition

Supported Contracts

To Be Added

Collection Policy Execution and Monitoring

Application Identifier: 05.14.02

Overview

Collection Policy Execution and Monitoring starts with the decision if a collection process shall be initiated for an account. Once a collection decision has been taken, the appropriate collection policy is selected. There are many events that may change the collection activities For example – customer paid, customer back out from a payment arrangement, customer status has been changed or a manual intervention in the collection process. All these require constant monitoring and process execution modifications.

Functionality

Functionality includes the following:

- Collection Decision Engine - Evaluates each arriving account, decides whether the account needs collection treatment, and assigns the relevant collection treatment policy to each account.
- Collection Treatment Management - Defines and initiates the collection treatment activities according to the appropriate collection policy (using a business process automation engine). A collection treatment can belong to one of the following categories: Financial, Service restriction, Customer communication, CSR interaction and Outside Collection Agency treatment including:
- Issue notice (e.g. Collection Letter, e-mail or SMS)
- CSR assignment – Assign a CSR or a CSR group to manually handle the collection.
- Issue Restrict/Restore/Disconnects request - Includes anything from restricting to suspensions, as well as the restoration when payment is received.
- OCA Referrals - Passing the collection process on to an Outside Collection Agency.
- Initiate Write-off requests
- Collection Execution Monitoring – Monitors events that may change the collection execution. Such events includes: customer paid, customer status has been changed, payment back-outs. As a result stop, resume or reselect the collection policy.
- Manual Intervention - Provides the CSR with many options to override the automated flow such as pause and continue the collection treatment, force an account into collection, change the selected collection policy and stop manually the collection treatment.

Supported Contracts

To Be Added

Collection Settlement

Application Identifier: 05.14.03

Overview

The application provides the mechanism that allows the CSR to negotiate with customers and offer them acceptable plans to pay their debts. These plans might be based on multiple installments over a defined period of time, including the milestones at which the customer is re-evaluated for fulfilling the arrangement.

Functionality

Functionality includes the following:

- Build payment plan – Based on system recommendation or CSR decision to build a payment plan.
- Payment plan monitoring – Monitor the payment plan execution and trigger events for the collection monitoring process.

Supported Contracts

To Be Added

05.15 Bill Calculation

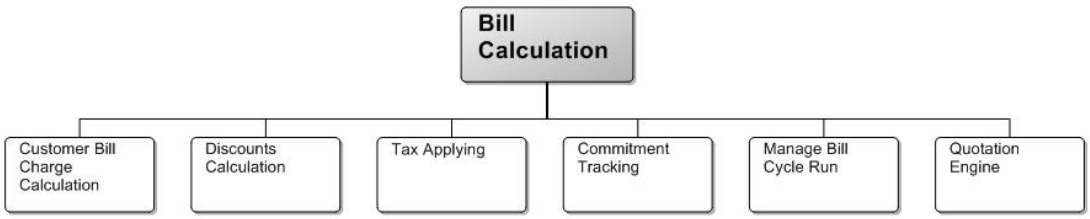

Figure 32: 05.15 Bill Calculation

Description

To Be Added

Bill Calculation

Application Identifier: 05.15

Overview

The purpose of this application is to calculate a convergent bill for next-generation voice, data, content, and commerce services - Including prepaid and postpaid services in a single convergent bill.

Functionality

Application functions include:

- Performing charge and event distribution to support a split bill
- Support flexible bill cycle definition
- Discounts and promotions
- Taxes based on jurisdictional tax requirements and exemptions, as well as surcharges & regulatory fees.
- Commitment tracking based on the customer contract
- Incorporate payments, adjustments, and other financial activity.

Supported Contracts

Exposed Contracts

- Billing Inquiry
- Quotations

Consumed Contracts

- TAX calculation

Customer Bill Charge Calculation

Application Identifier: 05.15.01

Overview

To Be Added

Functionality

Customer Bill Charge Calculation aggregates charges from different sources. By using the Product/Service Rating application it determines charges, including:

- recurring,
- one time
- usage

for purchased products and services in a given bill run based on the customer price plan set at time of order/contract negotiation.

Functionality also includes currency conversion and partial period (prorating) handling.

Supported Contracts

To Be Added

Discounts Calculation

Application Identifier: 05.15.02

Overview

To Be Added

Functionality

Discounts Calculation applies discounts based on pricing plan or promotions enrollment. It also supports discount allocation on any level of customer structure and monitors charges that can contribute and/or are eligible for a discount. Realizes caps on contributing/eligible amounts at various hierarchy points.

Supported Contracts

To Be Added

Tax Applying

Application Identifier: 05.15.03

Overview

Application of taxes, including surcharges and fees where applicable can occur within the Invoicing application or managed through the use of an external Tax module.

Functionality

The Tax Applying application examines tax applicability to charges based on the type of customer, jurisdiction and/or regional taxation rules. It also observes any customer/location/service tax exemptions. Finally, it applies the taxes accordingly.

Supported Contracts

To Be Added

Commitment Tracking

Application Identifier: 05.15.04

Overview

To Be Added

Functionality

Monitors terms and minimum revenue commitment agreements for applying penalties.

Supported Contracts

To Be Added

Manage Bill Cycle Run

Application Identifier: 05.15.05

Overview

To Be Added

Functionality

Manages the bill cycle run, including the incorporation of new charges and where applicable: payments, adjustments, late payment fees, and other financial activities. This also includes appropriate handling of consolidated billing.

Supported Contracts

To Be Added

Quotation Engine

Application Identifier: 05.15.06

Overview

The quotation engine supports the order management process by interfacing between the Order Management and Billing applications.

Functionality

The quotation calculation of the recurring and one-time charges that are associated with orders for services and equipment (S&E) is based on the following features:

- Order components – services and equipment and the relevant associated parameters
- Customer information – Customer's agreements with the CSP, and customer parameters
- CSP's policy and Product Catalog – Maintaining the CSP's rating schemas
- General market rating rules (such as tax)

Supported Contracts

- Order Management
- Customer Information Management

05.16 Online Charging

Figure 33: 05.16 Online Charging

Description

Online charging is a charging mechanism, where charging information can affect, in real-time, the service rendered. The charging request as well as the response is handled in real-time through the use of real-time guiding to (finding of) customer and price plan, real-time rating and real-time balance-management of monetary and non-monetary (e.g. free-units) balances and/or allowances

A request is sent by the network service-controller to the online-charging application in real-time (usually through an IP-socket) and a response is returned. The service-controller can decide, based on the response, whether to render the service and usually control the service characteristics (quality, etc.) prior to providing it or during the session.

Note: The relation of online and offline is subject for further study in future TAM version.

Online Charging

Application Identifier: 05.16

Overview

Online charging is a charging mechanism, where charging information can affect, in real-time, the service rendered. The charging request as well as the response is handled in real-time through the use of real-time guiding to (finding of) customer and price plan, real-time rating and real-time balance-management of monetary and non-monetary (e.g. free-units) balances and/or allowances

A request is sent by the network service-controller to the online-charging application in real-time (usually through an IP-socket) and a response is returned. The service-controller can decide, based on the response, whether to render the service and usually control the service characteristics (quality, etc.) prior to providing it or during the session.

Note: The relation of online and offline is subject for further study in future TAM version.

Functionality

The Online Charging Application is responsible for:

- **Real-time Rating**: perform real-time rating of the charge request based on all parameters of the request (type, quantity, etc.), all parameter of the customer/subscriber (price plans, accumulated usage, etc.) and other parameters (time-of-day, etc.). The same request may be rated differently for different subscribers based on their purchased offers. (Refer to the Product/Service Rating application)
- **Service-consumption reservation and authorization** authorizes the request coming from the service-controller based on the customer and subscriber eligibility for the service (e.g. based on customer-hierarchy and purchased offers) and on the current balance available.
- **Use of customer billing hierarchy**: each subscriber can be part of a customer-hierarchy tree of unlimited depth and size. Subscribers in the hierarchy may share balances, price plans and discounts. Customer hierarchies are commonly used for corporate customers who share allowances and balances
- **Advice of Charge/Advice of Rate:** provide, in real-time, an advice of the expected charge for a specific usage request. The advice is based on all parameters of the request (type, quantity, etc.), all parameter of the customer/subscriber (price plan, accumulated usage, etc.) and other parameters (time-of-day, etc.). The advice is usually based upon performing a full Rating process for the request.
- **Balance Management**: hold, calculate, apply policies and provide functionality / interfaces for the account balances of a customer and/or a subscriber.
    - **Balance containers:** hold and maintain the different balances that a customer and/or a subscriber may have. These include, but not limited to:
        - Monetary balances
            - Prepaid balances
            - Postpaid balances (in conjunction with an Account-Receivables (AR) application)
    - Non-monetary balances and allowances (e.g. free minutes, WAP-only quota, etc.)
    - Shared balances: Monetary or Non-monetary (e.g. between subscribers in a hierarchy)
- **Balance management policies:** allow the definition of policy per balance or balance-type. Policies include:
        - Minimum Allowable Balance limit (e.g. balance must remain above zero)
        - Balance expiration dates
        - Balance thresholds actions and notifications

- Roll-over and cyclic policies

- **Balance-management operations**: allow different operations to be performed on the managed balance. Operations include:
  - Reserve amounts: reserve amount from any balance for any session. Unused reservations are credited back into the balance when the session is released
  - Charge amounts: charges that are persisted into the balance
  - Credit/Debit operations
  - Balance Query

Note: Balance management for offline charging is also need to be addressed in the offline charging context.

- **Real-time Charging:** apply charges (rated requests) and taxes in real-time using the balance-management functionality. Charging can be done by units or by amount

Non-functional aspects of the Online-Charging application include:

- **Multi-session support**: Online charging applications must be able to support multiple simultaneous sessions for the same subscriber and/or for the same customer. The simultaneous sessions are able to use the same balances while adhering to the balance-limit policy defined (achieved using reservations)
- **Prepaid-Postpaid Convergence**: allow for prepaid subscribers and postpaid subscribers to be served by the same Charging application, and use shared balances and price plans.
  - Allow replenishment (top-up, recharge) of prepaid balances from postpaid accounts
  - Allow spending-limits and credit-control to be enforced on postpaid accounts
  - Split charging: allow splitting usage-charges between prepaid and postpaid balances based on any parameter For example: a subscription where voice calls are postpaid by a corporate and content is consumed from the employee prepaid balance.
- **High Availability**: Online-Charging application should provide Carrier grade availability with 99.999% application up-time
- **Low Latency**: responses to requests should be given in very low latency, usually below 25ms from request to response
- **High Throughput**: The Online-Charging application must support the maximum request and events throughput required during the busiest hour of the year without throttling or rejecting any request.

Supported Contracts

Exposed Contracts

- Service Control Point (SCP)
- SCP-like Network-Elements (NE)
- Intelligent Network (IN)
- Replenishment manager
- Customer Relationship Management (CRM) for Balance queries and similar activities
- Customer Management and Account-Receivables for Balance adjustments

- IVR (Interactive Voice Response) for Balance queries and similar activities
- Customer management for Create/Maintain/Delete customers, accounts and price plans
- Invoicing
- Account Receivables
- Data Warehouse

Consumed Contracts

- Product Catalog
- Provisioning
- Notifications and messaging

06.0 Service Management Domain

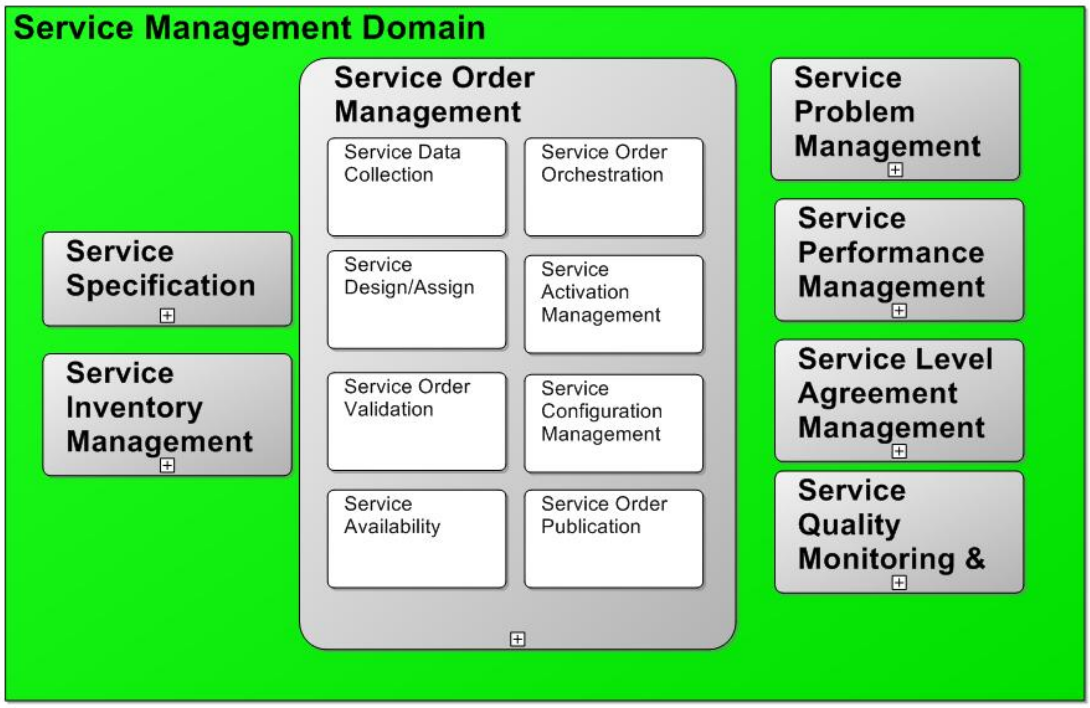

Figure 34: 06.0 Service Management Domain

Description

This group of applications supports and enables the processes that focus on the knowledge of services (e.g. voice; data, content services, etc.) and includes all functionality necessary for the management and operations of communications and information services required by or proposed to customers. The focus is on service delivery and management as opposed to the management of the underlying network and information technology. Some of the functions involve short-term service capacity planning; the application of a service design to specific customers or managing service improvement initiatives. These functions are closely connected with the day-to-day customer experience.

These processes are accountable to meet, at a minimum, targets set for service quality, including process performance and customer satisfaction at a service level, as well as service cost. The applications that an operator may have in the Service Management and Operations area are:

06.01 Service Specification Management

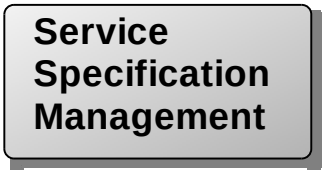

Figure 35: 06.01 Service Specification Management

Description

This application involves the storage and retrieval of service specifications. The service specifications represent the common and invariant aspects of various types of services. These specifications are used in the creation of new service instances.

Service Specification Management

Application Identifier: 06.01

Overview

This application involves the storage and retrieval of service specifications. The service specifications represent the common and invariant aspects of various types of services. These specifications are used in the creation of new service instances.

Functionality

To Be Added

Supported Contracts

To Be Added

06.02 Service Inventory Management

Figure 36: 06.02 Service Inventory Management

Description

To be added

Service Inventory Management

Application Identifier: 06.02

Overview

The Service Inventory holds the following types of information

1. The mapping of Product Specifications to Service Specifications and of Product Instances to Service Instances.
2. The mapping of service to service components. The components being either pure Service Layer features, or the resource features and the resource domain managers used to implement these features.
3. The domain level service implementation in the resource. This is the service, the domain manager that delivers the service and the inter-domain Access Point to Access Point relationships. Note that if the domain manager design decision is based on the network inventory model, then this aspect of the inventory is in the service & resource layer.

Functionality

Service Inventory Retrieval

This feature allows for client OSS to retrieve part or all of the service inventory known to the target OSS.

This feature may allow the following selection criteria:

- retrieval based on attribute matching
- retrieval of only the object instances that have been modified after a provided date and time.

For the selected objects, this feature may allow the client OSS to specify what specific attributes and relationships shall be returned.

Service Inventory Update Notifications

This feature entails the generation of inventory update notifications based on changes to the inventory known to a given OSS. The notifications concerning object creation, object deletion and attribute value changes.

Single Entity Notifications – in this variation of the feature, each notification pertains to only one entity, e.g., an IP VPN service instance

Multi-entity Notifications – in this variation of the feature, a single notification may report on inventory changes for multiple entities.

Service Inventory Update

This feature entails an OSS requesting that another OSS (referred to as the target OSS) update its inventory based on a provided collection of updates. The expectation is that the target OS update its inventory as requested, but no other side-effects are expected (e.g., creating a service in the network). This is a key point concerning this capability. The inventory update request can involve addition (new object), modification (change to an existing object) or deletion (removal of an object).

Service Inventory Reconciliation

This feature entails an OSS reconciling its own inventory with inventory discovered from another source. When new service inventory information is discovered, the OSS will try to match the newly discovered information with an entity or entities already known to the OSS.

If no match is found, the OSS will typically assume that a new entity has been discovered and add this to its inventory. Alternately, as decided by the service provider as part of their procedures, the OSS may record this event as an exception. For example, this may happen if the service provider always expects to have the planned service inventory in their inventory OSS before the actual services are activated.

If a match is found and there are no unexpected discrepancies, the OSS will update its inventory as needed.

If a match is found and there are unexpected discrepancies, the OSS will typically raise an exception so that service provider personnel can correct the problem.

Service Inventory Information Model

This feature is the information model for the services to be managed. Typically, the service provider would need to add a lot of detail concerning the services to be managed. The suggested approach for the service provider is to start with the TM Forum SID service model and then specialize the model for the specific services to be managed. The service model should indicate or point to the supporting resources for each services (the SID model, in fact, does do this).

Supported Contracts

To Be Added

06.03 Service Order Management

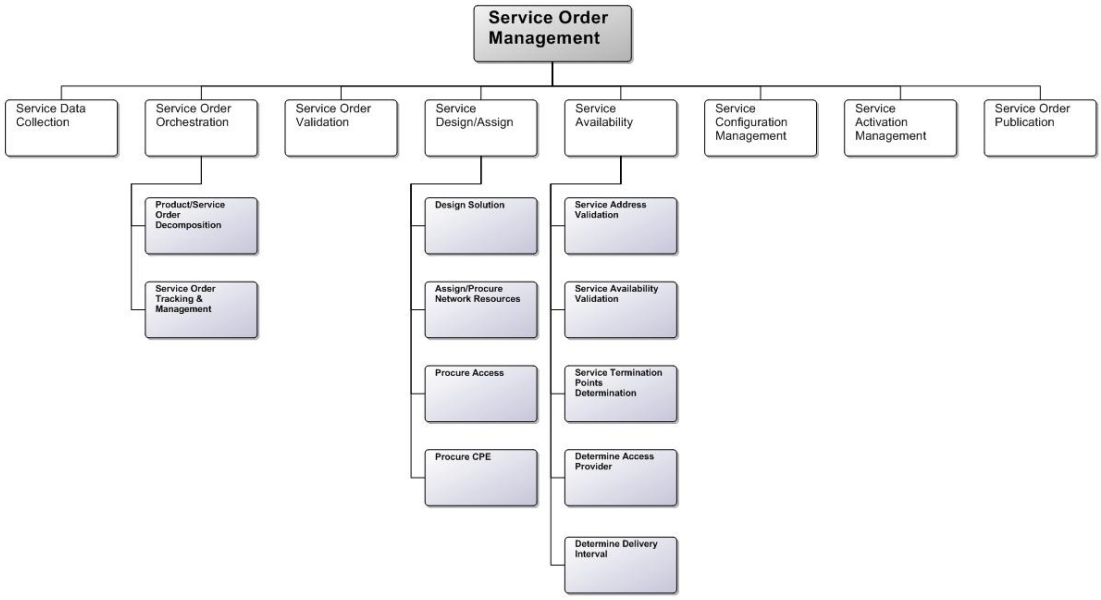

Figure 37: 06.03 Service Order Management

Description

Service Order Management applications manage the end to end lifecycle of a service request. This includes validating service availability as well as the service order request. Other functionality includes service order issuance, service and or product order decomposition, and service order tracking along with orchestrating the activation and the test and turn up processes. Notifications will be issued to the Customer Order Management during the service order orchestration process (especially upon completion). Such notification can trigger other steps in the Customer Order Management (e.g. service order completion concludes these steps with Customer Order Management).

In addition, Service Order Management also provides service design and assignment functionality.

Service Order Management

Application Identifier: 06.03

Overview

Service Order Management applications manage the end to end lifecycle of a service request. This includes validating service availability as well as the service order request.

Other functionality includes service order issuance, service and or product order decomposition, and service order tracking along with orchestrating the activation and the test and turn up processes. Notifications will be issued to the Customer Order Management during the service order orchestration process (especially upon completion). Such notification can trigger other steps in the Customer Order Management (e.g. service order completion concludes these steps with Customer Order Management).

In addition, Service Order Management also provides service design and assignment functionality.

Functionality

Service Order Management functionality includes:

- Service Data Collection,
- Service Order Validation,
- Service Order Publication,
- Service Availability,
- Service Design/Assign,
- Service Configuration Management
- Service Activation Management,
- Service Order Orchestration

Supported Contracts

To Be Added

Service Data Collection

Application Identifier: 06.03.01

Overview

To Be Added

Functionality

The Service Data Collection application gathers any needed service data to aid in the verification and issuance of a complete and valid service order as well as data necessary to address dependencies between service and/or resource orders.

Supported Contracts

To Be Added

Service Order Orchestration

Application Identifier: 06.03.02

Overview

To Be Added

Functionality

The Service Order Orchestration application provides workflow and orchestration capability across Service Order Management. This application will have the ability to either orchestrate via triggering another application to retrieve the order request from a common data repository or distribute the service order and/or order requests. This application also provides functionality to track and manage the overall service order, make project team assignments, as well as to track the overall order.

Service Order Orchestration will also orchestrate and manage dependencies between related Service Orders.

Supported Contracts

To Be Added

Product/Service Order Decomposition

Application Identifier: 06.03.02.01

Overview

To Be Added

Functionality

The Product/Service Order Decomposition application decomposes product orders (which is a portion of the customer order) into a service order, and the service order into resource order requests, and then distributes each request to perform the work.

This application also translates planned design changes into implementation jobs (which could include service ordering and/or delivery). That may span multiple resource facing services and technology domains. This might require additional data gathered via Service Data Collection.

Note: If an order repository or common order data services (common model) layer is being used and shared across layers (Customer, Service, and Resource layers), this decomposition can simplified

Supported Contracts

To Be Added

Service Order Tracking & Management

Application Identifier: 06.03.02.02

Overview

To Be Added

Functionality

The Service Order Tracking & Management application performs the following:

- Oversees the transfer of Service Order Requests to appropriate resource providers.

- Tracks the various resource orders until completed.
- Raises jeopardies as appropriate if specified dates and milestones are not met, and escalates jeopardies to appropriate management levels.
- Completes the service order when all resource orders have been completed.
- Sequences resource order provisioning if required.
- Provides status on the overall service order.

The above capabilities needs to be provided in both an ability to query in real time as well as a publish/subscribe mechanism to enable the use of the information wherever required.

Supported Contracts

To Be Added

Service Order Validation

Application Identifier: 06.03.03

Overview

To Be Added

Functionality

The Service Order Validation application validates the service order request based on contract, catalog, and provisioning rules.

Supported Contracts

To Be Added

Service Design/Assign

Application Identifier: 06.03.04

Overview

The Service Order Design/Assign application performs end to end engineering design of service.

Functionality

The Service Design & Assign application leverages the corporate supply chain and asset inventory to assemble end to end design records. This design will be used by Service Order Decomposition for issuing work order or activation requests as appropriate to Resource Order Management.

The Service Design/Assign application functionality includes the design of the end to end solution as well as the assignment/procurement of network resources and customer premise equipment.

Supported Contracts

To Be Added

Design Solution

Application Identifier: 06.03.04.01

Overview

To Be Added

Functionality

The Design Solution application determines the end to end service design. It applies engineering rules to determine required network facilities, equipment configurations and the method and access path to the customer site or location of service termination.

This application also establishes and manages the detailed design tasks required to issue the work orders.

Supported Contracts

To Be Added

Assign/Procure Network Resources

Application Identifier: 06.03.04.02

Overview

To Be Added

Functionality

The Assign/Procure Resources application determines facility and equipment availability. It selects/assigns appropriate network facility route(s) and configures facility equipment per engineering rules as well as obtains new assets from network plan and build (capacity management) if required.

As part of considering network alternatives and associated costs, technology and service options might also be presented back to the customer if the assignment impacts customer cost and/or time to procure.

This application does not manage the capacity at the resource level.

Supported Contracts

To Be Added

Procure Access

Application Identifier: 06.03.04.03

Overview

To Be Added

Functionality

The Procure Access application obtains access paths to the customer or service location through supply chain (internal or external) which is managed or delegated in the form of a resource order or a resource facing service order.

Supported Contracts

To Be Added

Procure CPE

Application Identifier: 06.03.04.04

Overview

To Be Added

Functionality

The Procure CPE application determines customer premise equipment needs and availability as well as assigns assets or orders CPE via supply chain processes as appropriate.

Supported Contracts

To Be Added

Service Availability

Application Identifier: 06.03.05

Overview

To Be Added

Functionality

The Service Availability application validates that the service or services specified on the service order are available at the specified customer/service location and feasible from a network point of view. This includes the following:

- service address validation,
- service availability validation,

- service feasibility validation
- establishment of service termination points,
- determination of access provider, and
- determination of delivery interval.

Supported Contracts

To Be Added

Service Address Validation

Application Identifier: 06.03.05.01

Overview

To Be Added

Functionality

The Service Address Validation application validates the service address against appropriate address databases for both installation and emergency service purposes.

Supported Contracts

To Be Added

Service Availability Validation

Application Identifier: 06.03.05.02

Overview

To Be Added

Functionality

The Service Availability Validation application validates that the service is available at the requested location and can support the requested service parameters at that location.

Supported Contracts

To Be Added

Service Termination Points Determination

Application Identifier: 06.03.05.03

Overview

To Be Added

Functionality

The Service Termination Points Determination application determines the appropriate service provider entry point to support the Customer's service request.

Supported Contracts

To Be Added

Determine Access Provider

Application Identifier: 06.03.05.04

Overview

To Be Added

Functionality

The Determine Access Provider application identifies available access providers or access technology at the given location and selects an access provider based on business rules.

Supported Contracts

To Be Added

Determine Delivery Interval

Application Identifier: 06.03.05.05

Overview

To Be Added

Functionality

The Determine Delivery Interval application calculates the service delivery due date using network capacity, access provider selection and work center intelligence (including workload and capacity). It also needs to take into account dependencies between Service Orders as set during the decomposition process (mainly relevant when decomposing a product order into service orders).

Supported Contracts

To Be Added

Service Configuration Management

Application Identifier: 06.03.06

Overview

The Service Configuration Management application is similar to the service design/ assign functions outlined elsewhere in this publication, but supports aggregate customer facing services. To explain this area in general, it is necessary to see a clear difference between services and networks /resources. Services can be viewed as being comprised of a number of building blocks - e.g. bandwidth, security, maintenance packages, SLAs, QoS, specific features e.g. voicemail.. Service Configuration management might be either the set up of network / resource components for a customer, or a class of customers of a generic service build. Service configuration can be derived from order details in addition to inherent business rules from service specifications and the service view in the Service Inventory Management application.

Functionality

The Service Configuration Management application generates a service plan to configure a customer service to fulfill a service order; this includes the following:

- Allocating the right service parameters to fulfill service orders
- Reserve the right service parameters based on service specification and service inventory
- Update information in the service inventory as to configuration of specific services
- Compose a service configuration plan according to the required service actions and sent to Service Order Orchestration and/or Service Activation Management
- Configure the specific service and it's parameters as appropriate
- Appropriately consider cross service dependencies as part of the above configuration activities.

Supported Contracts

To Be Added

Service Activation Management

Application Identifier: 06.03.07

Overview

This application is responsible for activation of specific services based on the specific service configuration.

Functionality

The Service Activation Management application includes the following:

- Access, plan and gather additional information for service activation
- Implement and activate the specific service configuration against the service configuration plan (including activation of CPE if part of the service offering)
- Provide notifications on successful activation; in cases of exceptions send fallouts to Service Order Orchestration and manage rollbacks activities (if applicable)
- Update information in service inventory as to configuration of specific services and turn status to active upon successful service activation

Supported Contracts

To Be Added

Service Order Publication

Application Identifier: 06.03.08

Overview

To Be Added

Functionality

The Service Order Publication application issues valid and complete service orders, and stores the order into an appropriate data store.

As part of order publication, additional data might be obtained or derived to support downstream functions that are not provided in the service order request.

Supported Contracts

To Be Added

06.04 Service Level Agreement Management

Figure 38: 06.04 Service Level Agreement Management

Description

Successful SLA management is a growing factor in maintaining customer satisfaction and winning new business. These can be applied to both business and consumer customers. Satisfied customers are less likely to churn to competitors. SLA Management applications use the output of the SQM applications to provide a comprehensive view of the level of service provided to customers compared to pre-agreed, often contractually binding, agreements. Typically SLA agreements will be agreed between operator and customer to measure a variety of service oriented issues and impacts. These may be either stated in terms of service characteristics, or in terms of the business impacts on the customer. An example of service oriented characteristics could include:

- Availability
- Security
- Latency
- Transmission speed
- Time to respond to the initial fault report
- The escalation process
- The time to repair
- Spares holding
- The algorithm for calculating rebates
- Contact details

- Time to deliver from order confirmation
- Additional services
- Capacity

Increasingly, business customers are demanding SLA's measured in terms of business impacts. For example, Qantas, the Australian state airline measures its communications service levels in terms of impact of any disruptions on flights. SLA's are also becoming an important characteristic between various players in the communications value chain. Service Level Agreements between network suppliers and service operators (for example a mobile virtual network operator MVNO) are common and are likely to grow between service providers and content suppliers

Service Level Agreement Management

Application Identifier: 06.04

Overview

Successful SLA management is a growing factor in maintaining customer satisfaction and winning new business. These can be applied to both business and consumer customers. Satisfied customers are less likely to churn to competitors. SLA Management applications use the output of the SQM applications to provide a comprehensive view of the level of service provided to customers compared to pre-agreed, often contractually binding, agreements. Typically SLA agreements will be agreed between operator and customer to measure a variety of service oriented issues and impacts. These may be either stated in terms of service characteristics, or in terms of the business impacts on the customer. An example of service oriented characteristics could include:

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- Security
- Latency
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- The escalation process
- The time to repair
- Spares holding
- The algorithm for calculating rebates
- Contact details
- Time to deliver from order confirmation
- Additional services
- Capacity

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Functionality

- Collection of Service KPIs and Key Quality Indicators (KQIs) from:
- Element management systems,
- Directly from certain resource elements
- Other OSS and applications
- Apply appropriate algorithms to calculate the SLA metrics
- Compare the calculated metric to the agreed SLA / Operational Level Agreements (OLA) metric
- Raise SLA alarms and pass to alarm management system
- Collate historical SLA information
- Analyze that information
- Publish the information in the form of reports etc.
- Notification of charge / settlement adjustment information to other architecture functions (including Product Interface Management, Billing & Settlement, Business Intelligence, Legal)
- Update Data warehouse with SLA statistics.
- **Key Data**
- SLA created in SLA Management system from SLA contract
- KPIs & KQIs from the network and other sources
- Business rules for comparing

Supported Contracts

To Be Added

06.05 Service Problem Management

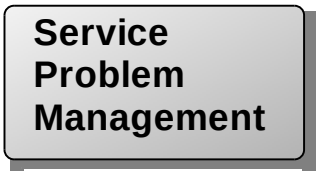

Figure 39: 06.05 Service Problem Management

Description

Service problem Management applications act as the bridge between resource problems (e.g. network problems) and customer affecting issues. Customer problem resolution, service problem resolution and resource problem resolution can be seen as one distributed set of related applications, ideally built around common data and functions. Each takes a different view of the same data. Thus related applications and functions are:

- Customer Problem Resolution
- Correlation & Root Cause Analysis
- Resource Problem Ticketing
- Service Performance Management
- Service Quality monitoring
- Resource performance management

Service Problem Management

Application Identifier: 06.05

Overview

Service problem Management applications act as the bridge between resource problems (e.g. network problems) and customer affecting issues. Customer problem resolution, service problem resolution and resource problem resolution can be seen as one distributed set of related applications, ideally built around common data and functions. Each takes a different view of the same data. Thus related applications and functions are:

- Customer Problem Resolution
- Correlation & Root Cause Analysis
- Resource Problem Ticketing
- Service Performance Management
- Service Quality monitoring

- Resource performance management

Functionality

Typical application functions supported are:

- Problem Reception
- Trouble Ticketing
- Problem Consolidation
- Closure
- Reporting
- Allocating priority
- Advising the Customer Resource Management systems (CRM)
- Advising the Network Operations Center
- Allocating the tasks to the appropriate people / roles
- Tracking progress
- Confirming when impact has been removed
- Updating Configuration Management systems
- Updating Inventory Management systems
- Tracking progress
- Confirming when fix has been completed
- Updating Billing systems
- Advising any other OSS/ systems as needed

Supported Contracts

To Be Added

06.06 Service Quality Monitoring & Impact Analysis

Figure 40: 06.06 Service Quality Monitoring & Impact Analysis

Description

Service Quality Monitoring (SQM) and impact analysis applications are designed to allow operators to determine what levels of service they are delivering to their customers. Ideally these take a customer centric view, i.e. the quality of service perceived by customers but may measure additional service metrics to allow the operator to be aware of approaching problems or degradations to service. Impact analysis applications extend this capability to predict the likely impact of service degradations or network problems on specific customers.SQM applications generally support the 4 sub-processes defined by eTOM:

- Monitor Service Quality
- Analyze Service Quality
- Improve Service
- Identify & Report Service Constraints

Service Quality Monitoring & Impact Analysis

Application Identifier: 06.06

Overview

Service Quality Monitoring (SQM) and impact analysis applications are designed to allow operators to determine what levels of service they are delivering to their customers. Ideally these take a customer centric view, i.e. the quality of service perceived by customers but may measure additional service metrics to allow the operator to be aware of approaching problems or degradations to service. Impact analysis applications extend this capability to predict the likely impact of service degradations or network problems on specific customers.SQM applications generally support the 4 sub-processes defined by eTOM:

Functionality

SQM applications are a major feed to service level agreement management applications. Key features are:

- **Monitor Service Quality**
  - Extracts service related key performance indicators (KPIs) from various management systems.
  - Receives alarm information
  - Receives test information
- **Analyze Service Quality**
  - Collates the KPIs and converts to Key Quality Indicators (KQIs) against which the service quality can be measured.
- **Improve Service**
  - Recommends improvements as a result of the Service Quality Analysis
- **Identify & Report Service Constraints**
  - Identifies areas within the network where service deterioration is being caused by constraints such as demand surges
  - Reports these to the resource layer

Supported Contracts

To Be Added

06.07 Service Performance Management

Figure 41: 06.07 Service Performance Management

Description

To Be Added

Service Performance Management

Application Identifier: 06.07

Overview

Service Performance Management Applications help monitor the end-end services, including the customer's experience. This can include a real-time, end-to-end view to ensure that each service is functioning correctly and a historical view.

These applications build on the Resource Performance data and active end-end service performance test data to provide a view of a service.

These applications provide a key input to determine the Quality of Service.

Functionality

The main functions of the Service Performance Management Applications are:

- Collection of Resource Performance Data from the Resource Management Applications (or directly in the absence of Resource Performance Management application)
- Collection of Service Performance data through end-end tests done internally through the application or external Service Test applications.
- Map the Performance data to Service Topology
- Calculate Service related KPIs, KQIs
- Long-term performance archive
- Short-term performance repository
- Input to Service planning and forecasting applications

- Identification of Service related problems
- Historical trending
- Service triage / testing
- Service Performance “dashboard”

Supported Contracts

To Be Added

07.0 Resource Management Domain

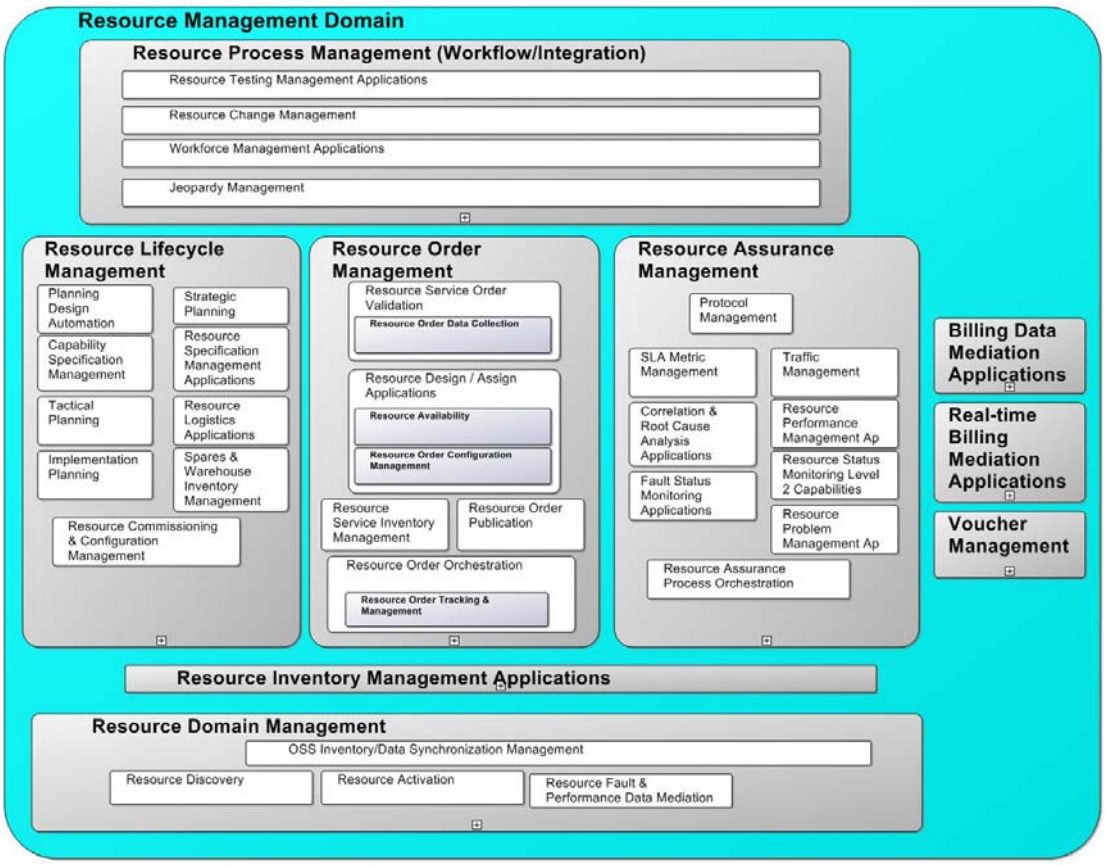

Figure 42: 07.0 Resource Management Domain

Description

This horizontal functional process grouping maintains knowledge of resources (application, computing and network infrastructures) and is responsible for managing all these resources (e.g. networks, IT systems, servers, routers, etc.) utilized to deliver and support services required by or proposed to customers. It also includes all functionalities responsible for the direct management of all such resources (network elements, computers, servers, etc.) utilized within the enterprise. These processes are responsible for ensuring that the network and information technologies infrastructure supports the end-to-end delivery of the required services. The purpose of these processes is to ensure that infrastructure runs smoothly, is accessible to services and employees, is maintained and is responsive to the needs, whether directly or indirectly, of services, customers and employees. RM&O also has the basic function to assemble information about the resources (e.g. from network elements and/or element management systems), and then integrate, correlate, and in many cases, summarize that data to pass on the relevant information to Service Management systems, or to take action in the appropriate resource.

In an ebusiness world, application and computing management are as important as management of the network resources. Moreover, network, computing and applications resources must increasingly be managed in a joint and integrated fashion. To cope with these needs, the eTOM framework includes the Resource Management & Operations process grouping (together with the corresponding Resource Development & Management grouping within SIP), to provide integrated management across these three sets of resources: applications, computing and network. These areas also encompass processes involved with traditional Network Element Management, since these processes are actually critical components of any resource management process, as opposed to a separate process layer.

The RM&O processes thus manage the complete service provider network and sub-network and information technology infrastructures.

The eTOM framework differentiates day-to-day operations and support from planning and development, and other strategy and lifecycle processes. This better depicts the structure of an enterprise, especially in an ebusiness era.

07.01 Resource Lifecycle Management

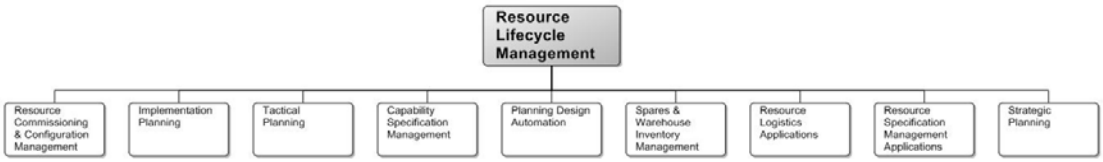

Figure 43: 07.01 Resource Lifecycle Management

Description

To Be Added

Resource Lifecycle Management

Application Identifier: 07.01

Overview

Resource Lifecycle Management (IT, APPS & Network)

Lifecycle management is fundamentally responsible for adding, churning and removing network and IT capacity. Where capacity is added, it is made available to subsequent Utilization, Quality and Accounting management.

Lifecycle management provides support for both Operational and Strategy, Infrastructure and Product wings of eTOM

Five specialist resource development and management applications are proposed here.

- Strategic Planning
- Planning Design Automation
- Tactical Planning
- Implementation Planning
- Job Control and Delivery Management

These represent distinct, real world planning functions and may consist of sub-functions. They apply to all network engineering for fixed, mobile and cable and IT applications. The term 'networked resource' is used for the totality of applications and network used to deliver the applications to consumers over any form of network media.

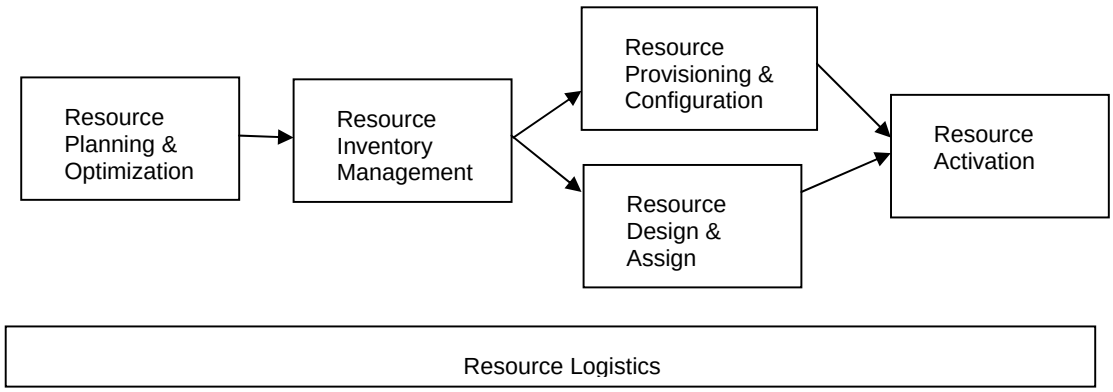

Figure 44: Resource Fulfillment Process

The Resource Lifecycle Management is responsible for managing the end-end lifecycle of the resource.

Functionality

To Be Added

Supported Contracts

To Be Added

Resource Commissioning & Configuration Management

Application Identifier: 07.01.01

Overview

These applications are responsible for managing and tracking the configuration of the resource (AKA CMDB). These applications typically work in a federated environment, where they rely on other applications for the data

Functionality

The functionality provided by these systems includes:

- Manage the commissioning process of a resource and ensuring that operational status are configured
- Database and manage the configuration of the individual resources
- Record the history of configuration changes
- Work with other applications like discovery Application to ensure that the resource configuration matches the designed configuration
- Work with the Inventory Management applications to ensure that the topology reflected in its database is in sync with that in the Inventory Management Systems

Supported Contracts

To Be Added

Implementation Planning

Application Identifier: 07.01.02

Overview

Implementation Planning is based on graphics rather than inventory data and is used for the local implementation of Tactical Plans at street level and within buildings.

Functionality

Implementation Planning applications are typically CAD/GIS based and are used to implement tactical plans locally at individual CSP sites and at street level. In addition they provide levels of implementation details that tactical planning does not need to specify, such as duct routes and the frame appearances of device ports. Implementation Planning will also identify shortfalls in infrastructure, such as building capacity, which may not be visible to central tactical planning users.

This requires large amounts of data, potentially leading to a very expensive system solution. However, such systems are used locally for construction projects, so the system

does not require a live view of the complete network. It is only necessary to *administer* a physical planning solution centrally to ensure data consistency; the data itself may be distributed to individual locations.

A specialist application covered by Implementation Planning is Radio Planning for cell site coverage and quality and for cell-to-cell coverage.

Supported Contracts

To be determined by the NGOSS Contract Implementation Program

Tactical Planning

Application Identifier: 07.01.03

Overview

Tactical Planning predominately supports the Operations Support and Readiness area of eTOM.

Functionality

Tactical Planning is responsible for the detailed design of resource against the existing networked resource at all technology layers, ensuring that the designed resource is actually deployed and for accurately recording the resultant inventory. At the physical layer, this will involve deploying devices and connections between devices. Further TAM applications are also required in order to test the resource on installation and to project manages the supply chain in order to deploy the planned resource.

At higher technology layers, Tactical Planning is responsible for detailed logical network design and implementation at the technology layers using input from Strategic Planning. It is also responsible for traffic engineering the capacity of the logical network, taking input from Performance Management. The output of Tactical Planning at the higher technology layers is often to network provisioning systems, which are used to implement the required logical connections into the bearer network.

Data Center and server farms are planned and deployed and capacity managed using the same Tactical Planning functions as used for resource.

Tactical planning is responsible for purchasing network equipment, usually through purchasing control systems and into the Enterprise Resource Management systems of suppliers. This is ideally achieved through Business-to-business (B2B) portals, both for operational efficiency and data integrity. Supply Chain Management controls this interaction. Standards such as from RosettaNet Telecommunications Industry Council are being developed to support electronic purchasing of telecoms equipment. RosettaNet are partnered with the TMF for this purpose.

A major role for Tactical Planning is to implement Strategic Plans, deploying specific devices and device connections at and between strategic locations. Tactical Planning also supports reactive planning, which involves the deployment of network capacity in response to immediate demands. It includes the following planning activities.

- Reactive to Strategic Planning by implementing strategic plans at all technology layers. This is the major internal planning role.
- Network rearrangement to support planned engineering works. This is an additional, significant internal planning role.
- Tactical enhancement or relocation of network capacity in response to unpredicted shortfalls / over-capacity. This is a necessary internal planning function, but could be regarded as a cost of failure of Strategic Planning.

- Detailed design and implementation of interconnect with other operators
- Reactive to Fulfillment by deploying capacity required for individual services to customers, building access network on demand as
- Reactive to Fault Management to support network repair
- Reactive to Performance Management to traffic engineer the higher technology layers
- These functions are primarily supported in inventory based capacity management systems where decisions are made and device specific designs are captured against an inventory of the existing, deployed and utilized network. Such systems are typically large scale as they are operated by planners across the entire geography of the network and ideally by planners responsible for all network and IT technologies, so a single, common inventory of the network is created.

Tactical Planning requires an accurate inventory of the network as a whole and detailed device modeling. It results in a master reference inventory of the planned networked resource against the inventory of deployed networked resource.

However, it is entirely expected that such systems may be federated along lines such as geography, technology and network vendor. This will ease the inventory management problem and enable the conflict-free, long-term transactions required by planning applications. Federation in this way must also support interworking and dependencies between the resulting management domains.

Supported Contracts

To Be Added

Capability Specification Management

Application Identifier: 07.01.04

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Planning Design Automation

Application Identifier: 07.01.05

Overview

The planning functions; Network Design Automation, Strategic, Tactical and Implementation Planning require change management that connects the activities into a set of planning processes. Strategic Planning needs to interwork with suppliers using Partner Management and Tactical Planning needs to connect out through the authorization and purchasing process to vendor ERPs as part of the supply chain. Network engineering generally relies on manual functions which need to be change managed through Job

Control. . These various forms of orchestration are brought together in the Job Control and Delivery Management application.

Functionality

Job Control provides the orchestration between planning duties, and also to manual network engineering activities required to develop and implement plans. Job Control must also link out to financial control in order to authorize the expenditure required to purchase the required resources. Delivery Management provides the link out to vendors ERP, via B2B portals and to network engineering for in-station and street activities, which also require Job Control functions. The build projects require project management to coordinate the various activities with the suppliers and to provide jeopardy management and other functions such as collaborative project management across business boundaries, which combine to implement the overall change management process. This means that Job Control and Delivery Management is a sophisticated and highly integrated orchestration application.

Supported Contracts

To Be Added

Spares & Warehouse Inventory Management

Application Identifier: 07.01.06

Overview

To Be Added

Functionality

Key Functions:

- Database of all spares (Capacity Management and optionally interface to Asset Tracking)
- Barcode/RFID tracking of all spares resources
- Record location of spares
- Record commercial information such as guarantees and date of purchase and interface to commercial asset management
- Support retrieval, update, update notifications and reconciliation.

Supported Contracts

To Be Added

Resource Logistics

Application Identifier: 07.01.07

Overview

Resource logistics applications coordinate the availability and deployment of resources to their in-service locations. These often have a close-coupling with supply chain applications but serve complementary roles. Whereas supply chain applications identify

vendors and alternate sources, and manage order fulfillment while seeking to minimize stocking levels; resource logistics applications identify and distribute resource stock where needed as quickly as possible.

Functionality

Key functions of resource logistics applications are:

- resource or kit distribution
- people + part + event coordination
- stock balancing or distribution in reaction to special events or disasters
- warehouse stock level projections
- Engineering Work Order Management
- Engineering Project Management
- Network Asset Deployment Workflow
- Resource Supply Chain Management
- Resource logistics applications take input from several functions to determine the need for resource distribution including
- resource planning (capacity)
- workforce management (preventative maintenance, change management)
- resource problem management (fault management)
- resource logistics applications output to supply chain management applications to identify resource needs and order placement.

Supported Contracts

To Be Added

Resource Specification Management

Application Identifier: 07.01.08

Overview

This application involves the storage and retrieval of resource specifications. The resource specifications represent the common and invariant aspects of various types of resources. These specifications are used in the creation of new resource instances.

Functionality

To Be Added

Supported Contracts

To Be Added

Strategic Planning

Application Identifier: 07.01.09

Overview

The focus of this application is the general network architecture and capacity, together with the strategy for the deployment of network and IT technology within the architecture. It

predominately supports processes in Strategy, Infrastructure and Product wing of eTOM.

Functionality

Such systems are used to analyze demand forecasts and utilization trends to determine optimum network deployments, such as tier structuring and resilient topologies. They are used to make strategic decisions as to which locations and which links to grow or shrink across the network and which locations are to become strategic sites. The result can be inventoried in either strategic or tactical planning system, but data will need to exist in both to support interworking.

Strategic planning is also used to bring new technologies into the network and to determine which vendors are to be used, which vendor devices are to be purchased and the configurations of those devices that will be deployed. It will also determine where different technologies should be deployed. For example, this will determine the balance of data and transmission networks and the location of data centers within the network. Such decisions are fed directly to tactical planning for implementation.

Part of the functionality is to specify the resource device and technologies in sufficient detail to enable Tactical Planning to create device and technology instances.

Radio spectrum allocation is a specialist area within Strategic Planning.

Determining interconnect sites and capacity to other CSPs is also a Strategic Planning activity.

Data Centre locations, sizing, interconnectivity and resilience is also a Strategic Planning area, together with the selection of application server vendors and infrastructure applications, such as those found in IMS.

Partner Management is a consequence of this type of Strategic Management. It is used to ensure that network vendors are aware of the changes in demand that a change in CSP strategy will make on them. When this is managed successfully it will result in vendors enhancing or reducing their production capacity to meet the anticipated medium and long term demand. Many strategic technology decisions come under pressure in their execution because vendors have not been forewarned about the demand and have not been able to expand production capacity in time. This function greatly improves the effectiveness of the supply chain.

Supported Contracts

To be determined by the NGOSS Contract Implementation Program.

07.02 Resource Process Management (Workflow/Integration)

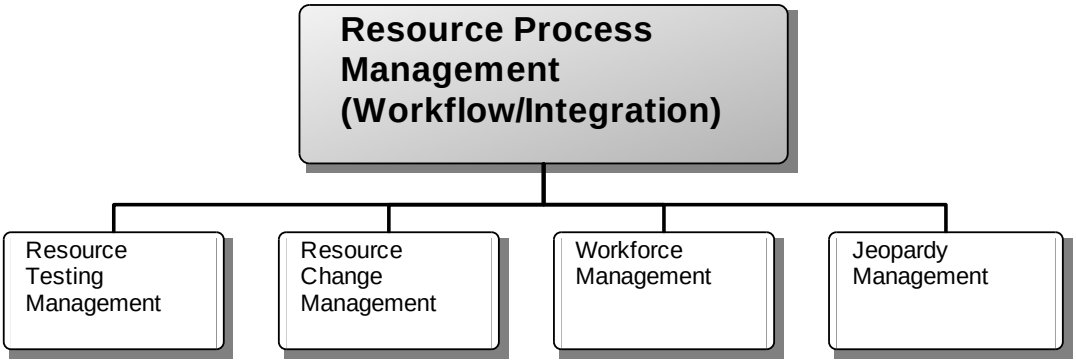

Figure 45: 07.02 Resource Process Management (Workflow/Integration)

Resource Process Management (Workflow/Integration)

Application Identifier: 07.02

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Resource Testing Management

Application Identifier: 07.02.01

Overview

Resource testing applications are focused on ensuring that the various resources are working properly. The resource testing applications are part of both the fulfillment and the assurance process. In the fulfillment process, the resource testing is responsible for ensuring that the assigned service works as designed, while on the assurance side the resource testing applications are responsible for fault isolation and correction. As part of the testing process, these applications also interface with the trouble process, which can trigger an automatic test.

Following is an example application flow:

Figure 15: Testing Management

Functionality

Following are some of the capabilities of the testing process:

- Test Work flow and Rules Engine
- Auto and Manual Test Initiation
- Test Life Cycle Management
- Test Head Management
- Manage Test Head Resources Capacity
- Manage Test Head Availability
- Element and Test Head Command and Control
- Test Results Management
- Interpret Test Results

Supported Contracts

To Be Added

Resource Change Management

Application Identifier: 07.02.02

Overview

Resource Change Management applications are responsible for managing the process in which a change is applied to the resource. These applications interface with Infrastructure lifecycle management applications to implement the actual change on the resource

Functionality

These applications are responsible for managing the Change Management Process and also ensure that the different stakeholders are notified throughout the change process. Some of the functionality provided by these applications is:

- Record the Request For Change
- Determine the impact of the Change against other events
- Notify the appropriate Stakeholders
- Manage the Change Approval Process
- Manage the Actual Change Implementation

Supported Contracts

To Be Added

Workforce Management

Application Identifier: 07.02.03

Overview

Workforce Management applications manage field forces to make optimum use of manpower and other resources such as vehicles. They are used to schedule resources, provide a map of field skill sets and provide forecasting and load balancing capabilities. Workforce Management can be used to manage both internal and external (customer)

resources in both service assurance and provisioning areas.

Functionality

Typical functions include:

Scheduling: Applications are usually designed to build schedules for groups and individuals taking into account shift patterns, daily duties, multiple skill sets, resource availability, schedule preferences and fluctuating nature of the workload.

Forecasting: Application usually calculate optimal staffing requirements with input of historic statistics, service level goals, call centre costs, change parameters and expected workload. They may include resources that are required by date, time, queue, resource pool etc.

Dynamic management: provides for immediate and unexpected changes in resource status, such as sick leave, or unforeseen changes in the workload dictate that conditions be constantly monitored, and spontaneous adjustments made

Operational Support: This function typically tracks and reports Work Force Management data such as actuals to forecasts and gathering individual and group statistics

Supported Contracts

To Be Added

Jeopardy Management

Application Identifier: 07.02.04

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

07.03 Resource Inventory Management

Figure 46: 07.03 Resource Inventory Management

Description

Resource Inventory applications manage information of all resources used to implement services and products. This application area is typically linked to various element management systems (i.e. building inventory for actual network and resource assets) and resource inventory database systems which may or may not be combined with Service Inventory Application(s) or database(s). In addition, Resource management applications have a major role to play managing spare parts; 'dumb' resources such as cable pairs and external plant and customer premises equipment.

In addition, Resource Inventory applications are used to discover and manage underutilized or 'stranded' resources.

Resource Inventory Management

Application Identifier: 07.03

Overview

Resource Inventory applications manage information of all resources used to implement services and products. This application area is typically linked to various element management systems (i.e. building inventory for actual network and resource assets) and resource inventory database systems which may or may not be combined with Service Inventory Application(s) or database(s). In addition, Resource management applications have a major role to play managing spare parts; 'dumb' resources such as cable pairs and external plant and customer premises equipment.

In addition, Resource Inventory applications are used to discover and manage underutilized or 'stranded' resources.

Functionality

Resource Inventory Information Model – the assumption is that this feature implements the standardized information model for the resources to be managed. Typically, the service provider would need to add a lot of detail concerning the resource attributes that are to be managed. The specific details will depend on the particular resources (e.g., particular types of managed elements and equipment) and associated technologies (e.g., SONET/SDH, ATM and Ethernet) to be managed. The suggested approach for the service provider is to start with the TM Forum SID model and then define or make use of an existing model that specializes the SID model for the specific technologies that need to be managed.

Key Functions:

Accurately describes the state of resources (network elements and their components, IT systems and applications, resources defined within systems etc.)

Track status all resources

Database of all spares (Capacity Management and optionally interface to Asset Tracking)

Barcode/RFID tracking of all resources including spares

Resource Site Information

- Resource History tracking for all problems and returns
- Interacts with Resource Activation and Resource Provisioning
- Manages under-utilized or 'stranded' assets

Resource Inventory Retrieval – this feature allows for client operations support (service assurance and billing systems) to retrieve part or all of the resource inventory known to the target OSS.

This feature may allow the following selection criteria:

- retrieval of a specified set of one or more sub-trees
- exclusion or inclusion of specified object types from the selected sub-tree
- further filtering based on attribute matching
- retrieval of only the object instances that have been modified after a provided date and time
- For the selected objects, this feature may allow the client operations support (service assurance and billing systems) to specify what specific attributes and relationships shall be returned. This (the attributes and relationships to be returned) would be the same for all objects of the same type.

Resource Inventory Update Notifications – this feature entails the generation of inventory update notifications based on changes to the inventory known to a given OSS. The notifications concerning object creation, object deletion and attribute value changes to other systems.

- Single Entity Notifications – in this variation of the feature, each notification pertains to only one entity, e.g., an equipment instance
- Multi-entity Notifications – in this variation of the feature, a single notification may report on inventory changes for multiple entities.
- Notification Suppression – in this variation of the feature, each notification pertains to only one entity. However, in cases where a container object is created (e.g., a managed element) that has many contained objects, the sending OSS may only report on the container object creation. The expectation is that the receiving OSS will use a retrieval operation to obtain the contained object. This concept is explained further in TM Forum document SD2-1, MTOSI Implementation Statement (see Section 2.5.1, Publisher Notification Suppression).

Resource Inventory Update – this feature entails an OSS requesting that another OSS (referred to as the target OSS) update its inventory based on a provided collection of updates. The expectation is that the target OS update its inventory as requested, but no other side-effects are expected (e.g., creating an SNC in the network). This is a key point concerning this capability. The inventory update request can involve addition (new object), modification (change to an existing object) or deletion (removal of an object).

Resource Inventory Reconciliation – this feature entails an OSS reconciling its own inventory with inventory discovered from another source (typically, the network). When new inventory information is discovered, the OSS will try to match the newly discovered information with an entity or entities already known to the OSS

- If no match is found, the OSS will typically assume that a new entity has been discovered and add this to its inventory. Alternately, as decided by the service provider as part of their procedures, the OSS may record this event as an exception. For example, this may happen if the service provider always expects to have the planned inventory in their inventory OSS before actual resources are installed.
- If a match is found and there are no unexpected discrepancies, the OSS will update its inventory as needed.

- If a match is found and there are unexpected discrepancies, the OSS will typically raise an exception so that service provider personnel can correct the problem.

Supported Contracts

To Be Added

07.04 Resource Order Management

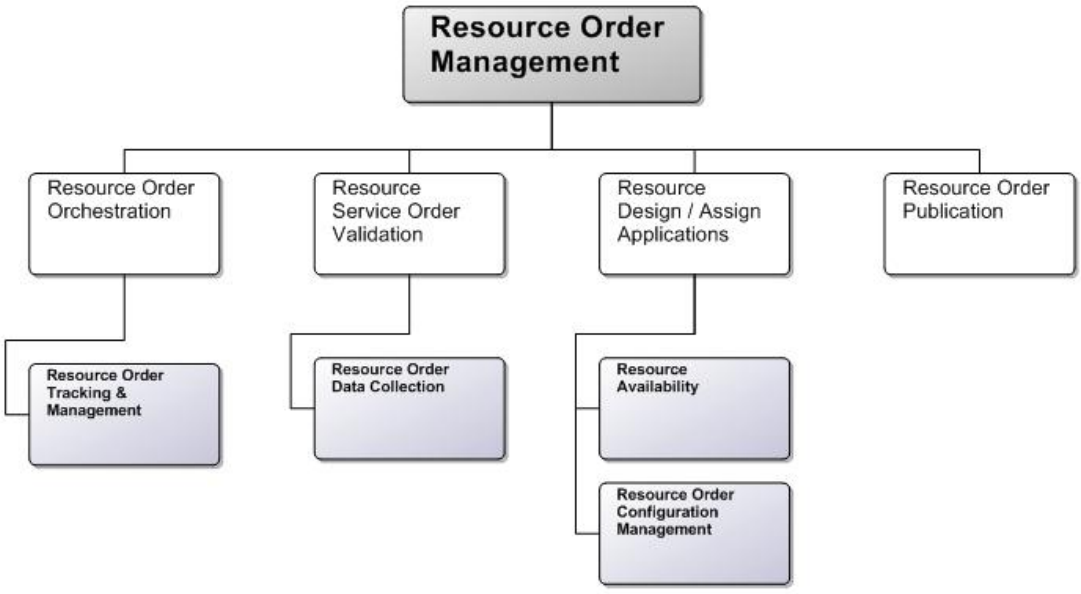

Figure 47: 07.04 Resource Order Management

Description

To Be Added

Resource Order Management

Application Identifier: 07.04

Overview

Resource Order Management applications manage the end to end lifecycle of a resource order request. This includes validating resource availability as well as the resource order request.

Other functionality includes resource order issuance, resource and or service order decomposition, and resource order tracking along with orchestrating the activation and the test and turn up processes.

Notifications will be issued to the Service Order Management during the resource order orchestration process (especially upon completion). Such notification can trigger other steps in the Service Order Management (e.g. resource order completion concludes these steps with Service Order Management).

In addition, Resource Order Management also provides network design and assignment functionality.

Functionality

Resource Order Management functionality includes:

- Resource Order Validation,
- Resource Order Publication,
- Resource Asset Design/Assign,
- Network Resource Activation ,
- Resource Order Orchestration

Supported Contracts

To Be Added

Resource Order Orchestration

Application Identifier: 07.04.01

Overview

This application component is responsible for managing and tracking the resource order. It will typically communicate with Service Order Management on the North side and the Resource Domain Manager or Resource directly on the South Side

Functionality

The Resource Order Orchestration application provides workflow and orchestration capability across Resource Order Management. This application will have the ability to either orchestrate via triggering another application to retrieve the order request from a common data repository or distribute the service order and/or order requests. This application also provides functionality to track and manage the overall resource order as well as to track the overall order.

Resource Order Orchestration will also orchestrate and manage dependencies between related resource orders.

Supported Contracts

To Be Added

Resource Order Tracking & Management

Application Identifier: 07.04.01.01

Overview

This application component manages the Resource Order and tracks its jeopardy.

Functionality

The Resource Order Tracking & Management application performs the following:

- Tracks the various resource orders until completed,
- Raises jeopardies as appropriate if specified dates and milestones are not met, and escalates jeopardies to appropriate management levels,
- Completes the resource order when all activities have been completed,
- Manages dependencies across resource orders as needed, and
- Provides status on the resource order.

Supported Contracts

To Be Added

Resource Service Order Validation

Application Identifier: 07.04.02

Overview

To Be Added

Functionality

The Resource Order Validation application validates the resource order request based on contract, catalog, and provisioning rules.

Supported Contracts

To Be Added

Resource Order Data Collection

Application Identifier: 07.04.02.01

Overview

To Be Added

Functionality

The Resource Data Collection application gathers any needed resource data to aid in the verification and issuance of a complete and valid resource order as well as data necessary to address dependencies between resource and/or work orders.

Supported Contracts

To Be Added

Resource Design / Assign

Application Identifier: 07.04.03

Overview

The Resource Design/Assign application addresses both the design of new resources to be included in a network as well as the design of resource configurations which are needed to support new service activations. Assignment is the function which conveys the new designs to those systems which initiate and support the implementation.

Functionality

The Resource Design / Assign application functions include:

- Physical, logical, and software design of resources including definition of configuration variables and initial parameters.
- Graphical presentation and visualization of resources, interconnections, or topology·
- End-to-end resource design and architecture to support service deployments·
- Architecture modifications to include resources or changes.
- New technology and new resource designs
- What-if configurations and modeling
- Real world modeling
- Controls manual installation tasks via Workforce Management process or applications
- Interface with Configuration or Inventory applications
- Multi-layer modeling and design (physical, data, transport, ...)

Supported Contracts

To Be Added

Resource Availability

Application Identifier: 07.04.03.01

Overview

To Be Added

Functionality

The Resource Availability application validates that the resource or resources specified on the resource order request are available at the specified location.

The Resource Availability application validates that the resource or resources specified on the resource order are available at the specified customer/service location and feasible from a network point of view. This includes the following:

- resource address validation,
- resource availability validation,
- resource feasibility validation
- establishment of service termination points, and
- determination of delivery interval.

Supported Contracts

To Be Added

Resource Order Configuration Management

Application Identifier: 07.04.03.02

Overview

The Resource Configuration Management application is similar to the service design/ assign functions outlined elsewhere in this publication, but supports aggregate customer facing services. To explain this area in general, it is necessary to see a clear difference between services and networks /resources. Services can be viewed as being comprised of a number of building blocks - e.g. bandwidth, security, maintenance packages, SLAs, QoS, specific features e.g. voicemail.. Service Configuration management might be either the set up of network / resource components for a customer, or a class of customers of a generic service build. Service configuration can be derived from order details in addition to inherent business rules from service specifications and the service view in the Service Inventory Management application.

Functionality

The Resource Configuration Management application generates a resource plan to fulfill a resource order. This includes the following:

- Allocating the right resource parameters to fulfill resource orders
- Reserve the right resource parameters based on resource specification and resource inventory
- Update information in the resource inventory as to configuration of specific resources
- Compose a resource configuration plan according to the required resource actions and sent to Resource Order Orchestration and/or Network Resource Activation
- Configure the specific resource and it's parameters as appropriate
- Appropriately consider cross resource dependencies as part of the above configuration activities.

Supported Contracts

To Be Added

Resource Order Publication

Application Identifier: 07.04.04

Overview

To Be Added

Functionality

The Resource Order Publication application issues valid and complete resource orders, and stores the order into an appropriate data store.

As part of order publication, additional data might be obtained or derived to support downstream functions that are not provided in the resource order request.

Supported Contracts

To Be Added

07.05 Resource Domain Management

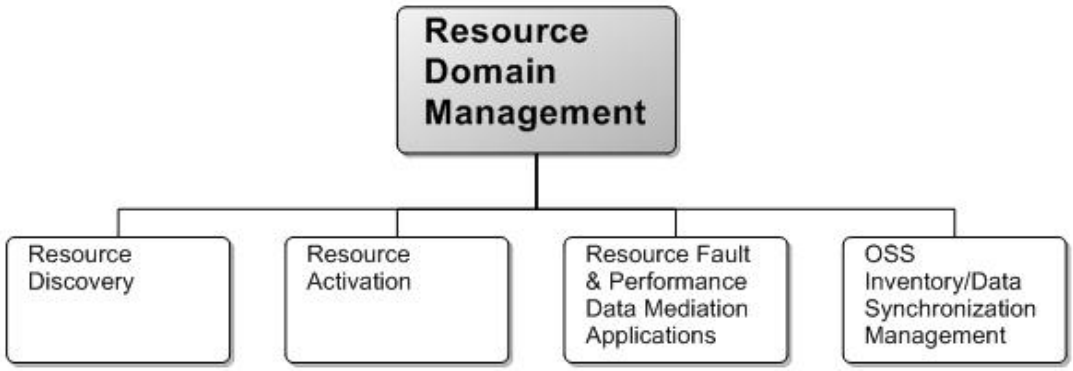

Figure 48: 07.05 Resource Domain Management

Description

Resource Domain Management is the application area that provides the exposed resource services that are available to all other application areas, including those others in the Resource Management layer.

Domain Management's role in Next Generation Network re-engineering is to hide the idiosyncrasies and shortcomings of the Network, IT Computing, and IT applications equipment from the rest of the OSS estate, freeing it to be agile.

This is particularly important as operators install lots of new, untried equipment with early release Element Management software.

Resource Domain Managers should be expert activators, alarm handlers, and billing mediators for their domain, but should not operate in any cross-domain capacity. It is the responsibility of the other Resource Management layer applications to perform any cross-

domain functions such as forecasting, capacity planning and design, and or for co-coordinating activation, root cause analysis and performance monitoring.

The basic model is shown below and is related to the examples shown in section 4.2 TMF 516.

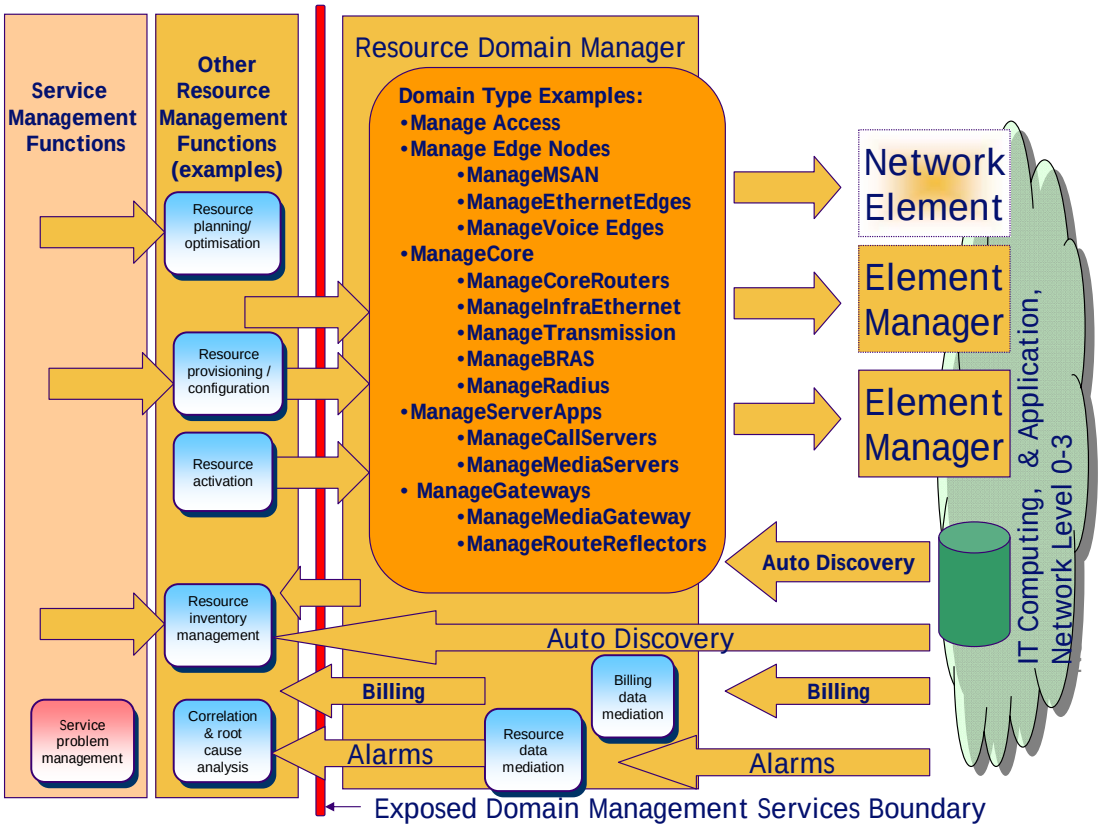

Figure 49: Relationship of Resource Domain Management to other TAM application areas

Why Domain Management?

Domains are defined as a set of entities, in this case resources, which have a common set of policies applied to them by a manager (M. Sloman, "Policy Driven Management for Distributed Systems," *J. Net. Sys. Mgmt.*, vol. 2, no. 4, 1994, pp. 333–60). Note that the general concept of a Domain allows for overlapping Domains, provided there are no policy conflicts. However it is likely that the TAM will need to mandate non-overlapping Resource Domains.

The resources that need to be managed include: IT computing, IT application, and networks.

Historically Networks have been managed as a service technology specific stove pipe such as SDH and ATM i.e. the service providers have commonly imposed a policy that all SDH services will be managed by one management systems stack. In next generation networks there is a need to move away from stovepipe E2E service management stacks towards a shared resource infrastructure model for services.

TMF 516 SoIP Resource Management Business Agreement suggests that NGN will need to introduce a set of patterns for managing resources. It identified in section 2.6 three dimensions for

patterns namely, Protocol, Functional and Network and covered the general requirements for IT computing, IT application, networks resources.

A specific example in TMF516 for Networks was the proposal to use Resource Management Domains that separately manage the logical and physical aspects of:

Access Networks

Access Nodes

Intelligence Nodes

Core Network

Gateway Nodes

Applications and Content Servers

Resource Domain Management

Application Identifier: 07.05

Overview

To Be Added

Functionality

The basic concept is to define resource domains that expose consistent services (NGOSS Implementation Contracts) to other TAM applications. Because Domains are based on the operator's policies the scope of the resource information model that they expose is based on the SP's individual policy decisions. However the basic services exposed are those necessary to support, at least, but not limited to, the other Resource Management Application Areas.

The Resource Domain Management applications are responsible for providing a completely encapsulated interface to network technology domains by:

- hiding vendor specific idiosyncrasies e.g. for network s through the use of mTOP/MTNM/MTOSI template mechanisms.
- presenting a standards based interfaces e.g. for networks mTOP/MTOSI/MTNM specifications using a standard data model.
- providing in-domain activation.
- providing in-domain alarm collection, filtering (and non data based correlation) to supplement that done by **Correlation & Root Cause Analysis**.
- providing in-domain QoS activation .
- providing in-domain inventory discovery to supplement that done by **Resource Inventory Management.**
- containing limited distributed copies of logical network inventory sufficient to support atomic operation rollback, element manager selection and network auto-discovery. Domain Managers are **not** the masters of this data. Where keys need to be assigned (e.g. IP addresses, VLAN IDs, PortIDs, telephone numbers) this will be undertaken by other applications in the Resource Management Layer.

The Resource Domain Management applications are **NOT** responsible for:

- cross-domain anything (activation, fault correlation and RCA, QoS, testing, orchestration – all done in **Resource Configuration / Provisioning**, **Correlation & Root Cause analysis**, **Resource Performance Monitoring**, **Resource Testing Management**).
- planning (done in **Resource Planning/Optimization**)

- design (done in **Resource Design/Assign**)
- assignment/ allocation of anything (e.g. ports, IP addresses) (done in **Resource Design/Assign**)
- managing the engineering work for physical network equipment (outside plant), fiber or copper (done in **Resource Logistics** and **Workforce Management**).
- providing in-domain performance monitoring – this is generally conducted by specialist tools and probes in **Resource Testing Management**.
- being the database of record (Network inventory database of record is in **Resource Inventory Management**)
- naming network resources (done in **Resource Planning/Optimization and Resource Design/Assign)**
- workflow (done in **Resource Configuration / Provisioning**,)
- B2B ordering (done in the **Partner/Supplier Management Applications**)

Replication of Resource Domains

Resource Domain Management may be replicated by Service Providers to cover any specific policies that they have for organizing resource domains e.g. e2E technologies such as SDH and ATM, Legacy PDH networks, narrow band voice networks, Application Servers containing IT Application and Content - IPTV, and Next Generation Networks where domains need to be formed based on network roles.

Domains may also be replicated to cover different vendors and different equipment types at the choice of the Service Provider.

Impact on Element Management

With Next Generation Networks there will be an evolution away from complex and expensive Element Management Systems towards Resource Domain Managers that have common features that directly connect to the network or Application Server elements themselves. This evolution is also needed to compress the number of systems in any stack to reduce complexity, increase agility and improve end to end process performance.

The use of a Resource Domain Manager means that this can happen whilst shielding all the other TAM applications areas from these detailed implementation changes.

Relationship to mTOP/ MTNM/MTOSI

In this analysis it is assumed that that the services exposed by the Domain Managers for Networks will be based on the MTOSI Specifications. This is shown as a red vertical bar in the figure. This sets a critical SP expectation on the position of the procurement boundary for basic Resources Management Functionality (Service interfaces).

It also shows a clear relationship between the TAM as an Application Architecture and actual conformance testable interfaces that have been developed by the TMF.

Note that MTOSI is not limited to just this boundary and may be used by other application areas in the Resource Management and Service Management layers.

Resource Domain Management for IT computing and applications will be defined in a future version.

Supported Contracts

To Be Added

Resource Discovery

Application Identifier: 07.05.01

Overview

The resource Discovery applications are responsible for automatically discovering the resources and their details through an management channel. These applications may either directly communicate with the Network resources or communicate through a Resource Domain Manager.

Functionality

The resource discovery applications are one of the core applications of Resource Management and provide a feedback loop from the resource. In many cases where the accurate topology is not available in OS systems, they provide the only source of topology for management.

These applications will either communicate directly or through a Domain Manager to retrieve the resource information details. The applications should be able to support either retrieving the overall resource information or the detailed resource information which can include sub-components.

There are a number of users for the discovered information. For example, the Resource Inventory system will use the discovered information to reconcile its data against as-is information while a Resource Root Cause Analysis application will use the discovered topology to enrich the event and pinpoint the true root cause.

Supported Contracts

To Be Added

Resource Activation

Application Identifier: 07.05.02

Overview

Resource activation applications interpret the needs of a fulfillment request into specific control commands for a network or sub-network often handling proprietary messaging with individual resource elements.

Functionality

Typical functions include:

- Update the resource instance to perform the activation or deactivation.
- Update the resource to activate Billing data collection
- Notify Resource Provision / Control of the activation status
- Update Resource Inventory with the resource status information
- Queued / scheduled activation requests
- Configuration validation and rollback
- Manage dependencies within, and across network elements through rules
- Multi-vendor and multi-technology activation
- Multiple NE activation coordination
- Confirm / identify available resources

Supported Contracts

To Be Added

Resource Fault & Performance Data Mediation

Application Identifier: 07.05.03

Overview

Resource Data Mediation applications provide integration to network and IT resources for all Resource Management functions.

These applications take the output from the various resources and re-format the data into a form usable by an application such as a status monitoring application. Mediation capabilities have historically been built for almost every OSS system that faces a variety of network elements or element management systems and the development and maintenance of these functions is a significant overhead since many interfaces often need to be changed when the element being monitored changes.

In recent years, specialist mediation tools, toolkits and applications have become commercially available along with libraries of interfaces to popular network level resources. As network resources deploy standardized interfaces, mediation becomes less of a requirement but for the foreseeable future, this capability is likely to be required.

Functionality

Resource Data Mediation represents the applications that enable the OSS and the networked resource to exchange data and command and control. Typically the data is northbound from the networked resource, including network and service discovery and fault, performance and billing events. Command and control is typically southbound from the OSS to the networked resourced, including service activation, configuration and protocol, alarm and billing settings. Southbound data includes pre-building data on Element Management Systems.

Typical functions include:

- Parsing of data from one format to another
- Correlation
- Pattern recognition
- Tools to set up and maintain parsing rules

Supported Contracts

To Be Added

OSS Inventory/Data Synchronization Management

Application Identifier: 07.05.04

Overview

OSS Inventory/Data Synchronization application provide a common inventory view across the applications in Resource Management. This may be a virtual common inventory produced by synchronization of federated inventories, a single inventory system, or some combination of the two.

Functionality

OSS Inventory/Data Synchronization Management represents the applications that ensure OSS Inventory data generated in each application is available to other applications as

required. OSS Inventory will contain at least resource capacity and service utilization modeling. The synchronization may not be as a result of executing other business processes, but can be dedicated synchronization processes, for example a regular re-synchronization scheduled for off-peak periods. For example, it enables Utilization Management to be updated with new capacity, and for Lifecycle Management to be updated with capacity utilization.

Note that this does not predetermine any implementation solution. It is entirely allowable within TAM to have, in this example Lifecycle Management and Utilization Management share a common OSS Inventory. The OSS Inventory/Data Synchronization Management application would represent the common inventory in this situation. Note also that TAM does not restrict any implementation solution to only one instance of each application, so the need for different common inventories and separate synchronization applications is fully accepted.

Supported Contracts

To Be Added

07.06 Resource Process Management (Workflow/Integration)

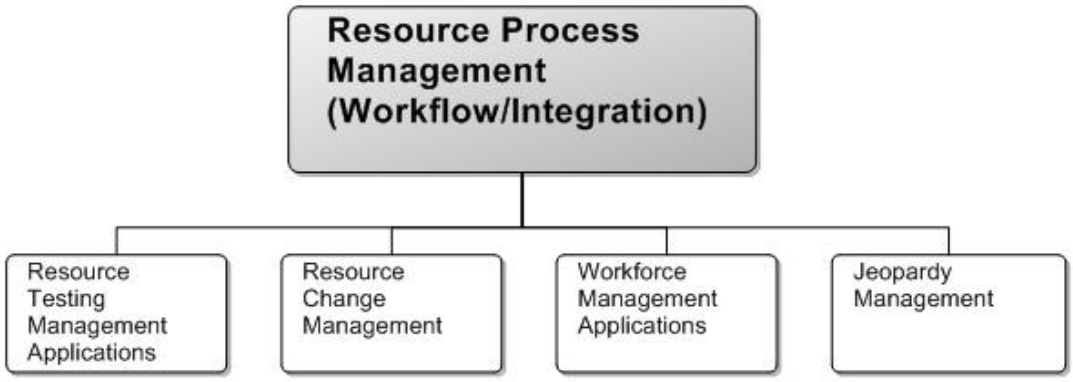

Figure 50: 07.06 Resource Process Management (Workflow/Integration)

Description

To Be Added

Resource Process Management (Workflow/Integration)

Application Identifier: 07.06

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Resource Testing Management

Application Identifier: 07.06.01

Overview

Resource testing applications are focused on ensuring that the various resources are working properly. The resource testing applications are part of both the fulfillment and the assurance process. In the fulfillment process, the resource testing is responsible for ensuring that the assigned service works as designed, while on the assurance side the resource testing applications are responsible for fault isolation and correction. As part of the testing process, these applications also interface with the trouble process, which can trigger an automatic test.

Following is an example application flow:

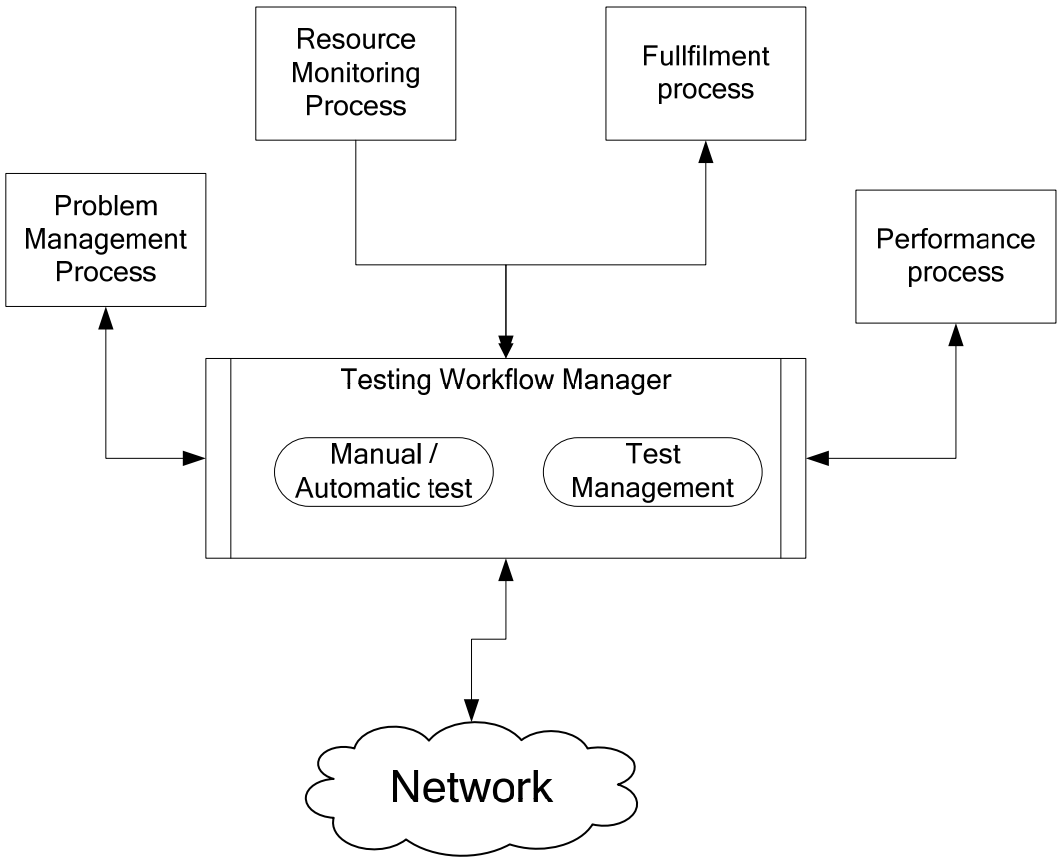

Figure 51: Testing Management

Functionality

Following are some of the capabilities of the testing process:

- Test Work flow and Rules Engine
- Auto and Manual Test Initiation
- Test Life Cycle Management
- Test Head Management
- Manage Test Head Resources Capacity
- Manage Test Head Availability
- Element and Test Head Command and Control
- Test Results Management
- Interpret Test Results

Supported Contracts

To Be Added

Resource Change Management

Application Identifier: 07.06.02

Overview

Resource Change Management applications are responsible for managing the process in which a change is applied to the resource. These applications interface with Infrastructure lifecycle management applications to implement the actual change on the resource

Functionality

These applications are responsible for managing the Change Management Process and also ensure that the different stakeholders are notified throughout the change process. Some of the functionality provided by these applications is:

- Record the Request For Change
- Determine the impact of the Change against other events
- Notify the appropriate Stakeholders
- Manage the Change Approval Process
- Manage the Actual Change Implementation

Supported Contracts

To Be Added

Workforce Management

Application Identifier: 07.06.03

Overview

Workforce Management applications manage field forces to make optimum use of manpower and other resources such as vehicles. They are used to schedule resources, provide a map of field skill sets and provide forecasting and load balancing capabilities. Workforce Management can be used to manage both internal and external (customer) resources in both service assurance and provisioning areas.

Functionality

Typical functions include:

Scheduling: Applications are usually designed to build schedules for groups and individuals taking into account shift patterns, daily duties, multiple skill sets, resource availability, schedule preferences and fluctuating nature of the workload.

Forecasting: Application usually calculate optimal staffing requirements with input of historic statistics, service level goals, call centre costs, change parameters and expected workload. They may include resources that are required by date, time, queue, resource pool etc.

Dynamic management: provides for immediate and unexpected changes in resource status, such as sick leave, or unforeseen changes in the workload dictate that conditions be constantly monitored, and spontaneous adjustments made

Operational Support: This function typically tracks and reports Work Force Management data such as actuals to forecasts and gathering individual and group statistics

Supported Contracts

To Be Added

Jeopardy Management

Application Identifier: 07.06.04

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

07.07 Resource Assurance Management

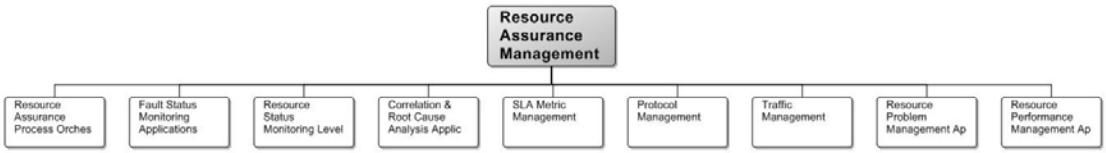

Figure 52: 07.07 Resource Assurance Management

Description

These are the group of Applications which are responsible for the resource assurance function

Resource Assurance Management

Application Identifier: 07.07

Overview

These are the group of Applications which are responsible for the resource assurance function

Functionality

To Be Added

Supported Contracts

To Be Added

Resource Assurance Process Orchestration

Application Identifier: 07.07.01

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Fault Status Monitoring

Application Identifier: 07.07.02

Overview

These applications are responsible for monitoring the administration and operation status of the resource. These applications ensure that the operational personnel always have the correct and latest operational status of the resource.

These applications also ensure that any changes to the network topology (configuration), is reflected into the dependent systems – performance management, service management etc. Also changes in load on resources are reflected. This means that the setting of relevant thresholds and observing the passing of these is within the capabilities supported by such applications.

Functionality

Application principles in this area are typically:

Responsible for displaying the operational status of the resource in either a tabular or graphical representation or both. The applications either directly communicate directly with the resources or through the resource domain management. The applications are responsible for collecting the status messages and correlating them to resource topology.

Distributed meta model of the configurable resources

- Meta-data capability to consolidate multiple databases
- Rules for access control and validation
- New and legacy information

Distributed meta model of expected resource load

- Meta-data capability to consolidate threshold modeling
- Rules for access control and validation
- New and legacy information

Process-driven workflow coordination

- Assigned tasking
- Process templates define work-flow

Mediation layer to support interaction of diverse applications

- Point to point and publish / subscribe modes
- Application Map to support load balancing, resilience

Directory-based profiles

- Users
- Data entities
- Applications

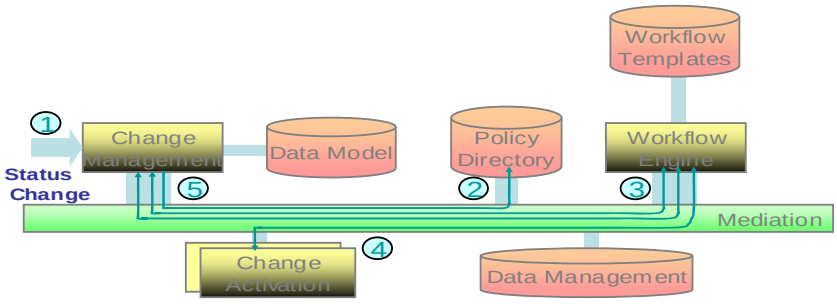

Figure 53: Status Monitoring Data Flow

The flow is:

1. A change in topology or operational status is received from a manual or automatic source
2. The policy directory (could be a person) decides on the appropriate action
    a. User Profiles
    b. Data Profiles
    c. Application Profiles
3. The action is then passed to the workforce control (system or person)

a. Process Templates
b. Workflow Tracking
c. Historical Archive
d. Fast Invocation / Results

4. The change is then activated
   a. Automated decomposition of change impact
   b. Automated activation via the network element / network managers
5. The change is then updated into the management system data model
   a. Meta-data schema
   b. Configurable network and server model
   c. Concurrent lifecycle views

Supported Contracts

To Be Added

Resource Status Monitoring

Application Identifier: 07.07.03

Overview

To Be Added

Functionality

The envisaged functionalities are:

- Network topology monitoring
- Network topology modeling
- Protection/rerouting policy
- Resource load monitoring
  - CPU load
  - Memory utilization
  - Storage (disc) utilization
  - Bandwidth utilization
- Application keep-alive monitoring
- Threshold policy modeling
- Automatic workforce control
- Resource status alarm handling
- Resource status alarm logging

Supported Contracts

To Be Added

Correlation & Root Cause Analysis

Application Identifier: 07.07.04

Overview

Correlation is the ability to collect various events in the network and through a transformation process reduce the number of raw events to a manageable amount to enable a user to move into the area of Root Cause Analysis (RCA), RCA enables the end user to quickly determine the root cause of a problem in the network. Correlation & Root Cause applications are often part of an overall resource problem management solution, but have a unique role in mediating network alarms with topology and configuration data.

Functionality

Capabilities of these applications can be divided into several areas:

Alarm Correlation:

Ability of the application to collect all relevant network events (alarms, performance measures, customer information, events, test results, etc.). The application will have the capability to collect, parse and normalize disparate alarm streams from various sources, including, but not limited to NMS, EMS, NE's, etc.

Reduction of alarms either presented to the user or for use by additional correlations. The more correlation methodologies the application is capable of delivering, the greater the overall reduction of alarms that should be accomplished.

There are several alarm correlation mechanisms which could be employed by the application:

Alarm de-duplication – first level of alarm reduction based on pre-defined user criteria. Alarm de-duplication is designed to eliminate repeated events to reduce the amount of "noise" from the network. The application should provide end user with capability to define rules for de-duplication.

Alarm auto-clearing – ability of the application to correlate a previous alarm with a clear-alarm received from the source (NE, NMS, and EMS). The application should deliver "out-of-the-box" auto-clearing capabilities for each device type/EMS/NMS supported, as well as capabilities for end users to define their own auto-clearing rules.

Alarm thresholding – ability of the application to handle various thresholding scenarios such as alarm flapping and integration with performance management systems to receive threshold crossing alarms, as well as generate synthetic threshold alarms based on pre-defined user conditions. The application should provide end user the ability to maintain "out-of-the box" rules, as well as develop their own rules for threshold management.

Correlating alarms with supporting data (topology, configuration).

Rules-based correlation (intra- or like-element driven)

The application should have the ability to perform topology-based correlation:

- intra-element
- inter-element (including up/down the various network layers)
- service-based; In order for the application to do topology based correlation, the application must be "topology aware". Topology awareness can be achieved through autodiscovery or integration with an inventory management application. Inter-element and service based correlation can only be achieved if the inventory data is valid and is available for integration with the correlation application.
- Alarm enrichment (external database connectivity)
- Ability to associate services to the physical aspects of the network.
- Filter, summarize, and reduce displayed alarms
- Consolidation of alarms

- Consolidating alarms across technology
- Consolidating alarms across elements
  - Present to alarm console
  - Graphical display of fault / topology overlay

Root Cause Analysis – (RCA) ability to pinpoint the root cause of the problem or in some instances probable cause of the problem. The application should have the ability to:

Root Cause isolation based on correlation analysis described above.

Customer impact analysis– accurate customer impact analysis depends on service correlation as well as the ability of the application to integrate inventory management and CRM databases to identify impacted customers.

Fault isolation

Network Element / network layer attribution

Alarm consolidation / substitution as well as alarm suppression of the sympathetic alarms.

Problem identification / initiation (ticket creation). Once Root Cause/Probable cause is determined, the application should have the ability to integrate with trouble management application for manual/automated ticket creation.

Resolution initiation (testing, solution identification/ownership, knowledge base index). The application should have capability to integrate with various testing applications. Integration with testing should be rules bases.

Knowledge of topology

Present to alarm console

Drill down from root cause into details

Supported Contracts

To Be Added

SLA Metric Management

Application Identifier: 07.07.05

Overview

These applications are responsible for managing how the metrics are managed. They are responsible for defining the templates for the metrics. The individual SLA/Performance Management applications will use these templates to monitor the performance of the Network.

Functionality

These applications will define the actual counters which will be measured by the network and also define how these individual counters are tied together to define an individual Service Level Objective (SLO). These applications will also be defining the normal operating parameters for these counters.

The Performance Management Application will use the counter definition to determine which counters which it needs to monitor and what are the normal acceptable values for

each counter. When the counter value falls outside this range, it can generate an exception. The SLO definitions are also used as a guide on how to aggregate the counters to provide SLA Management.

Supported Contracts

To Be Added

Protocol Management

Application Identifier: 07.07.06

Overview

These applications monitor the protocol (signaling) links to provide a real time view of the network. Please note that in this context these applications are not actually provide the actual signaling but are monitoring the protocol for aid in Service Assurance. Even though these applications have been around for a long time (SS7 Monitoring Applications) they have gotten more popular in the recent years with the introduction of many new signaling protocols.

Functionality

These applications monitor the protocol links to aid in determining the Resource and Service performance. These applications are typically probe based and use the probes to effectively monitor the vast amount of signaling traffic which is generated by the network. The applications will typically correlate this data to produce Service/Resource level statistics which can then be consumed by Performance/Service Quality Management Systems to provide a real time view of a Service/Resource.

These applications can also use the protocol information to segment the service traffic data into various uses (e.g. HTTP, FTP, etc. on an IP Service) to provide the Service Provider an view on how each of the protocols are functioning

Supported Contracts

To Be Added

Traffic Management

Application Identifier: 07.07.07

Overview

These applications utilize various inputs from other applications like Inventory, Performance, Protocol Management, etc. to effectively manage how the various services are routed through the network.

Functionality

These applications will utilize the inputs from various data sources to identify potential congestion in traffic over the network. These applications utilize the congestion information to highlight which of the Services will be affected.

In addition to identifying congestion, these applications will also suggest a corrective action, typically rerouting of the traffic, to ease the congestion on the network

Supported Contracts

To Be Added

Resource Problem Management

Application Identifier: 07.07.08

Overview

Problem or trouble ticketing applications provide comprehensive capabilities for recording problems, providing escalation of the problem based on a number of criteria. Systems are able to associate the effects of problems to root causes (based on root cause analysis systems or human deduction).

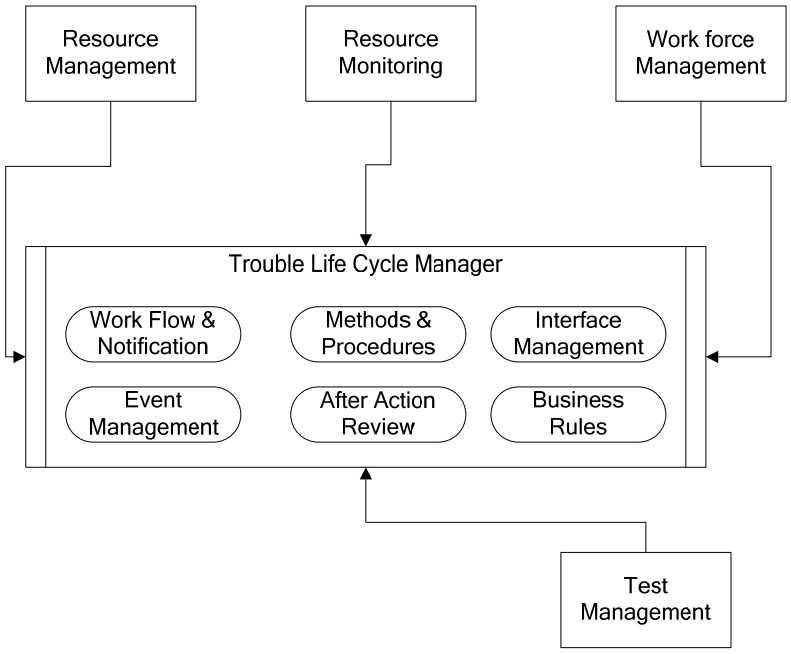

Figure 54: Resource Problem Management

Functionality

Typical functions include:

- Event Management
- Trouble ticket creation

- Auto and manual ticket initiation
- Outage classification and prioritization
- Problem tracking / history
- Ticket Workflow and notification
- Problem workflow
- Personnel utilization and interface to Work Force Management
- Knowledge Management
- Resolution identification, tracking and confirmation
- MTTR and Uptime measurements
- Problem trending and identification of design flaws or hot spots
- Feedback to customer: service status, trouble status, network bulletins
- Business Rules Management
    - Managing Methods and Procedures
    - Manage Interfaces to external functions
    - Consolidating trouble tickets across technology & elements
- Change control

Supported Contracts

To Be Added

Resource Performance Management

Application Identifier: 07.07.09

Overview

Applications in this area of the Applications Map can be sub-divided into four main functions.

Resource Performance management

Resource Data Mediation

The data flow is illustrated and each application area described below:

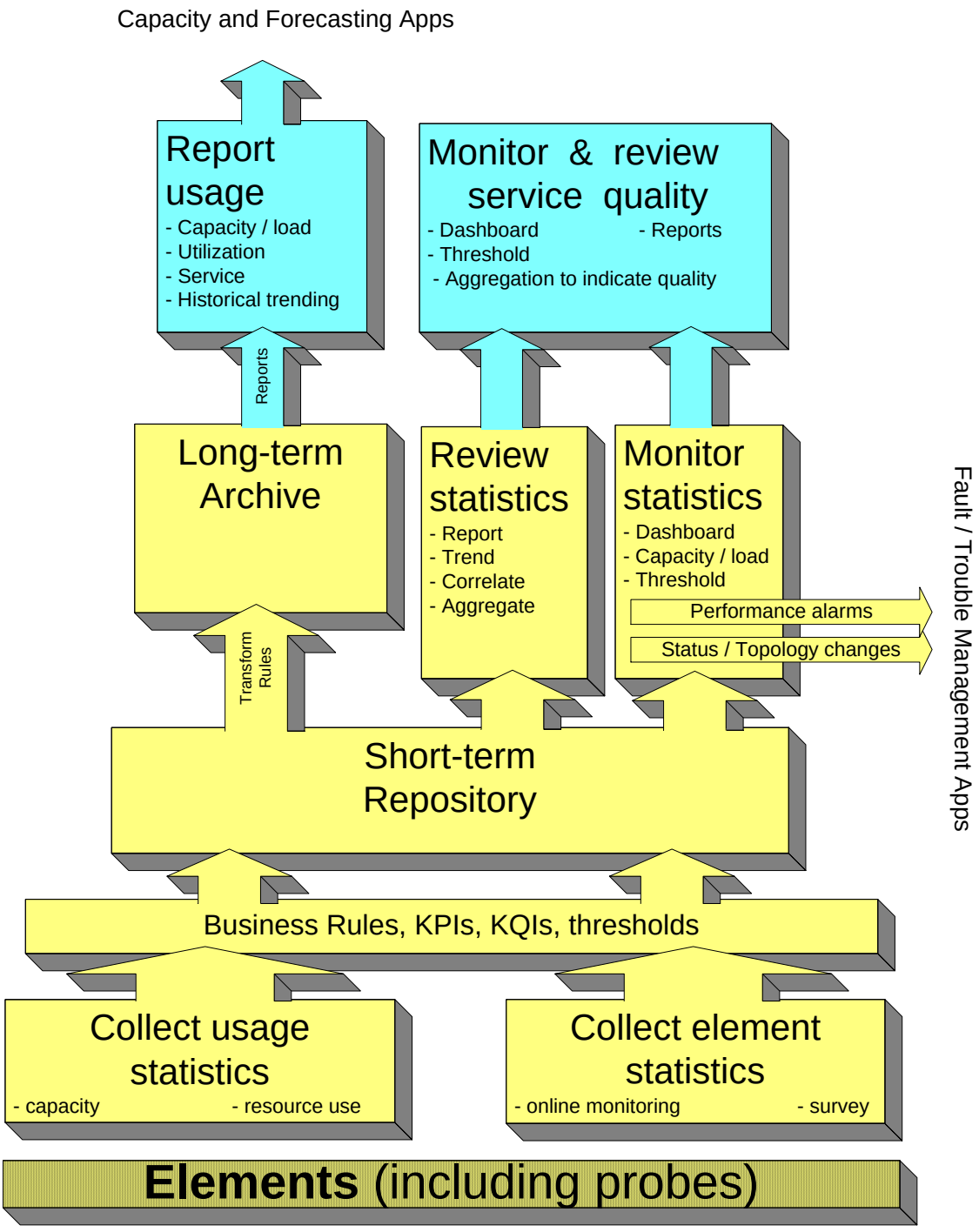

Figure 55: Resource Performance Management Data Flows

Traditionally, the management of network resources has been geared to managing the technology that supports the network - monitoring events. With multi-service networks it

will be managed according to the services being delivered across the network - monitored on service levels.

As the services and the network infrastructure that supports them become more complex, automation of the data analysis is required.

Functionality

Applications that support Performance Management will have one or more of the following capabilities:

- Resource Performance data collection
- Resource Topology Status data collection
- Business rules / formulae / KPIs, KQIs
- Cross NE and Layer data mediation
    - Intra- and inter-NE rules
    - Intra- and inter-layer rules
- Long-term performance archive
- Short-term performance repository
- Input to capacity planning and forecasting applications
- Input to resource problem management applications
- Historical trending
- Problem identification: Capacity, Configuration problem identification
- Problem triage / testing
- Utilization trending
- Capacity/load management
- Performance “dashboard”

Supported Contracts

To Be Added

07.08 Voucher Management

Figure 56: 07.08 Voucher Management

Description

Voucher management application handles all aspects of prepaid recharge vouchers. Generally, a voucher has a unique serial number and a PIN code by which it is identified. The PIN code is covered, and the cover must be scratched off in order to use the voucher. Scratch-vouchers can be purchased from vending machines, at kiosks and other points of sale.

Customers can use vouchers to recharge their balances via an IVR system or by contacting the call center and providing the CSR with the voucher.

Voucher Management

Application Identifier: 07.08

Overview

Voucher management application handles all aspects of prepaid recharge vouchers. Generally, a voucher has a unique serial number and a PIN code by which it is identified. The PIN code is covered, and the cover must be scratched off in order to use the voucher. Scratch-vouchers can be purchased from vending machines, at kiosks and other points of sale.

Customers can use vouchers to recharge their balances via an IVR system or by contacting the call center and providing the CSR with the voucher.

Functionality

Voucher Management Applications generally provide the following functionality:

- Voucher Ordering
- Definition and creation of packages and tentative vouchers
- PIN generation and encryption
- Pairing of serial numbers with PINs
- Sending of the order file to the manufacturer
- Voucher Distribution to dealers

Supported Contracts

To Be Added

07.09 Billing Data Mediation

Figure 57: 07.09 Billing Data Mediation

Description

These applications are very similar in function to resource mediation but especially concerned with billing functions (for voice, data, or content). Typically they are optimized to handle very large volumes of data but do not need to be as flexible as general purpose mediation as they typically parse call detail records (CDR's).

Billing Data Mediation

Application Identifier: 07.09

Overview

These applications are very similar in function to resource mediation but especially concerned with billing functions (for voice, data, or content). Typically they are optimized to handle very large volumes of data but do not need to be as flexible as general purpose mediation as they typically parse call detail records (CDR's).

Functionality

Typical functions include:

- CDR Formatting, mediation & correlation
- IP & IPCDR formatting / mediation/ correlation
- Wholesale Partner Gateways
- CDR/IPCDR pre-processing / rating

Supported Contracts

To Be Added

07.10 Real-time Billing Mediation

Figure 58: 07.10 Real-time Billing Mediation

Description

Real time billing mediation applications are significantly different from post paid mediation systems. The source of data is usually different (post paid billing systems usually collect call detail records after the call event), pre-paid systems take usage information from

signaling networks and monitor in-call usage. Services like Advice of charge, even for post paid usage, require real time mediation systems.

Real-time Billing Mediation

Application Identifier: 07.10

Overview

Real time billing mediation applications are significantly different from post paid mediation systems. The source of data is usually different (post paid billing systems usually collect call detail records after the call event), pre-paid systems take usage information from signaling networks and monitor in-call usage. Services like Advice of charge, even for post paid usage, require real time mediation systems.

Functionality

Capabilities required for real time mediation include:

- Acquisition and validation of events received from Network element.
- Formatting the event into a common-formatted event record.
- Identifying and routing the customer/customer population group associated with an event and routes the event to the relevant rating function
- Communication with the session control device
- Communication with the rating engine

Supported Contracts

To Be Added

08.0 Supplier/Partner Domain

Figure 59: 08.0 Supplier/Partner Domain

Description

The SupplierPartner Domain includes all SupplierPartner-oriented data and contract operations associated with a SupplierPartner. Its scope encompasses, planning of strategies vs. SupplierPartners, handling of all types of contact with the SupplierPartner, the management of the relationship, and the administration of SupplierPartner data. The SupplierPartner Domain also includes data and contract operations related to the SupplierPartner Bills, disputes and inquiries.

08.01 Supply Chain Management

Figure 60: 08.01 Supply Chain Management

Description

To Be Added

Supply Chain Management

Application Identifier: 08.01

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

08.02 Partner Management

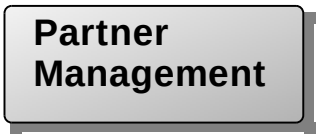

Figure 61: 08.02 Partner Management

Description

In the next generation telecom scenario, collaboration is the key to successful delivery of value added services and retention of customers. The telecom operators form horizontal and vertical revenue sharing relationships with players like other telecom operators, content providers, and regulatory bodies.

Most of the service providers now bring in a lot of products from partners to add to their service portfolio, so that customers can choose from a wide array to their preference and benefit. The service providers can also form channel partners through which they can offer their products to other markets where they don't have any direct access. As the market is getting polarized to service providers and customer owners, partnerships are going to be the key. Virtual world is opening up with increasing operations of players like MVNO's, extending services or products from other parties to their customers leveraging their brand power and customer access. Hence horizontal and vertical value chain integration is going to be a vital part of the consolidation and convergence strategy of any service provider. In the online content and commerce world, the length of value chain could go on to include content providers, brokers, intermediaries, network operators, payment processing entities, banks and so on. Revenue from the end customer needs to be shared among these value chain entities based on pre-defined agreements. Sometimes the revenue settlement process has to be done in real-time so that final transaction can be validated and output delivered to the end customer.

Partner Management

Application Identifier: 08.02

Overview

In the next generation telecom scenario, collaboration is the key to successful delivery of value added services and retention of customers. The telecom operators form horizontal and vertical revenue sharing relationships with players like other telecom operators, content providers, and regulatory bodies.

Most of the service providers now bring in a lot of products from partners to add to their service portfolio, so that customers can choose from a wide array to their preference and benefit. The service providers can also form channel partners through which they can offer their products to other markets where they don't have any direct access. As the market is getting polarized to service providers and customer owners, partnerships are going to be the key. Virtual world is opening up with increasing operations of players like MVNO's, extending services or products from other parties to their customers leveraging their brand power and customer access. Hence horizontal and vertical value chain integration is going to be a vital part of the consolidation and convergence strategy of any service provider. In the online content and commerce world, the length of value chain could go on to include content providers, brokers, intermediaries, network operators, payment processing entities, banks and so on. Revenue from the end customer needs to be shared among these value chain entities based on pre-defined agreements. Sometimes the revenue settlement process has to be done in real-time so that final transaction can be validated and output delivered to the end customer.

Functionality

A partner management application mainly does functions like

- Partner definition and hierarchy management
- Pre-defined revenue sharing agreements and variation rules
- Agreement definition for each service, product, channel or location
- Direct and indirect settlement
- Real-time settlement
- Drill down reconciliation at summary and detailed levels
- Partner event processing and revenue share accounting
- Partner payment handling

Supported Contracts

To Be Added

08.03 Wholesale / Interconnect Billing

Figure 62: 08.03 Wholesale / Interconnect Billing

Description

Wholesale billing applications include a variety of capabilities. Traditionally this area included inter-carrier settlements capabilities and this was later extended to interconnect billing applications. In today's competitive markets and complex value chains, it has expanded further to include among others Roaming, wholesale operators, resellers, Mobile Virtual Network Operators, Content Providers and E-Commerce. There is now an array of applications in the area providing charging, billing, and settlement capabilities on a raw data basis, individual transaction basis and bulk basis across a variety of services and platforms. These applications work across a variety of platforms and support a wide range of services, preferably in one single system. Wholesale applications need to adhere to international standards such as TAP and RAP files, which are processed in Roaming solutions.

Wholesale / Interconnect Billing

Application Identifier: 08.03

Overview

Wholesale billing applications include a variety of capabilities. Traditionally this area included inter-carrier settlements capabilities and this was later extended to interconnect billing applications. In today's competitive markets and complex value chains, it has expanded further to include among others Roaming, wholesale operators, resellers, Mobile Virtual Network Operators, Content Providers and E-Commerce. There is now an array of applications in the area providing charging, billing, and settlement capabilities on a raw data basis, individual transaction basis and bulk basis across a variety of services and platforms. These applications work across a variety of platforms and support a wide range of services, preferably in one single system. Wholesale applications need to adhere to international standards such as TAP and RAP files, which are processed in Roaming solutions.

Functionality

- Reference Data Creation and Management

- Definition of products and services, pricing schemes, partner entities and contracts into the system. Easy uploading of reference data from external sources such as XML files.
- Partners' accounting activities (Partner event processing)
- Processing the events generated by the partners' business activities for invoicing and payment purposes.
- Error Management
- Automatic and manual handling of records found in error, mass correction and re-rating of events.
- Partner Invoice management
- Accurate, flexible bi-directional invoicing for various settlement periods.
- Settlement management
- Oversee the Partners' accounting activities. Provide monitoring tools.
- Handling of payments
- Logging and tracking of full or partial payments.
- Disputes management
- Automated tools to ease and expedite dispute management.

Supported Contracts

- Interface with other financial management systems such as the general ledger.
- Report and Statements
- Tools for the analysis of the information available within the system such as accumulated charges, rated usage, etc.

09.0 Enterprise Domain

Figure 63: 09.0 Enterprise Domain

Description

Introduction

Enterprises need to manage themselves and the TAM has identified the following application areas:

- Revenue Assurance Management
- HR Management
- Financial Management
- Asset Management
- Security management
- Knowledge Management

Fraud Management

Mostly these functions are quite generic across many industry sectors and are not peculiar to the Communication industry.

Within Knowledge Management the communications industry has some very specific needs around the general title of 'Enterprise Information Applications or 'Business intelligence'.

09.01 Revenue Assurance Management

Figure 64: 09.01 Revenue Assurance Management

Description

Revenue Assurance is the collection of data quality and process improvement methods that reduce leakages, improve profits, revenues and cash flows without influencing demand

Applications to solve this problem vary considerably and they relate to almost any area of the OSS/BSS applications. The revenue assurance applications area is thus shown at this part of the TMF Applications Map for convenience.

Although, as its name suggest, Revenue Assurance is mainly about revenues and profits, revenue assurance activities in the Telco organization has significant implications on operational and strategic aspects of the service provider.

Revenue Assurance Management

Application Identifier: 09.01

Overview

Revenue Assurance is the collection of data quality and process improvement methods that reduce leakages, improve profits, revenues and cash flows without influencing demand

Applications to solve this problem vary considerably and they relate to almost any area of the OSS/BSS applications. The revenue assurance applications area is thus shown at this part of the TMF Applications Map for convenience.

Although, as its name suggest, Revenue Assurance is mainly about revenues and profits, revenue assurance activities in the Telco organization has significant implications on operational and strategic aspects of the service provider.

Functionality

The main revenue assurance application areas are:

- Detection of data discrepancies between systems and data repositories that might affect the ability to generate revenues or increase costs*, including,*
  - *Configuration data - e.g. between CRM, inventory and network)*
  - *Events data - e.g., between SS7, Switch, Mediation, and billing)*
  - Interconnect/partners billing
- Detection of data integrity and correctness problems, e.g., a switch that rounds incorrectly the durations of the call.

- Verification of the correctness of the application of the rating and billing rules – e.g., is the customer billed according to the correct plan, and is he billed correctly according to the correspondent plan
- Investigation of revenue leakages, finding and correcting their root cause to prevent the recurrence of similar leakages
- Grouping and classification of leakages
- Proactively test equipment and systems and processes to verify that they provide accurate information- e.g., using test call generation
- Generation and tracking of Revenue Assurance Trouble Reports and Alarms
- Automation of revenue assurance controls and data collection
- Automation of leakages correction
- Generation of revenue leakage reports and documentation both for internal needs as well as a support to regulatory compliance activities.

Supported Contracts

To Be Added

09.02 HR Management

Figure 65: 09.02 HR Management

Description

To Be Added

HR Management

Application Identifier: 09.02

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

09.03 Financial Management

Figure 66: 09.03 Financial Management

Description

To Be Added

Financial Management

Application Identifier: 09.03

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

09.04 Asset Management

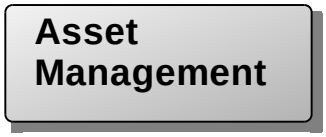

Figure 67: 09.04 Asset Management

Description

To Be Added

Asset Management

Application Identifier: 09.04

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

09.05 Security Management

Figure 68: 09.05 Security Management

Description

To Be Added

Security Management

Application Identifier: 09.05

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

09.06 Knowledge Management

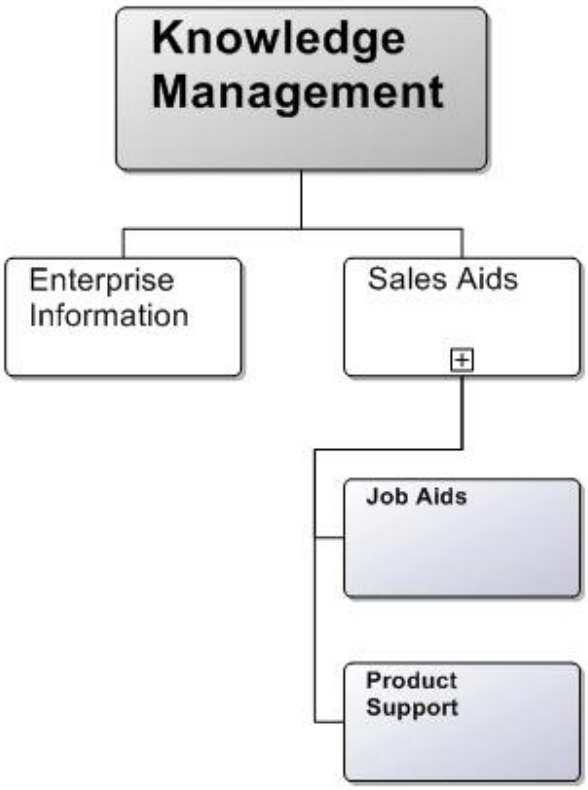

Figure 69: 09.06 Knowledge Management

Description

To Be Added

Knowledge Management

Application Identifier: 09.06

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

Enterprise Information

Application Identifier: 09.06.01

Overview

These applications are usually associated with Data Warehousing technologies and provide the enterprise with a range of filtered information and events to present to enterprise managers, often through a dashboard, to allow them recognize, respond and manage business events.

Functionality

The Enterprise Information Application is responsible for:

- The acquisition and management of data for use within Business Intelligence functions. This includes both internal corporate data, but also external data used to augment and enhance the organization's understanding of its customers and services.
- The transformation and remodeling of data to an agreed model for each managed business domain within the enterprise e.g. Retail, Wholesale.
- The cleansing and management of data quality to ensure an appropriate level of integrity and quality is maintained within the information. This also includes reporting to identify and initiate resolution of root cause issues pertaining to the data quality.
- Data Integration services to manage the distribution and synchronization of information to other platforms.
- The creation and management of an Enterprise Wide Data Warehouse for centralization and rationalization of business information containing all publishable quality data of a permanent nature for the enterprise. This information will be stored along the lines of common dimensions and over time to be used for analysis and prediction purposes.
- The creation of a business intelligence application layer to utilize the information within the warehouse. This will take the form of the following basic capabilities:
- Dashboarding
- Query and Reporting
- User Guided Knowledge Discovery
- Predictive Analytics / Data Modeling
- The generation of business data-driven event triggers for delivery to decision making platforms to assist in business intelligence
- The support infrastructure for Marketing functions (Batch and Real Time), and Campaign Management.
- The creation and management of an end to end Meta Data Repository for enhanced data identification and process understanding to further assist in Business Intelligence.
- The Enterprise Information platform is NOT responsible for:
    - The applications provided to customers, employees or agents of the enterprise which manage the customer relationship and capture of customer related data. These are proper to the Supplier Partner and Customer Relationship Management Applications described earlier.
    - The management of in-flight event status updates relating to complex order processing.

- The Enterprise Information application platform SHARES responsibility for:
    - Business Intelligence reporting. This function is supplied directly from tools that sit within the Enterprise Information Application and thorough a Business Intelligence layer from within the Customer Relationship Management application. This ensures that ALL relevant business communities have access and correct use of the information required for business intelligence. This also supports niche areas that require specific tools/techniques for prediction and data mining analysis.
    - Marketing and Campaign Management. A combination of Enterprise Information application and Customer Relationship Management Applications will be used to support Campaign Management.

Supported Contracts

- Manage Dashboard
- Manage Data Cleanse
- Manage Data Profiling
- Manage Data Synchronization
- Manage Event Enhancement
- Manage Extract
- Manage Party
- Manage Place
- Manage Predictive Analytics
- Manage Query & Reporting
- Manage User Defined Knowledge Discovery

Sales Aids

Application Identifier: 09.06.02

Overview

The Sales Aids Application provides access to methods and procedures as well as product information that can be used to assist in making a sale.

Functionality

The Sales Aids Application includes the following functionality:

- Access to various job aids as well as Methods and Procedures.
- Access to product information

Supported Contracts

To Be Added

Job Aids

Application Identifier: 09.06.02.01

Overview

To Be Added

Functionality

The Job Aids Application provides access to needed job aids, methods and procedures to assist in performing various sales related tasks while conforming to organizational standards. Aids can be passive, such as in the case of a searchable price book, or active, in the case of context-aware scripting to aid lead qualification as an example.

Supported Contracts

To Be Added

Product Support

Application Identifier: 09.06.02.02

Overview

To Be Added

Functionality

The Product Support application provides access to product information on the various products being sold by the service provider. This can include information such as product descriptions, configuration constraints, eligibility rules, and possibly pricing information.

Supported Contracts

To Be Added

09.07 Fraud Management

Figure 70: 09.07 Fraud Management

Description

To Be Added

Fraud Management

Application Identifier: 09.07

Overview

To Be Added

Functionality

To Be Added

Supported Contracts

To Be Added

10.0 Application Integration Infrastructure

Figure 71: Application Integration Infrastructure

10.1 Introduction

As described in section 12 - NGOSS and the TAM, the Telecom Applications Map is an integral part of NGOSS. Integrating applications into a cohesive, automated and flexible infrastructure to enable 'lean' operations is as important as the application's functionality itself. The full NGOSS recommendations for integration are available in the NGOSS Technology Neutral Architecture GB053. Thus this section of the Telecom Applications Map is designed as an overview for companies either building or deploying applications. Key to the success of a highly integrated 'lean operator' is that such an approach should enhance, not diminish the business flexibility that the enterprise can achieve. Previous approaches of tightly coupling applications with specific functional interfaces (i.e. 'hard-wired' integration) are not only expensive to build and maintain such one-one interfaces, they are extremely inflexible because they reflect the needs of the enterprise

and its business processes at the time of development. Today, the telecom industry is very dynamic and such 'hard-wired' approaches badly serve the business.

- It is critical to separate business process control from the individual OSS applications.
- The key is for the individual OSS applications to offer open interfaces that allow for business process control.

TM Forum's approach to integration is based on 3 key principles:

- the use of a common communications bus,
- the use of business process management (process workflow);
- the use of contract interfaces between applications and a common information model shared between the applications.

Clearly the applications described in this document need not adhere to these core principles but unless applications migrate in this direction, the level of process automation achieved will be low, the amount of business flexibility will be low and the level of customer service will be low.

Achieving lean and agile business processes places a very significant reliance on integration between applications that deliver the various work functions of an operator's main processes. Full flow-through integration of applications at an enterprise level is a very significant task and one that many industry sectors have been trying to perfect over many years. In the telecom industry, some degree of application integration has been achieved over the past decade, but this typically has consisted on system-system point integration to achieve a specific, high volume flow-through result. The reality of this approach is that it can work but it is very expensive and very inflexible, requiring programmatic changes every time a minor process change is needed. The enterprise integration framework described in this document seeks to provide an effective, generic and flexible approach to such integration where changes can be made by operations people rather than software engineers.

It is critical to the success of any 'lean operator' program that integration between processes, data and applications can be achieved progressively, accommodating both legacy applications as well as new systems sourced from commercial suppliers or built in-house. Some approaches to integration are really only applicable to 'clean-build situations and for most operators with legacy systems, it is most unlikely that they can deploy anything other than step-by-step progressive integration approach. This progressive approach assumes that an increasing number of steps in a lean operator's processes will be automated via applications, either by replacement of current manual process steps, replacement of existing applications with ones offering greater functionality or upgrades to existing systems. Thus the task of

providing end-to-end, flexible process automation is essentially one of providing integration between “islands” of automation.

There are 3 primary building blocks to achieving a generic and flexible approach to integration such process and application “islands”. These are:

A common communications infrastructure between each application. Several leading middleware products are now well established to provide a common communications vehicle. The most common of these is currently enterprise application integration (EAI) bus technology that supports numerous interface types to cater for a variety of legacy operating systems, databases, data formats, standards etc. EAI is concerned foremost with application-to-application exchange of data, not user activity or interaction. Other common communications vehicles such as web based approaches can also be used.

A business process management (BPM) environment. BPM is an emerging class of technologies that work hand-in–hand with EAI technology to provide a range of facilities to manage process and information flows between applications. The real value of BPM is the ability to define and execute business processes independent of applications and infrastructure. While EAI and integration capabilities offer an important resource to BPM environments, EAI software alone typically lacks the ability to address the user-facing side of business processes.

Contract-defined interfaces between applications. In NGOSS parlance, these are defined as contract interfaces. NGOSS Contracts define the interfaces to Services made available by the OSS application. The data and metadata in Contract specifications use information defined in the Shared Information and Data model (SID).

10.2 Common Communications - Enterprise Application Integration

Enterprise Application Integration (EAI) is a business computing term for the plans, methods, and tools aimed at modernizing, consolidating, and coordinating the applications in an enterprise. EAI technology allows this integration to be done using techniques that leverage the architecture. Using these concepts, applications send or receive events / messages to or from other components or send or receive notifications. Such architecture provides greater degrees of freedom. For example, components can be replaced by new ones more easily

as they have the same interface. It is also easier to plug-in a new component that will use the services already available. EAI includes:

transport of data between applications

data format translations

implementation, at EAI level, of enhanced enterprise level objects

In the following sections, we start with a description of the analysis methodology and guidelines that are used in this section for the EA Integration of the focused applications. Use of this analysis methodology should reduce making inappropriate decisions based on expected capabilities associated with such architectures.

It must also be noted that Enterprise Integration is generally implemented in a number of successive phases. This is particularly true when few existing applications are already efficiently integrated together. It is recommended that the first phases usually consist in the integration of new features and new applications and that in further phases it can be envisaged to enhance the integration of the existing applications.

10.3 Business Process Management & Workflow

Business Process Management (BPM) is the evolution of earlier concepts called workflow management (also know as Process Flow Management). As operators understand the need to introduce much greater flexibility and day-day change into their business processes, BPM and workflow management techniques, pioneered in manufacturing industry, are becoming more and more visible in the telecommunications industry.

Business flexibility is crucial for an operator as well as high levels of automation of its processes, not just of basic process flows but of complex and exception handling areas. One of the cardinal principles of NGOSS is to allow this by abstraction of business processes from application logic. The emergence of N-tier computing and component-oriented environments (such as COM and J2EE) allow for this principle in the same manner that the emergence of SQL and the two-tier client/server architecture enabled the abstraction of data management from application code. By separating business process management as an independent function, applications can be designed around existing processes, and thus to take advantage of shared business logic rather than reinventing and recoding it for each application.

There are considerable benefits to an operator in adopting this type of approach and would include:

Reduced costs

Staff savings

Cash flow improvement

Better customer perception

Faster and more flexible response to implement new processes or amend existing ones to accommodate new products / services

To understand how BPM fits with an operator and its infrastructure, it is helpful to examine the individual components of BPM. While commercial implementations vary in their specific definitions and software composition, most fit within the basic framework described below. Note that although some systems offer the ability to automate activities and define business rules, those that lack the fundamental components below cannot realistically be used as a BPM system.

A BPM system is defined by the components of:

Execution Engine

Process Designer,

Process Definitions

Activity Monitor

User interface which may be a combination of a Windows client application, HTML based Work Portal, or an exposed API or Web service

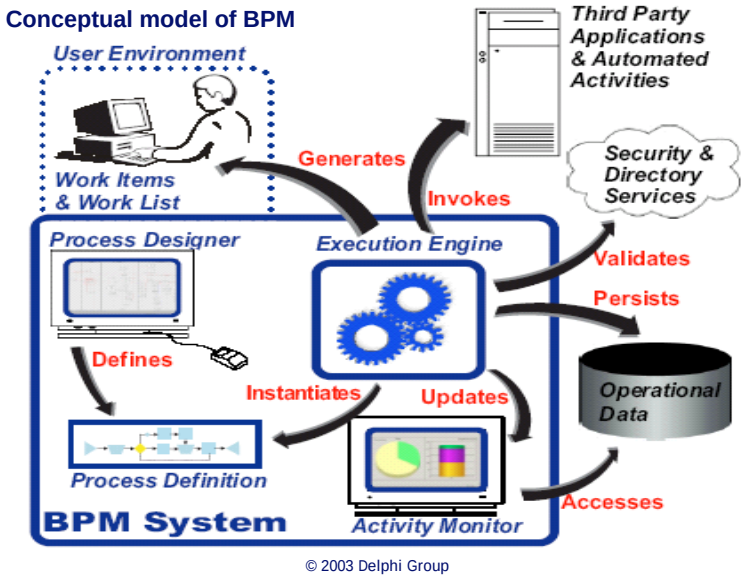

Figure 72: Conceptual model of Business Process Management

The majority of BPM systems on the market today are component-oriented and allow each of the individual pieces listed above to be deployed independently on individual servers. Individual business processes are defined by the process owner in a Process Definition, (increasingly expressed in a standard language such as UML or some variation of XML). Each Process Definition may be composed of both manual activities and automated activities. Once defined and validated within the Process Designer, processes are instantiated by an Execution Engine. The Activity Monitor provides access to status and performance metrics on the execution of processes.

End-to-end process 'orchestration'

It is unlikely that the implementation of an NGOSS based 'lean' migration program will be a 'big bang' type of approach implementing all new systems. Therefore, the Enterprise Integration Framework will need to integrate end-to-end processes across various 'islands of automation' ranging from existing legacy systems to new commercial-off-the-shelf technology. This approach is sometimes called 'orchestration' in process. An orchestration-based approach offers the ability to manage processes of greater complexity, (such as complex business service provisioning etc.) with far more efficiency than is otherwise possible with alternative approaches. The key to this is a modular approach to managing business rules, relationships, and activities.

Within a simple workflow automation paradigm, processes are defined "end-to-end" with all possible paths (or more commonly a single path) pre-determined. Thus 'Step 5' always follows 'Step 4' and precedes 'Step 6' even if different instances of an otherwise standard process may require a different sequence.

Orchestration allows for the sequencing of steps to be determined during the "run-time" instance of a process, with paths determined by evolving context resulting from each new step. Thus the potential number of paths and outcomes may otherwise be too complex to define in terms of pre-determined "If-Then-Else" rules, but may be easily resolved through human interaction and decision-making. This highlights the key architectural difference between automation and orchestration. Given the inherent complexity and constant changes within an operator's business environment, effectively managing processes requires the agility to shift with changes in context, rather than always being bound to the same scripted flow. This requires the unique ability to define processes as a set of atomic, goal-based activities with the enforcement of basic parameters (e.g., time limits, data variables), while separating the execution logic activities from the higher-level process definition. Process orchestration is not limited to invoking software, but rather represents a shift from task-based to goal-oriented process definition. Web services and other forms of software automation are utilized through process orchestration, yet not to the exclusion of manual, human-driven activities.

10.4 Contract defined interfaces

Contract defined interfaces are a key concept within the NGOSS architecture. This approach allows applications to locate each other and discover what services they offer through a repository of contracts. A contract is a well-formed interface by which the functionality of a component is made available to a client. Components advertise their contract instances by their class and the values of their service attributes, via a trading service. The remainder of the contract comprises the operations by which it provides the system services for which it was designed.

Contracts comprise a technology-neutral portion and a technology-specific portion. The technology neutral portion is independent of the protocols used between components, whereas this needs to be specified in the technology-specific portion that will be used at the systems level. Thus the interface specification is independent of the communications infrastructure.

It is possible that the technology-specific portion will not be completed until runtime. The reason for this is that the introduction of a new component can trigger the reconfiguration of the NGOSS adapters of existing components and consequently alter the communications between components. This enables a new component to enhance an existing business process dynamically.

NGOSS has defined a number of areas of contract interfaces and this work is continuing. For example, there has been much discussion about whether the technology-neutral portion of contracts should contain pre- and post-conditions and what the implications would be.

Index

11. Appendix 1 TAM Short Description

To Be Defined

12. Appendix 2 Changes from 2.1

There are major changes from 2.1 to release 3.0. In most of the sections the Level 1 applications have been unpacked and in many cases new Level 1 groupings have been defined. Following are at a high level the changes from 2.1:

Market/Sales Domain: Introduction of new Level 1's like Mass market Management, Sales Portal and unpacking of all Level 1's into Level 2

Customer Management: This section has undergone a major revision and new concepts like CSR toolbox have been introduced. In addition the Billing and Fulfillment sections have been organized and Level 2 and 3 introduced.

Service Management: The fulfillment domain has been reorganized under the Service Order Management

Resource Management: This section has been completely organized and many new concepts like Resource Lifecycle Management, Resource Order Management and resource Assurance have been introduced.

There are no changes to all other domains.

13. Appendix 3 - NGOSS and the TAM

This Telecom Applications Map is designed to provide the industry with a frame of reference in order to evolve the set of applications that enable and automate operational processes within a telecom operator. It is a fundamental part of the overall TM Forum Lean Operator program and TM Forum's core technical roadmap: New Generation Operations Systems and Software (NGOSS) that the telecom industry worldwide is using as a guide to help the evolution of its processes and systems.

The core aim behind NGOSS is to provide a technology and process roadmap for the industry worldwide that allows the simplified implementation of business process automation coupled with significantly improved business flexibility and agility. These operational aims directly link to the key objectives of TM Forum's Lean Operator program:

- to transform operating costs
- to transform business agility
- to transform levels of customer service
- to transform innovation levels

13.1 What is NGOSS?

NGOSS is a comprehensive, integrated set of tools for defining, developing, procuring and deploying operational and business support systems and software. It is available as a packaged set of industry-agreed guidelines; maps; models; methodologies and specifications that cover key business and technical areas. These NGOSS tools, and the clearly defined methodology for using them, assist the user to define, design and build NGOSS compliant solutions that can easily integrate into any NGOSS compliant environment. As such, NGOSS delivers measurable improvements in development and software integration environments through use of standards processes, reuse of components, and repeatable cycles.

NGOSS is a sound technical solution developed by industry leaders with hundreds of combined years of operations and software experience from some of the world's major service provider and supplier companies. Recognizing the need to create a common integration environment for software systems, TM Forum member companies have contributed significant resources from their senior architecture and engineering resources to make NGOSS a success.

This is being coupled with a major industry communications program driven by the TM Forum.

Automating telecom business processes requires a multi-step approach, from understanding existing processes through to designing how systems will integrate and operate. Typical activities would include:

- Defining and engineering/re-engineering business processes
- Defining systems to implement processes
- Defining data using a common information model
- Defining integration architecture
- Defining integration interfaces

The elements of NGOSS align directly with the steps in this process automation approach. As a result, NGOSS gives service providers the tools they need to undertake automation projects with confidence. NGOSS-based solutions use industry-accepted IT concepts and technologies to deliver a more productive development environment and efficient management infrastructure. NGOSS is prescriptive for only those few 'cardinal points' where interoperability is of over-riding importance. NGOSS also provides for customization across a wide range of functionality, thus allowing applications to be tailored to provide a competitive advantage while also working with legacy systems.

The elements of NGOSS fit together to provide an end-to-end system for OSS development, integration and operations. The elements of NGOSS may be used as an end-to-end system to undertake large-scale development and integration projects, or may be used separately to solve specific problems.

NGOSS is based on 4 key frameworks:

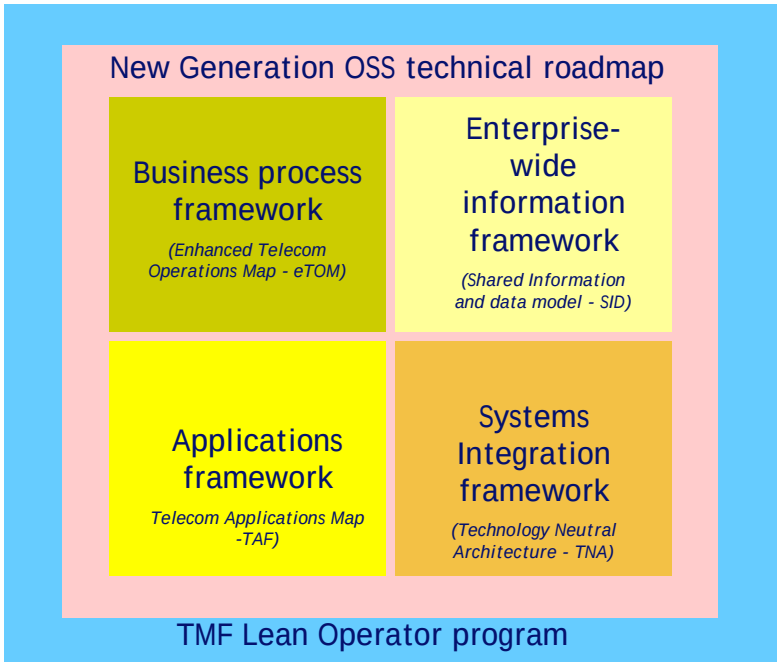

Figure 73: Major NGOSS Frameworks

Business Process Framework

The business process framework (TMF GB 921, the enhanced Telecom Operations Map®) is fundamental to ensuring that all of the key business activities of an operator are understood and captured in a single model. It defines all of the major flows of information within and external to the operator and provides a reference framework to migrate from current processes where such migration makes business sense. It provides a widely supported common language of business processes that are used in Telecom Operations. In addition, process flows are being developed for an ever-expanding list of key activities. It can be used to document existing processes of a Service or Network Provider, act as a framework for defining scope of a software-based solution, or simply enable clearer lines of communication between a service provider and their system integrator.

An operator needs to ensure that its business processes are as normalized as possible before it can truly unlock the value of commercial-off-the-shelf technology. Many will also benefit considerably from adopting industry best practice processes. The eTOM was developed from the best practices of some of the world's leading operators and provides a comprehensive business process framework for the information and communications services industry and serves as the blueprint for process direction and the starting point for development and integration of Operations Systems. It also includes work on converging telecom operational processes and IT operational processes.

As with other NGOSS frameworks, the business process framework is not necessarily 'better' than an operator's own internal process definitions. While this may be a side benefit, the major value comes from bringing processes broadly into line with other operators, using the same naming conventions, broadly the same process steps and having a ready built body of work (several hundred man-years of effort) that define detailed process flows between sub-processes and systems. This allows a methodology for gap analysis between operators. It also facilitates successful discussions and implementations with OSS vendors by providing a detailed reference document from which to migrate current processes, many of which may be duplicated but implemented in different ways. The eTOM business process framework provides an external, neutral point of resolution of internal process differences.

Enterprise-wide Information Framework

This framework (TMF GB922 – the Shared Information and Data Model) provides a common approach to defining and using information within an operator and is essential to achieve the highest levels of process automation and 'right-first-time' accuracy in assist in meeting ever rising customer service levels. The shared information and data model provides a "common language" for software providers and integrators to use in describing management information, which in turn allows easier and more effective integration across OSS software applications provided by multiple vendors. For example, if all OSS/BSS applications in a given operating environment defined "customer" the same way – last name, first name, title, address, phone number (country code/number), account ID – then no translation of information needs to occur when sharing "customer" details to serve multiple purposes.

The SID provides the concepts and principles needed to defined a shared information model, the elements or entities of the model, the business oriented UML class models, as well as design oriented UML class models and sequence diagrams to provide a system view of the information and data. In essence the SID is a reference library for defining information in an OSS.

Systems Integration Framework

This framework (TMF GB053 – the Technology Neutral Architecture and Contract Interface definitions) defines how the applications, data and process flows within an OSS environment will communicate and interact. This framework covers issues such as common communications, inter-process workflow, core software engineering principles such as the separation of process and data etc. In order to successfully integrate applications provided by multiple software vendors, the "plumbing" of the solution must be common. This framework defines architectural principles to guide OSS developers to create components that operate successfully in a distributed environment as prescribed by NGOSS. The Contract Interfaces define the "API" for interfacing those elements to each other across the architecture. This architecture is intentionally called "Technology Neutral" as it does not define how to implement the architecture, rather the principles that must be applied for any particular technology specific architecture to be NGOSS

compliant. TM Forum further defines technology specific interfaces for actual implementation in current software technologies such as J2EE.

Telecom Applications Map

This document (TMF GB 923 – The Telecom Applications Map) defines a clear target application set from which operators can either build a migration plan or create a greenfield structure. It also allows suppliers to clearly position their products and provides a common language and reference model for the industry world-wide.

13.2 What are the Business Benefits of Using NGOSS?

NGOSS offers service providers tangible business benefits that positively impact the bottom line:

- Having a well-defined long-term direction for business processes and OSS implementation reduces investment risk. When new systems and services are purchased, if they fit in with a well-defined strategy and detailed set of requirements, their longevity is more assured than in an environment with looser definition.
- Moving to an environment where process definitions, information models, interfaces and architecture are all standard allows for a true competitive bidding environment.

NGOSS delivers measurable improvements in development and software integration environments.

- With NGOSS, large chunks of process language, requirements, data models, interfaces and tests are already defined, significantly reducing development costs
- Integration of software with standard interfaces is significantly faster, reducing cost of bringing a new software system into an existing environment. In addition, integrating using NGOSS interfaces becomes a repeatable process, saving time and money on each project and improving success rates.

Definition of Use Cases and requirements becomes easier across service providers/supplier and supplier/supplier partnership relationships when the common language provided the various NGOSS frameworks are used.

Automation enables lower operational expenditure. With NGOSS, tackling the task of introducing additional automation to an operational environment comes with a blueprint to follow and guidelines to step through the changes. The task may still be large, but much of the work has been done within the NGOSS elements.

When automated systems are in place, making changes in a well designed, well-understood environment is straightforward. Reacting to a need to change a service offering, a billing option or a quality of service requirement becomes an easy to follow process rather than significant changes that require lengthy testing.

13.3 Core NGOSS principles

The TM Forum recommends that new generation OSS systems should be based on the 10 key business and technical principles of NGOSS described in the following sub paragraphs:

Enable an operator's business transformation.

The core aim behind NGOSS is to allow simplified implementation of business process automation coupled with significantly improved business flexibility and agility. These operational aims directly link to the key objectives of TM Forum's Lean Operator Program:

To transform operating costs

To transform business agility

To transform levels of customer service

To transform innovation levels

Reduce IT costs and timescales by utilizing widely available, commercial-off-the-shelf (COTS) software components.

NGOSS based applications should allow solutions to be rapidly implemented through the integration of off-the-shelf software components.

Allow a clear migration path by integrating with and evolving from legacy systems.

NGOSS has been specified to maximize the opportunities for re-use of business process components and integration with legacy systems. NGOSS takes into account existing legacy systems and considers migration of processes and software in its approach. Core to this is the specification of an integration framework and contract interfaces for each component.

Reduce software development costs and risks by building on industry best practices and existing standards work.

NGOSS draws widely from the work of other standards bodies and industry best practices. NGOSS brings together the best from each of these and applies them specifically into the telecom IT environment.

Provide comprehensive, enterprise-wide operational solutions for fixed, mobile, cable and converged industry segments

NGOSS is aimed at the telecommunications market in general and is not restricted to any one sector in particular. NGOSS provides tools to guide the user through a full-lifecycle of business process automation improvements from the analysis and requirements phases at the start of a project through to development and testing of systems and software. The NGOSS tools may be used as an integrated system or individually to focus on a specific area.

Allow corporate data to be widely shared across the enterprise and where appropriate with trading partners

NGOSS solutions adopt the principle of logically centralized data, providing more integrated views of customer and operational data via a common data model. This has significant bearing on operations, allows much improved levels of customer service (e.g. customer service agents can see all aspects of the services provided to a customer) and facilitates much higher levels of process automation.

Allow operator's organization to evolve without systems lock-in by using loosely coupled distributed systems

NGOSS based applications represent a move away from stand alone OSS stovepipes, toward a common distributed infrastructure for management process interaction.

Allow business processes to be easily changed without software change by separating control of business process flow from application operation.

NGOSS solutions separate control of business processes from the operation of business applications to provide flexibility to rapidly produce new business

solutions and allow more re-use of business components across multiple business scenarios. This may be accomplished by using business process management (BPM/ workflow) techniques or policy based management.

Allow simplified systems integration ('Plug & Play') through clearly defined contract Interfaces between applications.

NGOSS has been specified to maximize the opportunities for re-use of business process components. Core to this is the specification of contract interfaces for each application component.

Allow simplified systems integration by utilizing a common communications bus between applications.

NGOSS specifies the implementation of a common bus based architecture for communications between application components.

14. Administrative Appendix

This Appendix provides additional background material about the TeleManagement Forum and this document.

About this document

This is a TM Forum Guidebook. The guidebook format is used when:

The document lays out a 'core' part of TM Forum's approach to automating business processes.

Document Life Cycle

The TMF Applications Map is being issued as Team Draft Version. It can be considered valid until released for Member Evaluation. The purpose of an Evaluation Version is to encourage input based on experience of members and the public as they begin to use the document. Following the Evaluation Period, documents that are seen to deliver value are candidates for formal approval by the TM Forum. All documents approved by the TM Forum undergo a formal review and approval process.

This document will continue under formal change control. Supporting work will be issued as companions to this document. A document of this type is a "living document," capturing and communicating current knowledge and practices. Further inputs will be made because of detailed work ongoing in the TM Forum and the industry.

Document History

Version History

Version Number	Date Modified	Modified by:	Description of changes
0.1	31 October 2004	Keith Willetts	Initial Version
0.2	10 November 2004	TMF Staff	Formatting of Document
0.3	12 November 2004	Keith Willetts	Final revisions before first circulation

0.4	22nd November	Keith Willetts	Changes following review by TDC
0.5.3	14th February 2005	Piyush Sarwal	Incorporated contributions
0.5.4	7th April 2005	Libbey Scheible	Incorporated contributions
0.5.5	17 April 2005	Piyush Sarwal	Incorporated Comments from the team
0.5.6	18 April 2005	Libbey Scheible	Added team members to list of contributors.
0.5.7	Not recorded		
0.5.8	Not recorded		
0.5.9	05-May-05	Tina O'Sullivan	Minor corrections and additions prior to Member Evaluation.
1.6.11 & 1.7.12	May & June 2006	Libbey Scheible	versions were not used
1.8.13	8 August 2006	Shayan Sanyal	incorporated contributions and revised sections on Market / Sales and Customer Management
1.9.14	9 August 2006	Libbey Scheible	incorporated contributions on Product Mgmt, Domain Mgmt, Service Mgmt, & Resource Mgmt.
1.10.15 – 1.17.12	Aug. & Sept. 2006	Piyush Sarwal & Libbey Scheible	revised TAM diagram & incorporated additional changes such as moving the NGOSS overview to an appendix. Detailed change control log provided with Release 2.0 Change Request
1.18.13	12 October 2006	Libbey Scheible	revised the Assumptions list in the Introduction section to add the TNA definition of an application and to make requested word changes to TAM version.
2.0	21 November 2006	Tina O'Sullivan	Major tidy up of document prior to

			submission into Member Evaluation.
2.1	10 April 2007	Piyush Sarwal	Updated document to include short description and other minor changes
2.2	15 April 2007	Piyush Sarwal	Incorporated AMDOCS contribution, updated Servie PM functionality
2.3	25-April 2007	Piyush Sarwal	Updated the document based on Feedback and Moved the Whole Sale billing section
2.4	9th August 2007	Tina O'Sullivan	Processed BA_2007-0007 and template changes.
3.0	June 2008	TAM Team	Restructuring the Market/Sales, Customer, Service and resource domains
3.1	June 2008	A Chalmers	Format changes
3.2	July 2008	T.O'Sullivan	Minor corrections.

Release History

Release Number	Date Modified	Modified by:	Description of changes
1.0	May, 2005	TAM team	Initial release
2.1	April 10, 2007	TAM Team	Updated document to include short description and other minor changes
3.0	July 3, 2008	TAM Team	

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14.2 About TeleManagement Forum

TeleManagement Forum is an international consortium of communications service providers and their suppliers. Its mission is to help service providers and network operators automate their business processes in a cost- and time-effective way. Specifically, the work of the TM Forum includes:

Establishing operational guidance on the shape of business processes.

Agreeing on information that needs to flow from one process activity to another.

Identifying a realistic systems environment to support the interconnection of operational support systems.

Enabling the development of a market and real products for integrating and automating telecom operations processes.

The members of TM Forum include service providers, network operators and suppliers of equipment and software to the communications industry. With that combination of buyers and suppliers of operational support systems, TM Forum is able to achieve results in a pragmatic way that leads to product offerings (from member companies) as well as paper specifications.

14.3 Time Stamp

This version of the Application Map document, GB 929 Release 3.0, can be considered valid until further notice from TM Forum.

14.4 How can we obtain a copy?

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Depending upon the document, it could be accessible from New Items, Evaluation Versions, or a team's Members Only project area.

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14.5 How can we comment on the documents?

Comments must be in written form and addressed to the team editor for review with the project team. Please send your comments to the editor using the editor's e-mail shown in the section below.

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