Application Framework (TAM)

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Executive Summary

This document provides the global communications 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 (Frameworx) technical roadmap is a key technical and process enabler of that program. The Application Framework (TAM) forms one of the 4 major frameworks that comprise the Frameworx.

Granularity is an important factor in the design of this Application Framework. The authors have taken an approach at the systems level using the commercially available products as a guide. 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 a supplier 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 Business Process Framework® and the Information Framework Model. Thus terminology used in this Map mirrors, as far as possible, Business Process Framework parlance. For completeness, the Application Framework includes infrastructural software components as well as applications components.

# Introduction

Welcome to the Application Framework (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 Business Process Framework ® provides a frame of reference for *processes* and the Information Framework provides a frame of reference for standardized *information language*, the Application Framework provides a frame of reference for *applications*.

Release 1.0 of this document concentrated on the Operations (Fulfillment, Assurance, and Billing) segments of the Business Framework 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) Business Process Framework 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 Application Framework and Business Process Framework / Information Framework will be addressed in a future release.

Releases 4.0 introduced the concept of application spanning multiple horizontal components and are detailed in the Cross Domain applications Section. Fallout Management and catalog Management are examples of such application where they span Customer, Service and Resource Layers. Release 4.0 also broke up the testing domain into Resource and Service. The Service Assurance function has been refined both at the Resource and the Service layer in Release 4.0.

Release 4.5 is a further refinement of the concept introduced in 4.0. This release combines the charging function and the SLA function has also been combined into a single function. In addition to this the Catalog Management section has been further refined.

Release 12.0 aligns Application Framework release with the other Frameworks and is being released as part of the TMF Frameworx 12.0 release. Hence to align with the Frameworx release the next release after 4.5 has been named as 12.0. One of the major changes in this release is the breakup of the Application Framework document into multiple documents. The core principles of Application Framework document are now included in GB 929-CP. In Release 12.0 we include the Concepts and Principles Document which is called the GB929-CP document. Along with these documents we also plan to introduce the Application Frameworks User Guide (GB 929-U) in the next release.

In addition to the document structure changes, Release 12.0 includes the following changes

* Bill Calculation: An overhaul of the text, and adding one additional L3 (Invoice Generation)
* Payment Management: A new L2, with edits to Receivables management
* Voucher Management: An overhaul of the text.
* Billing Events Management: New Section
* Usage Management: New section, replaces Realtime Billing Mediation and Billing Data Mediation
* Location Management: New Section
* Network Number Inventory Management: New Section
* Sales & Marketing: Section updated
* Enterprise Domain: Finance Definitions included
* Customer Contact Management, Retention & Loyalty: Definition text incorporated into level 2s.

**Also Release 12.0 Application Framework Casewise model includes Cross Framework Mappings. This is a work in progress and will be further enhanced in the next release.**

The Application Framework provides the bridge between the Frameworx framework building blocks (Business Process Framework and Information Framework) 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 Application Framework keeps to language already common in the industry or used in other TM Forum publications particularly the Business Process Framework. 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 Application Framework 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 Application Framework:

* 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 Application Framework 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 Application Framework 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 Application Framework 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 Application Framework’s common language and the business integration points easier to identify.

The Application Framework 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 Application Framework 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
* Business Service 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 an Application Framework viewpoint.

The definition for an application from the technology neutral architecture viewpoint is "An Frameworx 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."

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 Application Framework.

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

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

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

Used Business Process Framework terminology when discussing business functions and Information Framework terminology when discussing system data.

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

Mapping Application Framework to Business Process Framework and Information Framework

# The Application Framework

The Application Framework has been designed to be of use by the entire spectrum of players in the communication 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 Application Framework can be used across the entire value chain as shown in figure 1 below:

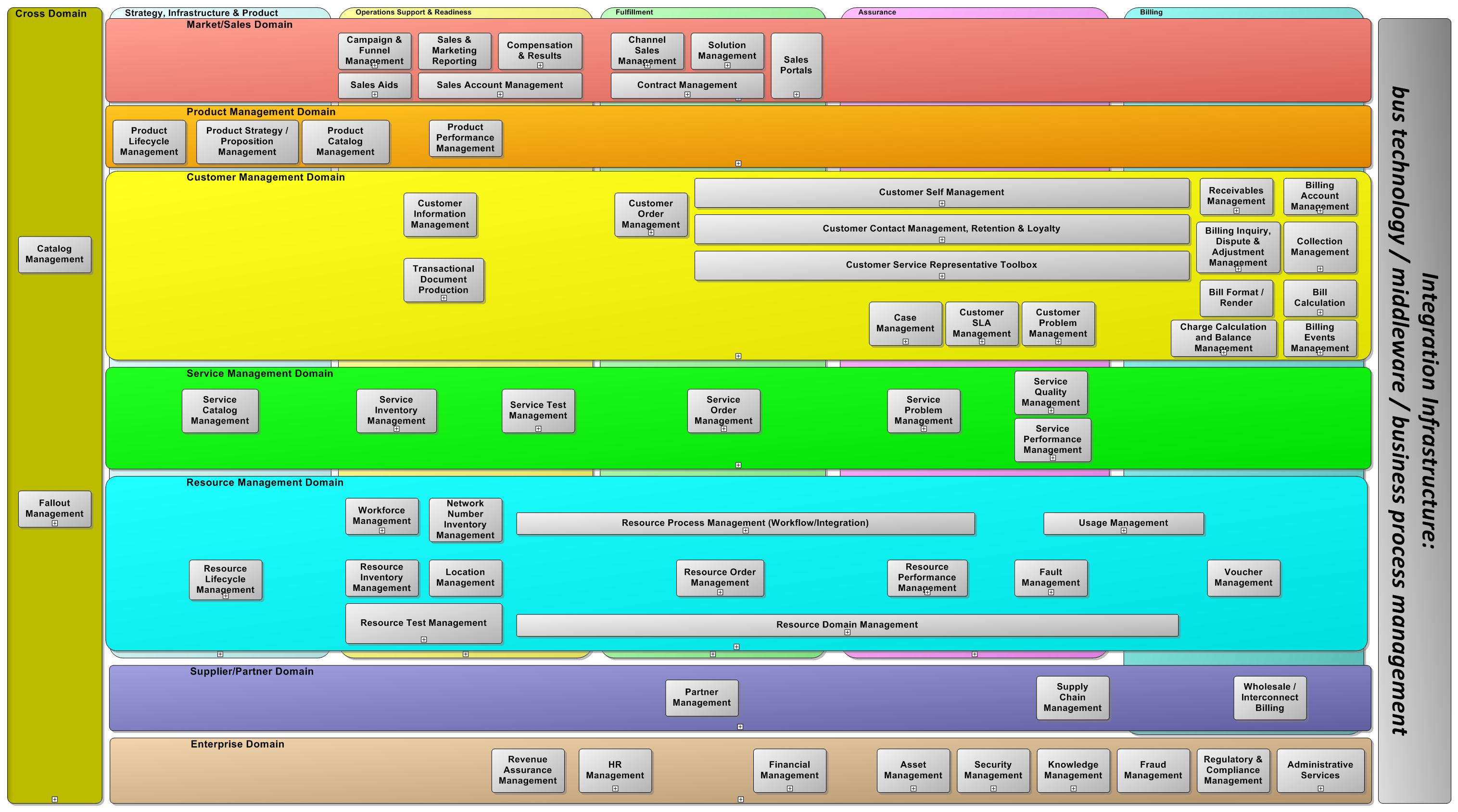


1. Value Chain

Wherever possible, the Application Framework uses language already common in the industry and builds on the process and common information models key to the TM Forum’s Frameworx program especially the Business Process Framework and the Information Framework. 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 Business Process Framework and Information Framework.

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

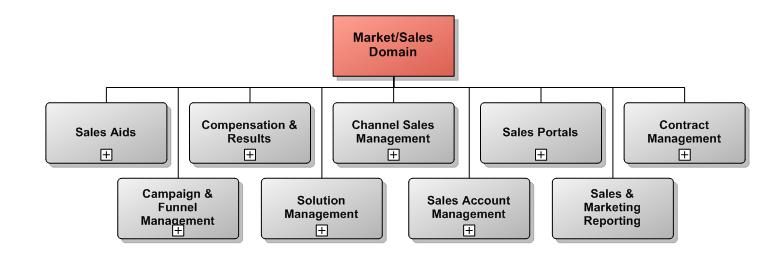
The Application Framework also recognizes managed resources including network based resources; content servers Intelligent network platforms and related network control technologies such as element management systems as well as the OSS infrastructure fabric e.g. bus technology, business process management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



1. The Application Framework

The bulk of this document is used to describe the level 1 applications of each of the layers of the Application Framework. 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 Business Services.

# 3. Market/Sales Management



1. 3. Market/Sales Management

### Campaign Management (Deleted)

**Application Identifier:** 3.1 (This Application ID has been deliberately unused!)

**Overview**

This Application was demoted to level 2, so the level 1 was deleted.

### Sales Aids

**Application Identifier:** 3.2

**Overview**

The Sales Aids Application provides access to methods and procedures as well as product information and other collateral 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 Business Services**

*To Be Added*

### Compensation & Results

**Application Identifier:** 3.3

**Overview**

The Compensation & Results application includes all functionality necessary to compensate a seller, from sales performance against 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.

**Supported Business Services**

*To Be Added*

### Channel Sales Management

**Application Identifier:** 3.4

**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 Business Services**

* 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)

### Corporate Sales Management (Deleted)

**Application Identifier:** 3.5 (This Application ID has been deliberately unused!)

### Mass Market Sales Management (Deleted)

**Application Identifier:** 3.6 (This Application ID has been deliberately unused!)

### Sales Portals

**Application Identifier:** 3.7

**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.  Sales Portals are used by both Direct and Indirect sellers. There is different content, links, capabilities offered for the specific kind of seller.

**Supported Business Services**

*To Be Added*

### Contract Management

**Application Identifier:** 3.8

**Overview**

Contract Management applications provide necessary functionality to facilitate a contract pertaining to a given solution.

**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 Business Services**

*To Be Added*

### Campaign & Funnel Management

**Application Identifier:** 3.9

**Overview**

Campaign & Funnel Management provides the necessary functionality to manage a service provider's campaigns and funnel/workflows.

**Functionality**

Campaign & Funnel Management functionality includes:

* Campaign Management
* Funnel/Workflow Management

**Supported Business Services**

*To Be Added*

### Solution Management

**Application Identifier:** 3.10

**Overview**

Solution Management applications provide the necessary functionality to provide a the right product to a given potential customer.

**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 Business Services**

*To Be Added*

### Sales Account Management

**Application Identifier:** 3.11

**Overview**

Sales Account Management applications provide the means to manage sales accounts.

**Functionality**

Sales Account Management - 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 Business Services**

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

### Sales & Marketing Reporting

**Application Identifier:** 3.12

**Overview**

Sales & Marketing Reporting provides insight into multiple aspects of Sales & Marketing, including closed loop marketing, sales metrics, forecasting, sales workflow, funnel and pipeline activities and order handoffs.

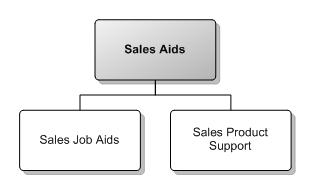
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 3.2 Sales Aids



1. 3.2 Sales Aids

### Sales Aids

**Application Identifier:** 3.2

**Overview**

The Sales Aids Application provides access to methods and procedures as well as product information and other collateral 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 Business Services**

*To Be Added*

### Sales Job Aids

**Application Identifier:** 3.2.1

**Overview**

The Job Aids Application provides access to needed job aids, methods and procedures to assist in performing various sales.

**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 Business Services**

*To Be Added*

### Sales Product Support

**Application Identifier:** 3.2.2

**Overview**

The Product Support application provides access to product information on the various products being sold by the service provider.

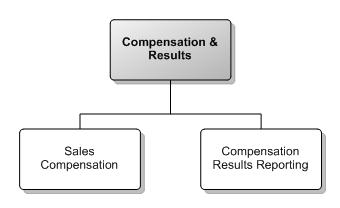
**Functionality**

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 Business Services**

*To Be Added*

## 3.3 M/S Compensation & Results



1. 3.3 M/S Compensation & Results

### Compensation & Results

**Application Identifier:** 3.3

**Overview**

The Compensation & Results application includes all functionality necessary to compensate a seller, from sales performance against 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.

**Supported Business Services**

*To Be Added*

### Sales Compensation

**Application Identifier:** 3.3.1

**Overview**

Sales Compensation applications provide the required functionality to determine the appropriate compensation based on sales results.

**Functionality**

Sales 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 Business Services**

### Compensation Results Reporting

**Application Identifier:** 3.3.2

**Overview**

Compensation Results Reporting applications provide compensation based reporting.

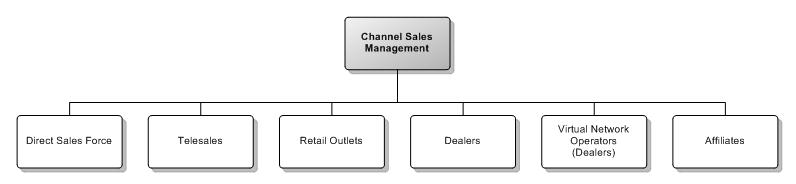
**Functionality**

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

**Supported Business Services**

*To Be Added*

## 3.4 M/S Channel Sales Management



1. 3.4 M/S Channel Sales Management

### Channel Sales Management

**Application Identifier:** 3.4

**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 Business Services**

* 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:** 3.4.1

**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**

Opportunities Dispatching-Create and dispatch opportunities to relevant employees/sales personnel.

Sales Quotes Dispatching-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 Business Services**

 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:** 3.4.2

**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:

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

**Supported Business Services**

*To Be Added*

### Retail Outlets

**Application Identifier:** 3.4.3

**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:

* Customer information management - Complete customer information management capabilities
* Contact and retention management - Customer contact and retention management capabilities
* Order capture and negotiation - Order capture and negotiation capabilities
* Retail integration - 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 - 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:

* Self-service kiosk - 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.
* Agent portable Device support - 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 Business Services**

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:** 3.4.4

**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 dealer’s 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 Business Services**

Potential interface areas:

* CRM
* Commissions management
* Knowledge management system
* Product catalog

### Virtual Network Operators (Dealers)

**Application Identifier:** 3.4.5

**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- Customer information management capabilities
* Customer contact and retention management - Customer contact and retention management capabilities
* Order capture and negotiation - 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 Business Services**

*To Be Added*

### Affiliates

**Application Identifier:** 3.4.6

**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:

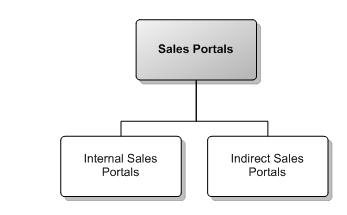
* Mass service/product pre activation
* Mass transaction feed of new orders Activation of service/product sold by affiliate
* Registration of pre activated service/product

**Supported Business Services**

Potential interface areas:

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

## 3.7 M/S Sales Portals



1. 3.7 M/S Sales Portals

### Sales Portals

**Application Identifier:** 3.7

**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.  Sales Portals are used by both Direct and Indirect sellers. There is different content, links, capabilities offered for the specific kind of seller.

**Supported Business Services**

*To Be Added*

### Customer Sales Portals (Deleted)

**Application Identifier:** 3.7.1 (This Application ID has been deliberately unused!)

### Internal Sales Portals

**Application Identifier:** 3.7.2

**Overview**

Internal Sales Portals provide sales tools to internal sales groups.

**Functionality**

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

**Supported Business Services**

*To Be Added*

### Indirect Sales Portals

**Application Identifier:** 3.7.3

**Overview**

Indirect Sales Portal provides sales tools to indirect sales teams.

**Functionality**

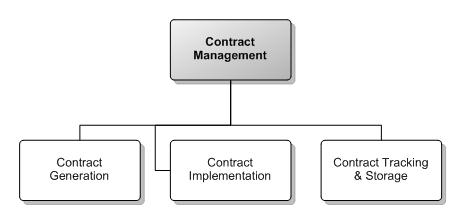
Indirect Sales Portals - Indirect Sales Portals provides appropriate sales tools to companies selling the service provider's products (e.g., affiliates, VNO’s, solution providers, dealers).

From these portals the seller can access other functions of the service provider such as funnel, ordering, and contracting, requests for on-boarding a solution provider company, managing solution provider user logins, education/certification and compensation reporting.

**Supported Business Services**

*To Be Added*

## 3.8 Contract Management



1. 3.8 Contract Management

### Contract Management

**Application Identifier:** 3.8

**Overview**

Contract Management applications provide necessary functionality to facilitate a contract pertaining to a given solution.

**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 Business Services**

*To Be Added*

### Contract Generation

**Application Identifier:** 3.8.1

**Overview**

Contract Generation applications provide the functionality to generate a contract.

**Functionality**

Contract Generation - 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.  In some cases counter-signatures may also be required.

**Supported Business Services**

*To Be Added*

### Contract Implementation

**Application Identifier:** 3.8.2

**Overview**

Contract Implementation applications provide functionality pertaining to the implementation of the contract across fulfillment, assurance, and billing.

**Functionality**

Contract Implementation - 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 Business Services**

*To Be Added*

### Contract Tracking & Storage

**Application Identifier:** 3.8.3

**Overview**

Contract Tracking and Storage provides the ability to view a customer's existing contract, search for customer contracts based on meta-data and to search text strings within contracts. There is a central repository for contract storage as well as the associated contract meta-data. This data can be mined for Campaigns and Lead Generation.

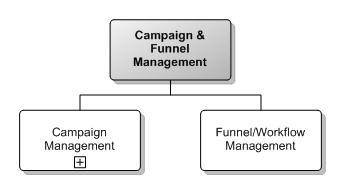
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 3.9 Campaign & Funnel Management



1. 3.9 Campaign & Funnel Management

### Campaign & Funnel Management

**Application Identifier:** 3.9

**Overview**

Campaign & Funnel Management provides the necessary functionality to manage a service provider's campaigns and funnel/workflows.

**Functionality**

Campaign & Funnel Management functionality includes:

* Campaign Management
* Funnel/Workflow Management

**Supported Business Services**

*To Be Added*

### Campaign Management

**Application Identifier:** 3.9.1

**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
* Lead Generation
* Campaign Execution & Refinement
* Performance Tracking

**Supported Business Services**

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

### Funnel/Workflow Management

**Application Identifier:** 3.9.2

**Overview**

Funnel Management applications, also sometimes known as pipeline, or tunnel, provide functionality to manage the funnel process.

**Functionality**

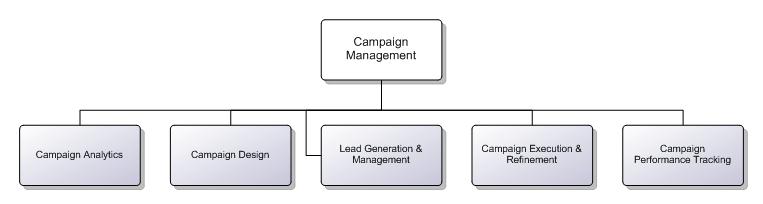
Funnel Management - Funnel Management handles the creation, assignment, tracking and management of leads and opportunities. Funnel Management consists of activities such as receiving the leads generated from leads generation, assigning sales personnel to leads, and tracking & qualifying the leads. It 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 Business Services**

*To Be Added*

## 3.9.1 Campaign Management



1. 3.9.1 Campaign Management

### Campaign Management

**Application Identifier:** 3.9.1

**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
* Lead Generation
* Campaign Execution & Refinement
* Performance Tracking

**Supported Business Services**

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

### Campaign Analytics

**Application Identifier:** 3.9.1.1

**Overview**

The Campaign Analytics applications are responsible for analyzing existing and prospective customers to help design appropriate product recommendations.

**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 Business Services**

*To Be Added*

### Campaign Design

**Application Identifier:** 3.9.1.2

**Overview**

Campaign Design applications provide the necessary tools to formulate a campaign, taking into account the targeted customers and products.

**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 Business Services**

*To Be Added*

### Lead Generation & Management

**Application Identifier:** 3.9.1.3

**Overview**

Lead Generation applications provide the tools necessary to generate leads from a variety of sources.

**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 Business Services**

*To Be Added*

### Campaign Execution & Refinement

**Application Identifier:** 3.9.1.4

**Overview**

Campaign Execution & Refinement applications provide the necessary tools to execute a previously designed campaign.

**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 Business Services**

*To Be Added*

### Campaign Performance Tracking

**Application Identifier:** 3.9.1.5

**Overview**

Campaign Performance Tracking applications provide the required functionality to monitor the performance of campaign as the campaign is being executed.

**Functionality**

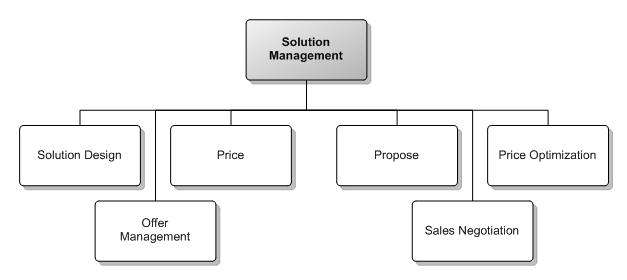
Campaign Performance Tracking provides the necessary functionality to monitor the campaign performance in real time. This is done by providing a combination of real-time reporting and what-if modeling capabilities to continuously optimize campaigns by taking corrective action-even when campaigns are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

*To Be Added*

## 3.10 Solution Management



1. 3.10 Solution Management

### Solution Management

**Application Identifier:** 3.10

**Overview**

Solution Management applications provide the necessary functionality to provide the right product to a given potential customer.

**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 Business Services**

*To Be Added*

### Solution Design

**Application Identifier:** 3.10.1

**Overview**

Solution Design applications provide the necessary functionality to provide an appropriate solution design.

**Functionality**

Solution Design - 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 Common Product Catalog.

**Supported Business Services**

*To Be Added*

### Price

**Application Identifier:** 3.10.2

**Overview**

Price Applications provide functionality concerning appropriate pricings for solution designs.

**Functionality**

Price - The Solution Management's Price function is concerned with assuring that the designs are priced consistent with pricing used for billing. The common 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/promotions 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 Business Services**

*To Be Added*

### Propose

**Application Identifier:** 3.10.3

**Overview**

Propose applications provide functionality to produce appropriate proposals based on the various solution options.

**Functionality**

Propose - 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 Business Services**

*To Be Added*

### Price Optimization

**Application Identifier:** 3.10.4

**Overview**

Price/Cost Optimization applications provide functionality regarding price and cost optimization of a given solution.

**Functionality**

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

**Supported Business Services**

*To Be Added*

### Offer Management

**Application Identifier:** 3.10.5

**Overview**

Offer Management applications provide the means to produce personalized offers to potential or existing customers.

**Functionality**

Offer Management - 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 Business Services**

*To Be Added*

### Sales Negotiation

**Application Identifier:** 3.10.6

**Overview**

Sales Negotiation applications provide the capability to provide quotations based on products available to the customer and produce an order request upon customer acceptance.

**Functionality**

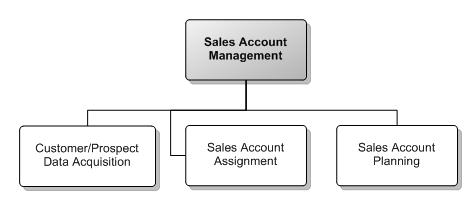
Sales Negotiation - Sales Negotiation provides the necessary functionality to negotiate the sale by providing multiple quotations as needed, taking into account the customer data, customer qualification, and offers made. Functionality includes access to products, product pricing, scheduling of appointments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

Sales Negotiation generates an order request.

**Supported Business Services**

*To Be Added*

## 3.11 Sales Account Management



1. 3.11 Sales Account Management

### Sales Account Management

**Application Identifier:** 3.11

**Overview**

Sales Account Management applications provide the means to manage sales accounts.

**Functionality**

Sales Account Management - 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 Business Services**

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

### Customer/Prospect Data Acquisition

**Application Identifier:** 3.11.1

**Overview**

Customer/Prospect Data Acquisition applications provides functionality to collect all necessary information to make the sale.

**Functionality**

Customer/Prospect Data Acquisition - 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 Business Services**

*To Be Added*

### Sales Account Assignment

**Application Identifier:** 3.11.2

**Overview**

Sales Account Assignment provides the necessary functionality to assign customers to a service provider’s sellers (either third party or internal). Ownership might further be differentiated based on various products with the same customer. Sales Account Assignment also maintains the sales hierarchy (different than HR reporting hierarchy) for sales compensation, sales forecasting, and sales results.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Sales Account Planning

**Application Identifier:** 3.11.3

**Overview**

Sales Account Planning looks at the service provider’s complete relationship with a large customer. This includes the customer’s outages, revenues, opportunities in the pipeline, etc. It allows the account executive to effectively manage the service provider’s relationship with the customer and to plan the selling strategy going forward.

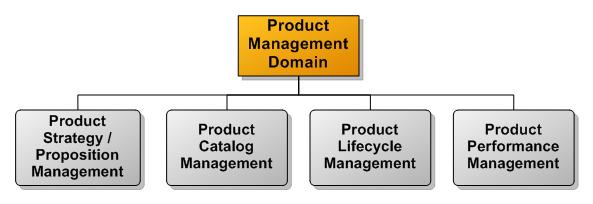
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

# 4. Product Management Domain



1. 4.0 Product Management Domain

### Product Strategy / Proposition Management

**Application Identifier:** 4.1

**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:

* Strategy Capturing and Management - Capture and manage details of the strategy
* Proposition Organization - 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
* Strategy Delivery Project Management - Project manage the delivery of strategy through propositions through products
* Strategy Performance Reporting - Enable performance reporting of the strategy, driven by the performance of the underlying products

**Supported Business Services**

*To Be Added*

### Product Catalog Management

**Application Identifier:** 4.2

**Overview**

Product Catalog Management is a realization of the Cross domain Catalog Management application in the Customer Domain. The applications are repositories of product listing within a service provider and include the ability to design, create, augment and map new entities and supporting data. The type of catalog management application is an implementation choice of the enterprise.

See: Cross Domain- Catalog Management for more information.

**Functionality**

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

* Product Offering Structure Data Model - Contain the complete data model for the product structure entities and the relationships that govern the behavior of a product and its underlying components
* Product Instantiation - Create and maintain product instances based on the common product structure, to form the centralized product catalog
* Product Components Maintenance - Create and maintain the different components that can comprise a product
* Product Components Maintenance - Create and maintain the parent / child / peer relationships between components to formulate the complete product instance
* Components Reuse - Reuse components in different product instances
* Service Logical Representation Management - Create and maintain the logical representation of services
* Components to Services and Resources Relationship Management - Create and maintain the relationships between components and their underlying services and resources
* Product to External Functions View Mgmt - Provide the complete master view of the product instances to external functions / applications / etc.
* End-to-End Product Data Management - 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:

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 catalog 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 Business Services**

*(Note: In this context the term Service is being used as an application service (i.e. API) and not the Information Framework 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.

### Product Lifecycle Management

**Application Identifier:** 4.3

**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 Business Services**

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.

### Product Performance Management

**Application Identifier:** 4.4

**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**

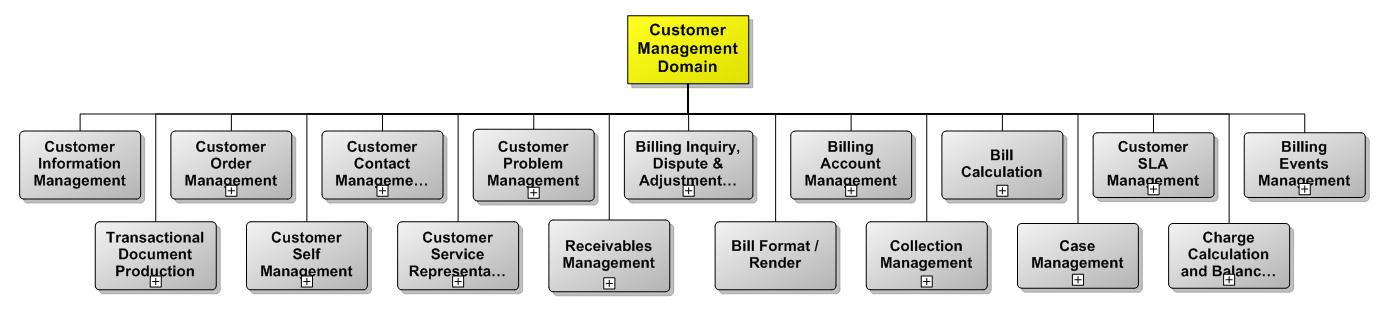
Performance factors typically gathered as part of Product Performance Management include:

* Product campaign tracking
* Product revenue reporting
* Product cost reporting
* Product capacity analysis
* Product Cost Management - Product Cost Management includes the activities and tools used to
* Product Inventory Optimization - Optimize product inventory
* Product Sourcing Determination - 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 Business Services**

*To Be Added*

# 5. Customer Management Domain



1. 5. Customer Management Domain

### Customer Information Management

**Application Identifier:** 5.1

**Overview**

Customer Information Management ensures the delivery of a consistent, accurate and complete customer view to operational and analytical touch-points across the service provider enterprise, thus enabling the optimization of key business processes and the leverage of new revenue opportunities. Customer information is typically scattered across mixed environment with fragmented, isolated customer data which needs to be consolidated, directly or using data federation. A Customer Information Management application, using context sensitive business logic, synchronizes customer information across all of service provider systems and reconciles customer data inconsistencies. Customer Information Management traditionally lies within the boundaries of Master Data Management (MDM), however, it is not mandatory.

**Functionality**

* Customer information modeling - flexible customer data modeling in support of enterprise needs
* 360 degree customer view – facade of all the customer information including:
  + Customer details - E.g. name, contact persons for this customer, account managers for this customer, addresses (residence, billing, etc.), 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 CIM 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)
  + Relationships between Customer instances and/or other data entities such as party, customer bill, customer order, address, or customer problem reports.
* Data mapping - tools enabling the integration with BSS and OSS (such as CRM, ERP, Ordering, Billing) for obtaining customer information
* Customer data matching - deterministic and heuristic algorithms for matching customer data coming from multiple sources
* Duplication handling - identify and manage suspected duplication
* Automatic merging – define survivorship rules for automatic record merging
* Data stewardship - manual intervention in record handling and merging
* Data cleansing – validation, normalization and quality checks
* Governance - control of granular access to data and business services for privacy and security management

**Non Function Aspects**

* Online response time - online response for synchronous transactions and adequate asynchronous updates
* Hybrid physical data model support - support for different implementation approaches from referential to consolidation or anything in between

**Supported Business Services**

**Consumed Contracts**

* Master Data Management (MDM) – Using COTS MDM contracts

**Exposed Contracts**

* Customer Information management

### Transactional Document Production

**Application Identifier:** 5.2

**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 Business Services**

**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

### Customer Order Management

**Application Identifier:** 5.3

**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 may also pertain to 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 Business Services**

* 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)

**Exposed Contracts**

* Customer Qualification

### Customer Self-Management

**Application Identifier:** 5.4

**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
* 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.

**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 Business Services**

*To Be Added*

### 

### Customer Contact Management, Retention & Loyalty

**Application Identifier:** 5.5

**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.
* Interaction Management.
* Build Customer Insight.
* Analyze and Manage Customer Risk.
* Personalize Customer Profile for Retention & Loyalty.
* Validate Customer Satisfaction.

**Supported Business Services**

* 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

### Customer Service Representative Toolbox

**Application Identifier:** 5.6

**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 Business Services**

*To Be Added*

### Customer Quality of Service & Service Level Agreement Management (Deleted)

**Application Identifier:** 5.7 (This Application ID has been deliberately unused!)

### Customer Problem Management

**Application Identifier:** 5.8

**Overview**

The purpose of Customer Problem Management is to manage problems reported by customers, resolving these problems to the customer’s satisfaction, and providing meaningful status on the issue as needed to the customer.

Customer problems can include:

* General questions on products purchased and being used by the customer
* Problems with products already purchased and being used by the customer either due to lack of education or service/network problems.
* Problems with a material purchase from the service provider, even if they do not have an account with the said service provider.
* General inquiries, complaints, and commendations.

Note: A customer problem may or may not result in a billing adjustment. Billing related issues are handled via Billing Inquiry, Dispute & Adjustment Management,

See Case Management for more information.

**Functionality**

Typical application functions supported are

* Customer Problem Qualification & Reception
* Customer Problem Lifecycle Management
* Customer  Problem Diagnostics
* Customer Problem Resolution
* Customer Problem Verification & Closure
* Customer Problem Reporting

**Supported Business Services**

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

### Receivables Management

**Application Identifier:** 5.9

**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 Business Services**

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

### Billing Inquiry, Dispute & Adjustment Management

**Application Identifier:** 5.10

**Overview**

This is a front end application for managing billing inquiries, disputes, and adjustments. Billing inquiries are provided by Bill Calculation. 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 Business Services**

*To Be Added*

### Bill Format / Render

**Application Identifier:** 5.11

**Overview**

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.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Product/Service Rating (Deleted)

**Application Identifier:** 5.12 (This Application ID has been deliberately unused!)

### Billing Account Management

**Application Identifier:** 5.13

**Overview**

The purpose of Billing Account Management is to provide functionality necessary to establish and modify a customer's billing account. This includes configuration of the account as well as management of account associations.

**Functionality**

Billing Account Management functionality includes management of the following:

* Billing Account Configuration Management
* Billing Account Association Management

**Supported Business Services**

*To Be Added*

### Collection Management

**Application Identifier:** 5.14

**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 Business Services**

* 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

### Bill Calculation

**Application Identifier:** 5.15

**Overview**

**Business Context**

The Bill Calculation application automates the tasks required to calculate the bill. It takes billing preference, recurring product, non-recurring charge information and usage charge information, calculating the charges that must be billed.

Bill Calculation may occur on demand or within bill cycles that are carefully planned and controlled for integrity and completeness as well as workload balancing (computer and staff)

The output of Bill Calculation is a bill for products and services – The products and services may include both prepaid and postpaid services in a single bill.

**Overview**

The Bill Calculation application processes all charges against an account during bill cycles. Bill Calculation can be executed both on a cyclic basis and *on demand.* It performs bill invoicing, dealing with bill compilation of charges, credits, payments, adjustments, fees & taxes at various levels, such as product and/or account level that have been generated since the last run for that account. It could apply discounts. Finally, Bill Calculation Management calculates bill totals and subtotals as appropriate.

The pricing plans and discounts are determined based on the agreements for the invoiced customer or account.

**Functionality**

Bill Calculation functionality includes:

         Performing charge and event distribution to support a split bill

         Support various bill cycle intervals

         **Assemble billing information:**  Pull together all the information to be included on the invoice, incorporating taxes, surcharges, and other fees and may include payments, adjustments, and other financial activities.

         **Apply pricing and discounting:** Apply pricing and discounting rules and algorithms in the context of the assembled information.

         **Fee Calculation:** Calculates and applies bill-time fees where necessary.

         **Generate an invoice:** Execute invoice generation according to operational schedules.

         **Billing Financials:** Create appropriate transactions regarding the current invoice for Receivables Management.

**Supported Business Services**

**Exposed Contracts**

* Billing Inquiry
* Quotations

**Consumed Contracts**

* TAX calculation

### Online Charging (Deleted)

**Application Identifier:** 5.16 (This Application ID has been deliberately unused!)

### Case Management

**Application Identifier:** 5.17

**Overview**

Case Management applications manage the end to end lifecycle of a case.  Cases and Case Management could apply to any area of assurance, billing, or fulfillment, but presumably in the customer layer.  More specifically, Case Management could apply to customer problems (service affecting or not), bill inquiries, disputes, or areas of ordering if so implemented by the service provider.

Given Case Management must manage the lifecycle of a case, there must be a means to define and configure different types of cases along with the workflow to execute the various types of cases through their respective lifecycles.  There must also be the capability to analyze and correlate cases as well as report on the various cases open at any given time, and archive the cases once closed.

Note:  The presentation layer for these applications will be found elsewhere (Self Service, CSR Toolbox, etc.).

**Functionality**

Case Management applications provide the following key functionality:

* Case Definition and Configuration
* Case Workflow
* Case Execution & Tracking
* Case Correlation & Analysis
* Case Reporting
* Case Archival

**Supported Business Services**

*To Be Added*

### Customer SLA Management

**Application Identifier:** 5.18

**Overview**

Customer SLA Management applications include the required functionality to assure that SLA agreements made between operators and customers are met.  This includes processing measurements made elsewhere and checking the measurements and taking appropriate actions when the specified agreements are not met.

Note:  Customers can include partners and 3rd party providers.

**Functionality**

Customer SLA Management functionality includes the following:

* Customer SLA Issue Reception
* Customer SLA Collection
* Customer SLA Analysis
* Customer SLA Violation Management
* Customer SLA Reporting

**Supported Business Services**

*To Be Added*

### Charge Calculation and Balance Management

**Application Identifier:** 5.19

**Overview**

The Charge Calculation and Balance Management applications are responsible for calculating customer specific charges and discounts and management of balances. These support both real-time and batch processing modes of operation.

**Functionality**

Charge Calculation and Balance Management functionality includes the following:

* Charge Calculation
* Balance Management

**Supported Business Services**

**Exposed Contracts**

* Billing Inquiry
* Quotations

**Consumed Contracts**

* TAX calculation

### Billing Events Management

**Application Identifier:** 5.20

**Overview**

Billing Event Management encompasses Billing Event Processing and Billing Event Error Management.

Billing Event Processing provides the functions necessary to collect events that are relevant for billing processes, relate them to the proper product offering or customer account, and direct the events to the appropriate billing sub-functions. Billing events include:

         Events that indicate the need for periodic billing of a recurring product charge(from customer orders).

         Records that indicate the need for billing of a non-recurring charge (from customer orders).

         Records produced by network elements (from usage management). Usage Management will collect and distribute the network records that will be used in the Billing processes to Billing Event Management.

Billing Event Error Management functions are a complex set of activities related to automating the processes of correcting errors in billing events. This often includes the capability to apply mass corrections.

**Functionality**

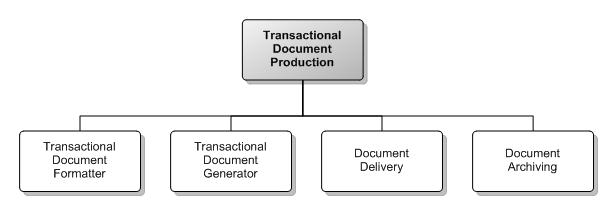
Billing Event Management functionality includes:

* Billing Event Processing
* Billing Event Error Management

**Supported Business Services**

*To Be Added*

## 5.2 Transactional Document Production



1. 5.2 Transactional Document Production

### Transactional Document Production

**Application Identifier:** 5.2

**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 Business Services**

**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:** 5.2.1

**Overview**

*To Be Added*

**Functionality**

The Transactional Document Formatter is used to:

* Bills and Letter Template Formatting - Develop and maintain the bill or letter template
* Template Usage Business Rules - Develop and maintain business rules for the template usage
* Input Data Source Definition - Define the data input source specification for run time production
* Input Binding Rules to Template - Define the binding rules between the input data and the template format
* Resource Template Definition - Define and maintain resources (font, colors, images and language) for the template

**Supported Business Services**

*To Be Added*

### Transactional Document Generator

**Application Identifier:** 5.2.2

**Overview**

**Functionality**

The Transactional Document Generator function:

* Document Information Formatting - Formats document information in the customer selected or default format
* Marketing Information Incorporating - Incorporates marketing messages
* Apply Regional Requirements - 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).
* Legend Formatting - Formats section legends (summary, call detail, etc.) based on regulatory requirements.
* Send to Downstream Interface - Sends data to downstream interfaces, such as finance, warehouse, etc.

**Supported Business Services**

*To Be Added*

### Document Delivery

**Application Identifier:** 5.2.3

**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 Business Services**

*To Be Added*

### Document Archiving

**Application Identifier:** 5.2.4

**Overview**

**Functionality**

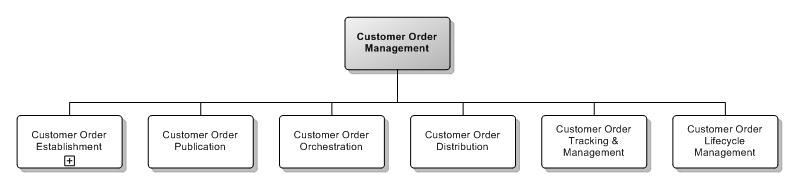
Document Archiving is used to store compressed transactional documents for future retrieval e.g. by customer care, self-care or reprint. Functionality includes:

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

**Supported Business Services**

*To Be Added*

## 5.3 Customer Order Management



1. 5.3 Customer Order Management

### Customer Order Management

**Application Identifier:** 5.3

**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 may also pertain to 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 Business Services**

* 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)

**Exposed Contracts**

* Customer Qualification

### Customer Order Establishment

**Application Identifier:** 5.3.1

**Overview**

Customer Order Establishment applications provide the necessary functionality to establish a valid customer order.

**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
* Customer Qualification
* Customer Order Validation

**Supported Business Services**

*To Be Added*

### Customer Order Publication

**Application Identifier:** 5.3.2

**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.

**Supported Business Services**

*To Be Added*

### Customer Order Orchestration

**Application Identifier:** 5.3.3

**Overview**

Customer Order Orchestration applications provide workflow and orchestration for the Customer Order Management area.

**Functionality**

Customer Order Distribution - 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.

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 Business Services**

*To Be Added*

### Customer Order Distribution

**Application Identifier:** 5.3.4

**Overview**

Customer Order Distribution applications decomposes a customer order and distributes order requests to appropriate downstream systems.

**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 Business Services**

*To Be Added*

### Customer Order Tracking & Management

**Application Identifier:** 5.3.5

**Overview**

Customer Order Tracking & Management provides the functionality necessary to track and manage the distributed requests decomposed by Customer Order Distribution.

**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 Business Services**

*To Be Added*

### Customer Order Lifecycle Management

**Application Identifier:** 5.3.6

**Overview**

Customer Order Lifecycle Management provides the functionality necessary to track and manage a Customer Order from establishment to cancellation.

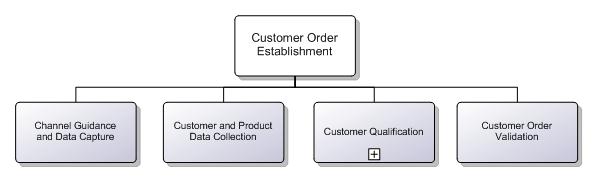
**Functionality**

* Pending Orders Maintenance - 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)
* Order Versioning Maintenance - 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 Business Services**

*To Be Added*

## 5.3.1 Customer Order Establishment



1. 5.3.1 Customer Order Establishment

### Customer Order Establishment

**Application Identifier:** 5.3.1

**Overview**

Customer Order Establishment applications provide the necessary functionality to establish a valid customer order.

**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
* Customer Qualification
* Customer Order Validation

**Supported Business Services**

*To Be Added*

### Channel Guidance and Data Capture

**Application Identifier:** 5.3.1.1

**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 Business Services**

*To Be Added*

### Customer and Product Data Collection

**Application Identifier:** 5.3.1.2

**Overview**

Customer and Product Data Collection applications provide the means to gather additional customer and product data needed as part of Customer Order Establishment

**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 Business Services**

*To Be Added*

### Customer Qualification

**Application Identifier:** 5.3.1.3

**Overview**

Customer Qualification applications provide the necessary functionality to determine what offerings the customer can be provided.

**Functionality**

Customer Qualification - Customer Qualification provides necessary functionality to consider the customer's credit as well as offering eligibility and offering availability at the customer location. Customer Qualification assures that orders contain only products that are feasible at the customer location that the customer can pay for at a risk level the provider can accept.

**Supported Business Services**

*To Be Added*

### Customer Order Validation

**Application Identifier:** 5.3.1.4

**Overview**

Customer Order Validation applications provide the required functionality to validate a customer order request.

**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 Business Services**

*To Be Added*

## 5.3.1.3 Customer Qualification



1. 5.3.1.3 Customer Qualification

### Customer Qualification

**Application Identifier:** 5.3.1.3

**Overview**

Customer Qualification applications provide the necessary functionality to determine what offerings the customer can be provided.

**Functionality**

Customer Qualification - Customer Qualification provides necessary functionality to consider the customer's credit as well as offering eligibility and offering availability at the customer location. Customer Qualification assures that orders contain only products that are feasible at the customer location that the customer can pay for at a risk level the provider can accept.

**Supported Business Services**

*To Be Added*

### Customer Credit Eligibility

**Application Identifier:** 5.3.1.3.1

**Overview**

Customer Credit Eligibility applications apply business rules to determine what offerings the customer is able to purchase based on credit history (provided through other systems).

**Functionality**

Customer Credit Eligibility - 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 Business Services**

### Offering Availability

**Application Identifier:** 5.3.1.3.2

**Overview**

Offering Availability apply business rules to determine what offerings are available at the customer location.

**Functionality**

Offer Availability - Offering 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.

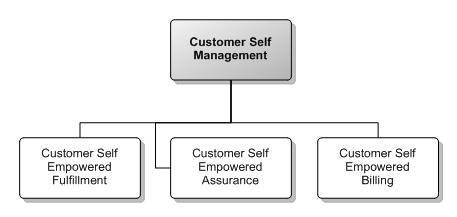
As appropriate, Service Availability checks are also done, where based on the customer service location, service feasibility checks are done to assure the offering can actually be provided to the customer. This implies that the customer location is clearly established. Service feasibility checks are conducted via contract with the Service Order Management application.

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 Business Services**

*To Be Added*

## 5.4 Customer Self-Management



1. 5.4 Customer Self-Management

### Customer Self-Management

**Application Identifier:** 5.4

**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
* 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.

**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 Business Services**

*To Be Added*

### Customer Self Empowered Fulfillment

**Application Identifier:** 5.4.1

**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 - 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
* Knowledge Management Access - 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 Business Services**

* 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:** 5.4.2

**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 - 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
* Service Requests and SLA Reporting - 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 Business Services**

* 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 enment tracking)
* Activation and Provisioning
* Resource Management

### Customer Self Empowered Billing

**Application Identifier:** 5.4.3

**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

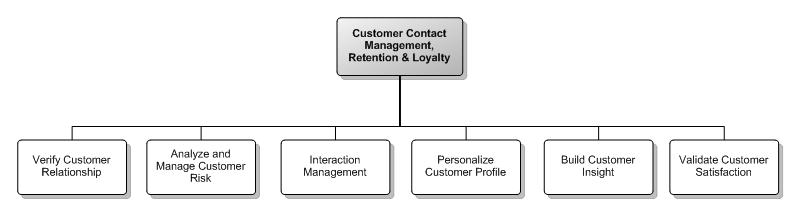
 Organizational reports on usage and charges

 Organizational approval process (such as for payments and disputes)

**Supported Business Services**

*To Be Added*

## 5.5 Customer Contact Management, Retention & Loyalty



1. 5.5 Customer Contact Management, Retention & Loyalty

### Customer Contact Management, Retention & Loyalty

**Application Identifier:** 5.5

**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.
* Interaction Management.
* Build Customer Insight.
* Analyze and Manage Customer Risk.
* Personalize Customer Profile for Retention & Loyalty.
* Validate Customer Satisfaction.

**Supported Business Services**

* 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:** 5.5.1

**Overview**

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.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Analyze and Manage Customer Risk

**Application Identifier:** 5.5.2

**Overview**

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.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Interaction Management

**Application Identifier:** 5.5.3

**Overview**

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).

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Personalize Customer Profile

**Application Identifier:** 5.5.4

**Overview**

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.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Build Customer Insight

**Application Identifier:** 5.5.5

**Overview**

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.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Validate Customer Satisfaction

**Application Identifier:** 5.5.6

**Overview**

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.

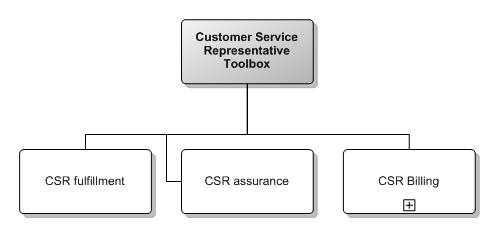
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 5.6 Customer Service Representative Toolbox



1. 5.6 Customer Service Representative Toolbox

### Customer Service Representative Toolbox

**Application Identifier:** 5.6

**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 Business Services**

*To Be Added*

### CSR fulfillment

**Application Identifier:** 5.6.1

**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 Application Map 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
* CSR access to a specific order - 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 Business Services**

* Order Management
* Product Catalogue

### CSR assurance

**Application Identifier:** 5.6.2

**Overview**

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

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### CSR Billing

**Application Identifier:** 5.6.3

**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:

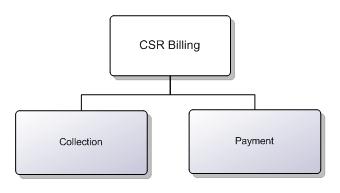
* Billing Inquiry Dispute & Adjustment Management
* Payment
* Collection

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

**Supported Business Services**

*To Be Added*

## 5.6.3 CSR Billing



1. 5.6.3 CSR Billing

### CSR Billing

**Application Identifier:** 5.6.3

**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 Application Map version will incorporate the Billing Account Management into the same framework.

**Supported Business Services**

*To Be Added*

### Collection

**Application Identifier:** 5.6.3.1

**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 - 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 Business Services**

*To Be Added*

### Payment

**Application Identifier:** 5.6.3.2

**Overview**

*To Be Added*

**Functionality**

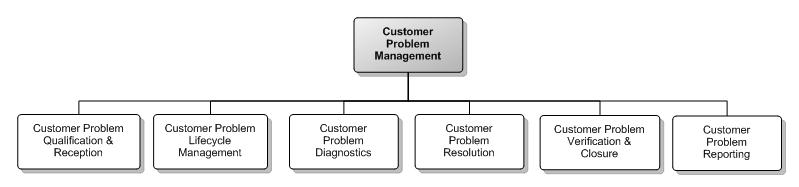
The purpose of payment application is to accept customer payment via the customer service representative (CSR). Payments are handled by Receivable Management. The functionality includes:

* Immediate Payment of Balance/Specific Invoice - Immediate payment of balance / specific invoice using existing or new pay means
* Prepaid recharge - Prepaid recharge using vouchers / other pay means

**Supported Business Services**

*To Be Added*

## 5.8 Customer Problem Management



1. 5.8 Customer Service / Account Problem Resolution

### Customer Problem Management

**Application Identifier:** 5.8

**Overview**

The purpose of Customer Problem Management is to manage problems reported by customers, resolving these problems to the customer’s satisfaction, and providing meaningful status on the issue as needed to the customer.

Customer problems can include:

* General questions on products purchased and being used by the customer
* Problems with products already purchased and being used by the customer either due to lack of education or service/network problems.
* Problems with a material purchase from the service provider, even if they do not have an account with the said service provider.
* General inquiries, complaints, and commendations.

Note: A customer problem may or may not result in a billing adjustment. Billing related issues are handled via Billing Inquiry, Dispute & Adjustment Management,

See Case Management for more information.

**Functionality**

Typical application functions supported are

* Customer Problem Qualification & Reception
* Customer Problem Lifecycle Management
* Customer  Problem Diagnostics
* Customer Problem Resolution
* Customer Problem Verification & Closure
* Customer Problem Reporting

**Supported Business Services**

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

### Customer Problem Qualification & Reception

**Application Identifier:** 5.8.1

**Overview**

Customer Problem Qualification & Reception applications provide the necessary functionality to detect, evaluate and quality a reported or affected customer problem.

**Functionality**

Customer Problem Reception functionality includes:

* ID customer/Customer validation. To make sure who the customer is
* ID services: This refers to service validation to see what service(s) the customer has subscribed to
* Reception of problems from:
  + Customers
  + southbound internal systems (service problem management, service performance management, service quality management)
  + outside north systems, including social networks/third parties.
* Problem triage:
  + Qualify Symptoms/Reason for call (when reception is via a customer contact).  Non-qualified issues will be referred appropriately.
  + Associate received problem with appropriate customer(s)  and customer products/services (when reception is via a southbound or northbound system
* Access to a complete customer problem history database

**Supported Business Services**

*To Be Added*

### Customer Problem Lifecycle Management

**Application Identifier:** 5.8.2

**Overview**

Customer Problem Lifecycle Management applications provides the necessary functionality to manage the end-to-end lifecycle of the customer problem as defined and configured by the service provider.

Note:  All customer incidents/cases may be tracked, if so determined by the service provider.

**Functionality**

Customer Problem Lifecycle Management functionality includes:

* Create a case if needed
* Relate the given case to an existing case/ trouble ticket if appropriate
* Relate the given case to a workforce management dispatch or initiate a dispatch if appropriate.
* Tracking of the case, including the related activities (dispatches, tier-II tickets, etc.).
* Associate correct diagnostic code to the case
* Case Archival

**Supported Business Services**

*To Be Added*

### Customer Problem Diagnostics

**Application Identifier:** 5.8.3

**Overview**

Customer Problem Diagnostics applications provide the necessary functionality to perform the root cause analysis of a reported or affected customer problem.

**Functionality**

Customer Problem Diagnostics functionality includes the following:

* Determine the source (root cause) of the problem
* Utilize service performance and service problem management functions
* Use Diagnostics /Testing tools to determine the actual cause
* Use a detailed physical, logical and service inventory to create an up-to-date detailed customer connectivity/topology view.
* Utilize the following data to resolve the customer problem:
  + Customer Topology and inventory type data (e.g., logical and physical inventory)
  + Customer Information including the business organizational hierarchy
  + Change Management data
  + Customer Service Order data
* Receive service quality of service violation data from Service Quality Management
* Correlate various events associated with customer contact to determine the source
* Update the case with a “Cause Code”

**Supported Business Services**

*To Be Added*

### Customer Problem Resolution

**Application Identifier:** 5.8.4

**Overview**

Customer Problem Resolution applications provide the necessary functionality to resolve a customer reported or affected problem back to the original state.

**Functionality**

Customer Problem Resolution functionality includes:

* Taking  necessary measures to address the problem and correct it
* Utilize resource and service problem management functions to appropriately repair the customer product or service

**Supported Business Services**

*To Be Added*

### Customer Problem Verification & Closure

**Application Identifier:** 5.8.5

**Overview**

Customer Problem Verification & Closure applications provide the necessary functionality to verify if the problem has been resolved and to close the case when the problem is indeed resolved.

As part of verification and closure, follow-up may be needed with customer service representatives if a complaint (or commendation) was placed against the individual.  Appropriate actions must be taken, especially if trends are discovered.

**Functionality**

Customer Problem Verification & Closure functionality includes the following:

* Verify with the customer that the problem has been fixed (this may involve further testing to verify the problem is indeed fixed)
* Verify that the service and/or resource level tickets have been closed, and the issue related to these respective tickets resolved.
* Close the customer trouble ticket.
* Document the cause code

**Supported Business Services**

*To Be Added*

### Customer Problem Reporting

**Application Identifier:** 5.8.6

**Overview**

Customer Problem Reporting applications provide the necessary functionality to report on the status of open/ closed customer problems.

**Functionality**

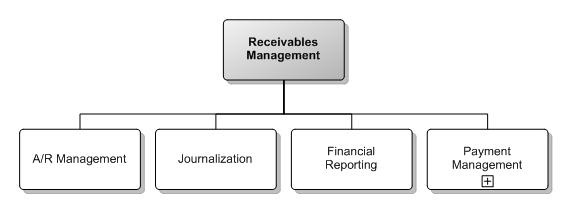
Customer Problem Reporting functionality includes the following:

* Generate operational reports, as well as reports against various metrics.
* Generate customer problem lifecycle tracking reports

**Supported Business Services**

*To Be Added*

## 5.9 Receivables Management



1. 5.9 Receivables Management

### Receivables Management

**Application Identifier:** 5.9

**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 Business Services**

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

### A/R Management

**Application Identifier:** 5.9.1

**Overview**

A/R Management applications provide necessary tools to maintain the customer account receivable. This includes managing balances as well as posting of payments and other financial activities.

**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 posting and other financial activities. It includes:

* Posting of invoice charge items from 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.
* Application of Payments  
  This process receives customer payments from various sources and applies them to customer account balances. It also performs activities, such as:
  + Payment Allocation to balances
  + Transfers of funds between accounts
* Deposit Management.  
  Deposit Management manages amounts held as a guarantee of payment. Interest may be accumulated on this deposit amount. If payment is not made in a timely manner, a portion of this deposit may be applied to the outstanding balance. Based on business policy, deposits may be refunded with applicable interest after some period of time. Deposit Management maintains and executes on these policies.
* Financial Account Management  
  Financial Account Management supports the financial activities that relate to customer accounts. These activities includes:
  + Refunds
  + Disputes
  + Adjustments / Credits
  + Write-offs.
* Advance Payment Acceptance  
  Advance Payments are accepted before initiation of service - usually at time of ordering. Interest is not accrued on advance payments.
* 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 Business Services**

*To Be Added*

### Journalization

**Application Identifier:** 5.9.2

**Overview**

Journalization applications provide the capability to analyze and translate customer financial activities into records that can then be sent to the corporate general ledger.

**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, payment, refund, and collection processes. This application accumulates journal entries and maps them to the GL transaction based on criteria such as appropriate geographical accounting principles for sending downstream to the corporate general ledger.

**Supported Business Services**

*To Be Added*

### Financial Reporting

**Application Identifier:** 5.9.3

**Overview**

Financial Reporting applications provide customer financial data to downstream systems and processes.

**Functionality**

Financial Reporting applications provide data 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 Business Services**

*To Be Added*

### Payment Management

**Application Identifier:** 5.9.4

**Overview**

**Business Context**

The Payment Management application supports interfaces between the service provider billing systems and the internal and external systems that are responsible for processing payment requests. It enables customers to choose between many payment channels whilst allowing those payments to be processed in a standardised, efficient and secure manner

**Overview**

The Payment Management application provides a link between the payment channels (egg Post office, Retail shops, etc.) and the service provider to allow many forms of payment to be accepted in a controlled manner. Payment Management interfaces with financial institutions to verify and accept or decline financial transactions.

**Functionality**

Payment Management facilitates the transfer of information between the service provider’s financial institution and the customer’s financial institution.

Payment Management performs the following functions:

         Payment interface management

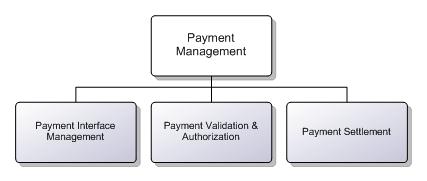
         Payment validation and authorisation

         Payment settlement

**Supported Business Services**

*To Be Added*

## 5.9.4 Payment Management



1. 5.9.4 Payment Management

### Payment Management

**Application Identifier:** 5.9.4

**Overview**

**Business Context**

The Payment Management application supports interfaces between the service provider billing systems and the internal and external systems that are responsible for processing payment requests. It enables customers to choose between many payment channels whilst allowing those payments to be processed in a standardised, efficient and secure manner

**Overview**

The Payment Management application provides a link between the payment channels (e.g. Post office, Retail shops, etc.) and the service provider to allow many forms of payment to be accepted in a controlled manner. Payment Management interfaces with financial institutions to verify and accept or decline financial transactions.

**Functionality**

Payment Management facilitates the transfer of information between the service provider’s financial institution and the customer’s financial institution.

Payment Management performs the following functions:

         Payment interface management

         Payment validation and authorisation

         Payment settlement

**Supported Business Services**

*To Be Added*

### Payment Interface Management

**Application Identifier:** 5.9.4.1

**Overview**

**Overview**

Payment Interface Management **retrieves** and transmits payment information with payment channel organisations (financial institutions/clearing houses) in a secure manner according to agreements.

**Functionality**

Payment Interface Management performs the following functions:

         Manages interfaces between the service provider and payment channel organisations where payment request may be initiated within the service provider’s system or external payment agent systems.

         Supports direct debit payments from the nominated (specified) bank accounts.

         Supports refund transactions based on the saved payment transaction details.

**Functionality**

Payment Interface Management performs the following functions:

         Manages interfaces between the service provider and payment channel organisations where payment request may be initiated within the service provider’s system or external payment agent systems.

         Supports direct debit payments from the nominated (specified) bank accounts.

         Supports refund transactions based on the saved payment transaction details.

**Supported Business Services**

*To Be Added*

### Payment Validation & Authorization

**Application Identifier:** 5.9.4.2

**Overview**

Payment Validation & Authorization assures that all payments are properly validated and authorized with the appropriate financial institutions. This includes support for preauthorization of charges.

**Functionality**

Payment Validation & Authorization performs the following:

         Supports financial institutions’ security standards (e.g. “Verified by Visa” and “MasterCard SecureCode”).

         Liaises with financial institutions for payment authorisation.

         Provides remittance details to the bill accounts receivable management application within the service provider billing system.

**Supported Business Services**

*To Be Added*

### Payment Settlement

**Application Identifier:** 5.9.4.3

**Overview**

Payment Settlement submits authorized transactions from the service provider to the financial institution and provides reconciliation support.

**Functionality**

Payment Settlement performs the following:

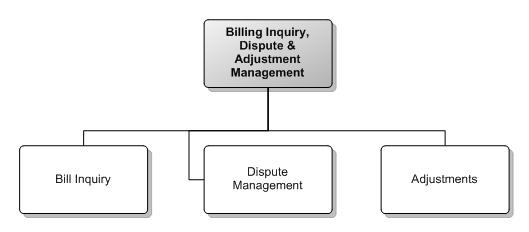
         Submits authorised transactions to the financial institutions for settlement.

         Supports the reconciliation process with financial institutions

**Supported Business Services**

*To Be Added*

## 5.10 Billing Inquiry, Dispute & Adjustment Management



1. 5.10 Billing Inquiry, Dispute & Adjustment Management

### Billing Inquiry, Dispute & Adjustment Management

**Application Identifier:** 5.10

**Overview**

This is a front end application for managing billing inquiries, disputes, and adjustments. Billing inquiries are provided by Bill Calculation. 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 Business Services**

*To Be Added*

### Bill Inquiry

**Application Identifier:** 5.10.1

**Overview**

Biling Inquiry applications provide capabilities to view a given customer’s invoicebill and supporting details in order to answer customer questions.

**Functionality**

The purpose of Bill Inquiry is to provide the capabilities to view customer bill and supporting details 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 - View usage summary and details (billed and non-billed)

**Supported Business Services**

*To Be Added*

### Dispute Management

**Application Identifier:** 5.10.2

**Overview**

Dispute Management applications provides necessary functionality to identify, track, and assign an appropriate disposition to contested charges.

**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 Business Services**

*To Be Added*

### Adjustments

**Application Identifier:** 5.10.3

**Overview**

Adjustments applications provides appropriate functionality to create transactions that affect a customer’s account balance as a result of an assessment or dispute.

**Functionality**

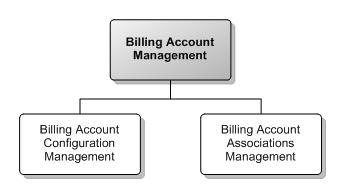
The purpose of Adjustments is to adjust customer's account balance based on the result of a detailed assessment or dispute. Possible adjustments may include tax adjustments, account/invoice/charge level adjustment, good will adjustment as well as refund or credits.

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 Business Services**

*To Be Added*

## 5.13 Billing Account Management



1. 5.13 Billing Account Management

### Billing Account Management

**Application Identifier:** 5.13

**Overview**

The purpose of Billing Account Management is to provide functionality necessary to establish and modify a customer's billing account. This includes configuration of the account as well as management of account associations.

**Functionality**

Billing Account Management functionality includes management of the following:

* Billing Account Configuration Management
* Billing Account Association Management

**Supported Business Services**

*To Be Added*

### Billing Account Configuration Management

**Application Identifier:** 5.13.1

**Overview**

Billing Account Configuration Management provides the necessary capability to create and update billing accounts. It also provides the ability to modify billing account parameters.

**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 Business Services**

*To Be Added*

### Billing Account Associations Management

**Application Identifier:** 5.13.2

**Overview**

The Billing Account Associations Management application provides the necessary capabilities to manage billing account associations with other entities.

**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.

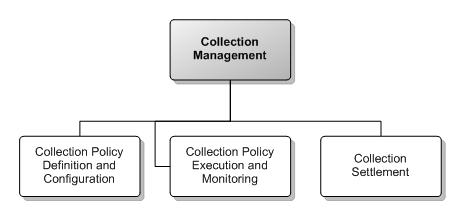
Those associations would enable:

* 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 Business Services**

*To Be Added*

## 5.14 Collection Management



1. 5.14 Collection Management

### Collection Management

**Application Identifier:** 5.14

**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 Business Services**

* 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:** 5.14.1

**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:

* Collection Flows Creation - Assembly of collection steps into collection flows
* Collection rules definition

**Supported Business Services**

### Collection Policy Execution and Monitoring

**Application Identifier:** 5.14.2

**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 Business Services**

*To Be Added*

### Collection Settlement

**Application Identifier:** 5.14.3

**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**

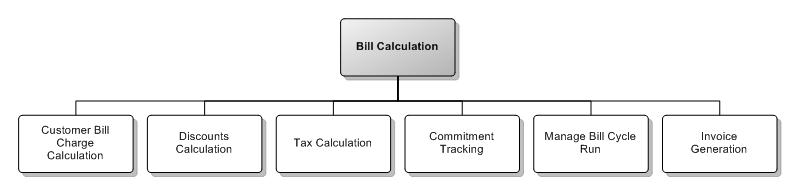
Functionality includes the following:

* 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 Business Services**

*To Be Added*

## 5.15 Bill Calculation



1. 5.15 Bill Calculation

### Bill Calculation

**Application Identifier:** 5.15

**Overview**

**Business Context**

The Bill Calculation application automates the tasks required to calculate the bill. It takes billing preference, recurring product, non-recurring charge information and usage charge information, calculating the charges that must be billed.

Bill Calculation may occur on demand or within bill cycles that are carefully planned and controlled for integrity and completeness as well as workload balancing (computer and staff)

The output of Bill Calculation is a bill for products and services – The products and services may include both prepaid and postpaid services in a single bill.

**Overview**

The Bill Calculation application processes all charges against an account during bill cycles. Bill Calculation can be executed both on a cyclic basis and *on demand.* It performs bill invoicing, dealing with bill compilation of charges, credits, payments, adjustments, fees & taxes at various levels, such as product and/or account level that have been generated since the last run for that account. It could apply discounts. Finally, Bill Calculation Management calculates bill totals and subtotals as appropriate.

The pricing plans and discounts are determined based on the agreements for the invoiced customer or account.

**Functionality**

Bill Calculation functionality includes:

         Performing charge and event distribution to support a split bill

         Support various bill cycle intervals

         **Assemble billing information:**  Pull together all the information to be included on the invoice, incorporating taxes, surcharges, and other fees and may include payments, adjustments, and other financial activities.

         **Apply pricing and discounting:** Apply pricing and discounting rules and algorithms in the context of the assembled information.

         **Fee Calculation:** Calculates and applies bill-time fees where necessary.

         **Generate an invoice:** Execute invoice generation according to operational schedules.

         **Billing Financials:** Create appropriate transactions regarding the current invoice for Receivables Management.

**Supported Business Services**

**Exposed Contracts**

* Billing Inquiry
* Quotations

**Consumed Contracts**

* TAX calculation

### Customer Bill Charge Calculation

**Application Identifier:** 5.15.1

**Overview**

The Customer Bill Charge Calculation provides appropriate functionality to assemble items to be incorporated into a bill, applying prices or recalculating charges in the context of appropriate billing events. Customer Bill Charge Calculation also considers the results of aggregation and balance management functions in the process of calculating charges.

**Functionality**

Customer Bill Charge Calculation aggregates charges from different sources. By using the Charge and Balance Management 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. It also recalculates charges as appropriate across product, location, or customer, and considerations based on business rules.

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

**Supported Business Services**

*To Be Added*

### Discounts Calculation

**Application Identifier:** 5.15.2

**Overview**

The Discounts Calculation provides appropriate functionality to apply discounts to charges.

Discount Calculation provides appropriate functionality to apply discounts or recalculate discounts in the context of appropriate billing events. Discount Calculation also considers the results of aggregation and balance management functions (based on a certain balance, different discounts are applied) in the process of calculating discounts.

**Functionality**

Discounts Calculation determines charge discounts based on pricing plan; including discounts on recurring, one time, and usage charges. Discounts may be applied at different levels such as cross product, cross location, or cross customer (all customers that are part of a given group plan – some affiliation). The discounts can be apportioned across multiple events.

**Supported Business Services**

*To Be Added*

### Tax Calculation

**Application Identifier:** 5.15.3

**Overview**

Tax Calculation provides the necessary functionality to calculate taxes, including surcharges and fees; where applicable. This function can occur within the Invoicing application or through the use of an external Tax module.

**Functionality**

Discounts Calculation determines charge discounts based on pricing plan; including discounts on recurring, one time, and usage charges. Discounts may be applied at different levels such as cross product, cross location, or cross customer (all customers that are part of a given group plan – some affiliation). The discounts can be apportioned across multiple events.

**Supported Business Services**

*To Be Added*

### Commitment Tracking

**Application Identifier:** 5.15.4

**Overview**

The Commitment Tracking application provides commitment governance between the customer and provider.

**Functionality**

The Commitment Tracking application provides appropriate capability to monitor terms and conditions that govern financial commitments between the customer and the provider.

Capabilities include:

         gathering data to be used in the evaluation of the terms and conditions

         evaluating the terms and conditions in the context of the gathered data

         determining the outcome of the evaluation (financial benefits or penalties).

**Supported Business Services**

*To Be Added*

### Manage Bill Cycle Run

**Application Identifier:** 5.15.5

**Overview**

Manage Bill Cycle Run applications provides appropriate capability to control bill cycle activities.

**Functionality**

Manage Bill Cycle Run manages the bill cycle run, triggering various billing activities necessary to complete the production of the invoice or set of invoices.

**Supported Business Services**

*To Be Added*

### Quotation Engine (Deleted)

**Application Identifier:** 5.15.6 (This Application ID has been deliberately unused!)

### Invoice Generation

**Application Identifier:** 5.15.7

**Overview**

Invoice Generation provides the means to calculate the balance due for an invoice/bill. In addition, it assembles charges, credits, taxes, fees and adjustments that affect the balance due. Subtotals and totals are also calculated at various levels.

**Functionality**

Invoice Generation provides the means to calculate the balance due for an invoice/bill. In addition, it assembles charges (including charge distribution- charges incurred by other customers), credits, taxes, fees and adjustments that affect the balance due. Subtotals and totals are also calculated at various levels.

Invoice Generation provides appropriate level of detail regarding the items on the invoice to accommodate revenue reporting needs. It also provides the detail necessary to Bill Format & Render (or Transactional Document Production) to produce a complete customer bill.

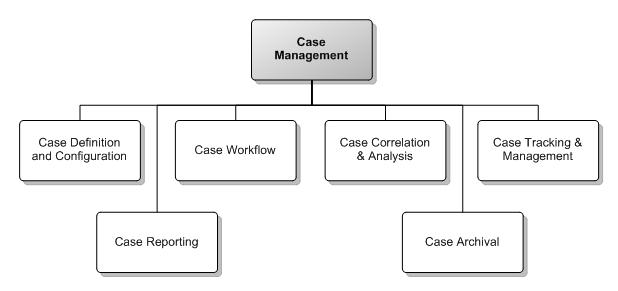
During the course of assembling items include in the customer bill, invoice generation will invoke Tax Calculation in order to determine taxes on the applicable items and include the taxes in the amount due.

**Supported Business Services**

*To Be Added*

### 

## 5.17 Case Management



1. 5.17 Case Management

### Case Management

**Application Identifier:** 5.17

**Overview**

Case Management applications manage the end to end lifecycle of a case.  Cases and Case Management could apply to any area of assurance, billing, or fulfillment, but presumably in the customer layer.  More specifically, Case Management could apply to customer problems (service affecting or not), bill inquiries, disputes, or areas of ordering if so implemented by the service provider.

Given Case Management must manage the lifecycle of a case, there must be a means to define and configure different types of cases along with the workflow to execute the various types of cases through their respective lifecycles.  There must also be the capability to analyze and correlate cases as well as report on the various cases open at any given time, and archive the cases once closed.

Note:  The presentation layer for these applications will be found elsewhere (Self Service, CSR Toolbox, etc.).

**Functionality**

Case Management applications provide the following key functionality:

* Case Definition and Configuration
* Case Workflow
* Case Execution & Tracking
* Case Correlation & Analysis
* Case Reporting
* Case Archival

**Supported Business Services**

*To Be Added*

### Case Definition and Configuration

**Application Identifier:** 5.17.1

**Overview**

Case Definition and Configuration applications provide the necessary functionality to define different types of cases, along with the states for each case type and associated configurations and workflow.

**Functionality**

Case Definition and Configuration applications are responsible for defining and configuring the various types of cases.  Case types could include general queries, complaints, commendations, and problem/trouble reporting.

**Supported Business Services**

*To Be Added*

### Case Workflow

**Application Identifier:** 5.17.2

**Overview**

Customer Order Workflow applications provide general workflow and orchestration capability for the Case Management area.  This capability will be used to implement the flow defined and configured via the Case Definition and Configuration application.

**Functionality**

The Case Workflow application provides workflow and orchestration capability across Case Management.

**Supported Business Services**

*To Be Added*

### Case Correlation & Analysis

**Application Identifier:** 5.17.3

**Overview**

Case Correlation & Analysis applications provide appropriate functionality to relate cases as appropriate.

**Functionality**

Case Correlation & Analysis applications provide appropriate functionality to relate cases as appropriate.

Case correlation can include correlation of multiple cases that have the same root cause as can be correlated within the customer layer.

It is not expected that this application will relate cases to service or resource level troubles.  This functionality is expected to be in the service layer.

**Supported Business Services**

*To Be Added*

### Case Tracking & Management

**Application Identifier:** 5.17.4

**Overview**

*To Be Added*

**Functionality**

The Case Tracking & Management application handles the cases based on the definition and configuration established via the Case Definition and Configuration application. The Case Tracking & Management application performs the following:

•         Oversees the transfer of the case to appropriate internal applications or work groups, as well as affiliates or partners.

•         Tracks the case until closed.

•         Provides status on the overall case.

•         Raises jeopardies on the case as appropriate if specified dates and milestones are not met.

•         Escalates jeopardies to appropriate management levels.

•         Creates and manages case worklists. This can include the need to contact the customer to inform them of a change in the case.

•         Updates the state of a case as defined by Case Definition and Configuration.

•         Sequences the various steps of the case if required.

•         Notifies appropriate parties or applications when the case has been closed/completed.

Real time query as well as publish/subscribe mechanisms must also be provided as part of the above capabilities.

**Supported Business Services**

*To Be Added*

### Case Reporting

**Application Identifier:** 5.17.5

**Overview**

Case Reporting applications provide Case Management based reporting.

**Functionality**

Case Reporting provides various operational reports regarding the status and state of the various cases in the Case Management application.

**Supported Business Services**

*To Be Added*

### Case Archival

**Application Identifier:** 5.17.6

**Overview**

Case Archival Applications provide appropriate functionality to archive and cases at an appropriate time after case closure.

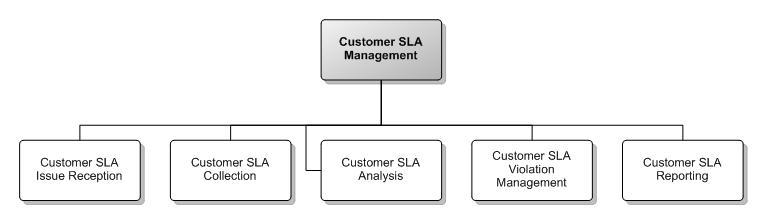
**Functionality**

The Case Archival applications provide the means to archive cases at the appropriate time as well as retrieve the archived cases as needed.

**Supported Business Services**

*To Be Added*

## 5.18 Customer SLA Management



1. 5.18 Service Level Agreement Management

### Customer SLA Management

**Application Identifier:** 5.18

**Overview**

Customer SLA Management applications include the required functionality to assure that SLA agreements made between operators and customers are met.  This includes processing measurements made elsewhere and checking the measurements and taking appropriate actions when the specified agreements are not met.

Note:  Customers can include partners and 3rd party providers.

**Functionality**

Customer SLA Management functionality includes the following:

* Customer SLA Issue Reception
* Customer SLA Collection
* Customer SLA Analysis
* Customer SLA Violation Management
* Customer SLA Reporting

**Supported Business Services**

*To Be Added*

### Customer SLA Issue Reception

**Application Identifier:** 5.18.1

**Overview**

Customer SLA Issue Reception applications provide the necessary functionality to receive a complaint or notice about some product or service with respect to an established customer service level agreement.

**Functionality**

Customer SLA issue Reception functionality includes:

* Customer Validation
* Service Validation
* Reception of the problem from:
  + Customers or customer systems
  + Internal systems (SQM, Service Problem Management, Service Performance Management, and Customer Problem Management as well as billing or fulfillment systems)

**Supported Business Services**

*To Be Added*

### Customer SLA Collection

**Application Identifier:** 5.18.2

**Overview**

Customer SLA Collection applications provide the necessary functionality to collect information about a given SLA issue.

**Functionality**

Customer SLA Collection collects additional customer SLA related information from established sources, including service quality management, service performance management, service problem management, third parties, and customers.

**Supported Business Services**

*To Be Added*

### Customer SLA Analysis

**Application Identifier:** 5.18.3

**Overview**

Customer SLA Analysis applications provide the necessary functionality to analyze performance with respect to the established Service Level Agreement.

**Functionality**

Customer SLA Analysis functionality includes:

* Translating performance data received into a form suitable for SLA analysis.

Analyzing the level of service received by the customer and comparing it to the contractual obligations.  This can include analysis of historical SLA information as well.

**Supported Business Services**

*To Be Added*

### Customer SLA Violation Management

**Application Identifier:** 5.18.4

**Overview**

Customer SLA Violation Management applications provides the necessary functionality to manage SLA violations and the activities necessary to resolve the apparent degradation or violation.

**Functionality**

Customer SLA Violation Management functionality includes:

* Notifying appropriate people or systems to remedy the violation.
* Per the SLA contract, quantifying the violation in terms of an adjustments or actions per the contract.
* Passing this adjustment or action on to billing or appropriate systems for remedy.
* Tracking and management of open Customer SLA issues.

**Supported Business Services**

*To Be Added*

### Customer SLA Reporting

**Application Identifier:** 5.18.5

**Overview**

Customer SLA Reporting applications provide the necessary functionality to report on Customer SLA performance as well as on open SLA issues.

**Functionality**

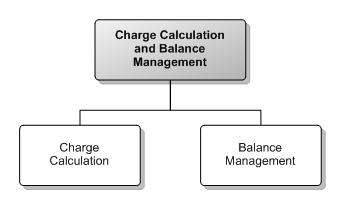
Customer SLA Reporting functionality includes:

* Producing reports on open SLA issues
* Producing reports on how the service provider is performing per the specified service levels.

**Supported Business Services**

*To Be Added*

## 5.19 Charge Calculation and Balance Management



1. 5.19 Charge Calculation and Balance Management

### Charge Calculation and Balance Management

**Application Identifier:** 5.19

**Overview**

The Charge Calculation and Balance Management applications are responsible for calculating customer specific charges and discounts and management of balances. These support both real-time and batch processing modes of operation.

**Functionality**

Charge Calculation and Balance Management functionality includes the following:

* Charge Calculation
* Balance Management

**Supported Business Services**

**Exposed Contracts**

* Billing Inquiry
* Quotations

**Consumed Contracts**

* TAX calculation

### Charge Calculation

**Application Identifier:** 5.19.1

**Overview**

The Charge Calculation application assigns a value (monetary or other) to an event in the context of a product and payer. Charge calculation may be as simple as direct application of a price to an event or may be complicated, involving a combination of price and other factors (measurements). The values that result from a charge calculation are not limited to monetary values – they may represent many types of units (minutes, points, tokens, etc.).

The application accepts events that are:

* Usage events / records or
* Events derived from Customer and Order/Product information that indicate the need for recurring and onetime charges.

The value that results from Charge Calculation may be used in many subsequent processes, including:

         affecting a balance (Balance Management)

         the preparation of an invoice (Bill Calculation)

         pay-it-now processing options.

The values that result from the calculation may be expressed as recurring charges/credits, one-time charges/credits, or usage charges/credits.

Taxes may be calculated for the individual customer specific charges using the Tax application, otherwise taxes are calculated by the Tax application during the bill calculation process.

**Functionality**

The main functions of the Charge Calculation applications are:

* Charge/Credit calculation – Calculate event-level charges/credits (one time, recurring, and usage).
* Recalculation – recalculation of charges/credits based on information received later (e.g. from the Service Level Agreement function, delayed call detail record file arrival, delayed order arrival). Recalculation may be necessary: pre-billing (prior to Bill Calculation), during the Bill Calculation process, and/or post-billing.
* Proration of calculated charges/credits.
* Accumulate events that provide measurements that will be used in the charge calculation (e.g. used allowance).

Non-functional aspects of the Charge Calculation applications include:

* **High Availability**: When used in online mode, the Charge Management application should provide Carrier grade availability (99.999).
* **Low Latency**: Responses to requests should be given with very low latency.
* **High Throughput**: The application must support the maximum request and events throughput required during the busiest hour of the year without throttling or rejecting any request.
* **Small Charge Precision** – Precision level shall be maintained for small charges.

**Supported Business Services**

**Exposed Contracts**

* **Advice of Charge –** provide an immediate advice of the expected charge/credit 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.).

**Consumed Contracts**

* **Tax Application –** execute the Tax application immediately following Charge Calculation in order to support real-time payment processing and real-time balance management.

### Balance Management

**Application Identifier:** 5.19.2

**Overview**

The Balance Management applications are responsible for activities related to the creation and maintenance of the balances of a customer and/or a subscriber. Balances may be shared (e.g. between subscribers in a hierarchy).

These processes will be required to support both batch and real-time processing.

Types of balances include:

* + Monetary balances
    - Prepaid balances
    - Postpaid balances

Non-monetary balances (e.g. free minutes, WAP-only quota, tokens, etc.)

**Functionality**

The balance management applications will support the definition of policies 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 include:

* + Unit reservation from a balance for a specified interval (session). Unused units are credited back into the balance when the session is released.
  + Balance inquiry.
  + Support for multiple simultaneous sessions that affect a common balance.
  + Replenishment (top-up, recharge) of prepaid balances from postpaid accounts (e.g. credit card or credit balance).
  + Enforcement of spending-limits and credit-control for postpaid balances.
  + Splitting charges between multiple balances.
  + Notifications upon balances reaching a configured threshold (e.g. spending limit support).
  + Credit and debit operations resulting from application of a value calculated by Charge Calculation processes.
  + Application of a payment to a balance.
  + Communication of balance information to the financial systems (e.g. General Ledger, Accounts Receivable) within the enterprise.

Provide transaction logs to support reporting activities.

**Supported Business Services**

**Exposed Contracts**

**Balance replenishment** - Allow the use of various payments to affect a balance means including vouchers, e-Transaction, Direct debit, Credit card or any other form of payment. The contract may be used by many channels: self-service via an IVR system, SMS/USSD, ATM, a web application, or with CSR assistance.

**Balance consumption** – Allow various processes to reduce a balance.

**Balance creation** – Establish a new balance for a customer.

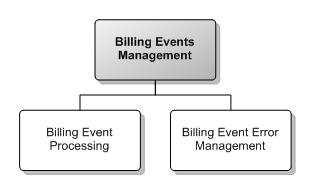
**Balance inquiry**.

**Balance adjustments**.

**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, purchased offers, credit limit parameters, bill shock prevention regulation, etc. ) and on the current balance available. Note: this is possibly a component of a larger scope authorization contract which can involve data such as identity authorization, location, etc.

**Consumed Contracts**

## 5.20 Billing Events Management



1. 5.20 Billing Events Management

### Billing Events Management

**Application Identifier:** 5.20

**Overview**

Billing Event Management encompasses Billing Event Processing and Billing Event Error Management.

Billing Event Processing provides the functions necessary to collect events that are relevant for billing processes, relate them to the proper product offering or customer account, and direct the events to the appropriate billing sub-functions. Billing events include:

         Events that indicate the need for periodic billing of a recurring product charge (from customer orders).

         Records that indicate the need for billing of a non-recurring charge (from customer orders).

         Records produced by network elements (from usage management). Usage Management will collect and distribute the network records that will be used in the Billing processes to Billing Event Management.

Billing Event Error Management functions are a complex set of activities related to automating the processes of correcting errors in billing events. This often includes the capability to apply mass corrections.

**Functionality**

Billing Event Management functionality includes:

* Billing Event Processing
* Billing Event Error Management

**Supported Business Services**

*To Be Added*

### Billing Event Processing

**Application Identifier:** 5.20.1

**Overview**

Billing Event Processing includes collection, guiding, distribution, mediation, enrichment, analysis, summarization, and correlation of billing event records. These functions are required to support both file and event based processing.

Billing events may originate from many sources. A primary source of billing events is the Usage Management function. The Usage Management function will provide information produced by various network elements to Billing Event Processing. Events produced in the Usage Management function may be used as:

1.    **Measurements** for calculating the charge of purchased products offerings where the price is a usage price type. The events may report measurements expressed in various units (bandwidth, duration, quantity, message vs. measured, etc.).

2.    **Purchase** indicators that indicates to Billing that a product offering has been “ordered” by a customer (

Other sources of billing event records are:

* Third parties
* Ordering platforms
* Other billers.

Events to be rated are distributed to the appropriate rating system. Once rated, the events are returned from Rating to Billing Events Management and from there distributed to Bill Calculation. Rated events may be used by Balance Management to affect a balance.

Events that indicate a roaming activity are distributed to outside service providers.

**Functionality**

Billing Event Processing includes:

* Collection (including gateway functions)
* Guiding
* Distribution
* Mediation
* Enrichment
* Analysis
* Summarization
* Correlation

**Supported Business Services**

*To Be Added*

### Billing Event Error Management

**Application Identifier:** 5.20.2

**Overview**

The Billing Events Error Management function accepts events which have been identified as being non-processable. Examples could include the inability to identify the owner of the usage (customer), and inability to apply a valid rate, etc. The function provides users with these capabilities:

         The ability to categorize unbilled events

         Features to identify the error cause

         Correction capabilities (via mechanized script or manual correction)

         Re-distribution features to send the usage to the proper destination(s).

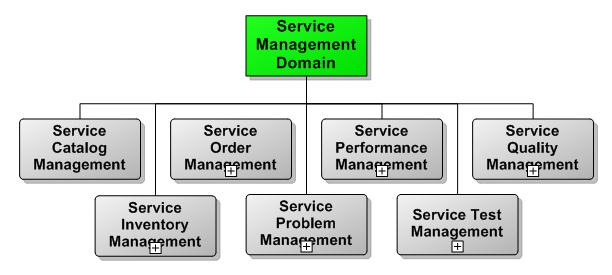
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

# 6. Service Management Domain



1. 6. Service Management Domain

### Service Catalog Management

**Application Identifier:** 6.1

**Overview**

Service Catalog Management is a realization of the Cross domain Catalog Management application in the Service Domain. The applications are repositories of service listing within a service provider and include the ability to design, create, augment and map new entities and supporting data. The type of catalog management application is an implementation choice of the enterprise.

See: Cross Domain- Catalog Management for more information.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Service Inventory Management

**Application Identifier:** 6.2

**Overview**

Service Inventory Management represents the applications which contain and maintain information about the instances of services in a telecom organization.

A Service Inventory application may store and manage any or all of the following entities:

* Customer facing service (CFS) instances, and their attributes
* Resource facing service (RFS) instances, and their attributes

The Service Inventory may also store and manage service relationships:

* The mapping of services (RFSes or CFSes) to other services and/or service components, the components being either:
* Other child services
* Resources and the resource domain managers used to implement the service, or
* Services and resources in Supplier/Partner systems used to implement the service

This mapping is stored either intrinsically in the core Service Inventory, or discretely via Service-Supporting Resource Inventory applications.

Service Inventory may include the following relationship types between entity instances:

         Realization by Composition – A mapping from a service to the child services and/or resources which specifically compose that service (e.g. the RFS instance or instances whose whole purpose is to implement a CFS, the assignable resources which realize an RFS). If a parent service is torn down, child objects with a Composition relationship are typically removed or reallocated (e.g. transitioned to spares inventory).

         Realization by Aggregation – A mapping from a service to the services and/or resources which support this service in addition to other services. (e.g. a network access RFS which supports a number of different network CFSes). If a parent service is torn down, child objects with an Aggregation relationship are typically maintained as long as at least one other parent service still exists.

         Dependency – A link between services and/or resources which is not strong enough to qualify as Composition or Aggregation, but where various Fulfillment, Assurance, and Change Management processes need to be aware of the relationship. Dependency relationships support the ability for change management processes to evaluate if a dependent service or resource may be impacted by changes to a specific service or resource.

**Functionality**

* Service Inventory Information Model
* Service Inventory Retrieval
* Service Inventory Update Notifications
* Service Inventory Update
* Service-Supporting Resource Inventory
* Service Inventory Reconciliation / Synchronization

**Service Inventory Information Model**

This function is the underlying information model for the service instances to be managed. The model serves as the foundation for the data itself and a guiding force for the definition and modelling of new services.

The Service Inventory Information Model should evolve in close coordination with the Service Specification data model, since the Service Inventory model must be able to store instances designed in accordance with all the service specifications defined via the Service Specification Management system.

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 component services and resources for each service (the SID model, in fact, does do this).

**Service Inventory Retrieval**

This function allows for client system to retrieve a part or all of the service inventory known to the Service Inventory Management system.

This feature may support 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

         retrieval based on relationship to a specific entity (e.g. all CFS instances supported by a specific RFS instance)

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 function entails the generation of inventory update notifications based on changes to the inventory known to the Service Inventory Management system. The notification types typically include object creation, object deletion, attribute value changes, and object relationship 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 (e.g. changes in any component services of a specific CFS).

**Service Inventory Update**

This function entails an external system requesting that the Service Inventory Management system update its inventory based on a provided collection of updates. The expectation is that the Service Inventory Management system 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 creation of an object, deletion of an object, or modification of an object’s attributes, or creation or deletion of an object’s relationships to other objects.

**Supported Business Services**

**Consumed Contracts**

* Service Specification
* Resource Inventory Management Systems

**Exposed Contracts**

* Customer Order Management
* Service Order Management
* Service Problem Management
* Service Performance Management
* Service Level Agreement Management
* Service Quality Monitoring
* Revenue Assurance

### Service Order Management

**Application Identifier:** 6.3

**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 Business Services**

*To Be Added*

### Service Level Agreement Management (Deleted)

**Application Identifier:** 6.4 (This Application ID has been deliberately unused!)

### Service Problem Management

**Application Identifier:** 6.5

**Overview**

Service Problem Management applications are responsible for receiving service affecting customer problems as well as network troubles/faults, relating the various problems, and resolving them in an efficient manner.

**Functionality**

Service Problem Management functionality includes:

* Service Problem Reception
* Service Problem Analysis
* Service Problem Correction & Resolution
* Service Problem Tracking & Management
* Service Problem Reporting

**Supported Business Services**

*To Be Added*

### Service Quality Monitoring & Impact Analysis (Deleted)

**Application Identifier:** 6.6 (This Application ID has been deliberately unused!)

### Service Performance Management

**Application Identifier:** 6.7

**Overview**

Service Performance Management Applications monitor, analyze, and report on the end-end service performance. This can include a real-time, end-to-end view to ensure that each service is functioning correctly as well as 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-to-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 Business Services**

*To Be Added*

### Service Test Management

**Application Identifier:** 6.8

**Overview**

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

**Functionality**

Following are some of the capabilities of Resource Test Management:

* Service Test Strategy and Policy Management
* Service Test Lifecycle Management
* Service Test Command and Control
* Service Test Services

**Supported Business Services**

*To Be Added*

### Service Quality Management

**Application Identifier:** 6.9

**Overview**

Service Quality Management (SQM) applications are designed to allow operators to monitor and manage the levels of service they are delivering. Service quality measurements are collected and compared against established quality indicators, and the conclusions made available to interested parties.

**Functionality**

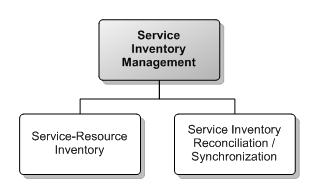
SQM applications are a major feed to service level agreement management applications. Key features include:

* Service Quality Model Establishment
* Service Quality Monitoring
* Service Quality Analysis
* Service Quality Reporting

**Supported Business Services**

*To Be Added*

## 6.2 Service Inventory Management



1. 6.2 Service Inventory Management

### Service Inventory Management

**Application Identifier:** 6.2

**Overview**

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**Functionality**

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**Service Inventory Update**

This function entails an external system requesting that the Service Inventory Management system update its inventory based on a provided collection of updates. The expectation is that the Service Inventory Management system 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 creation of an object, deletion of an object, or modification of an object’s attributes, or creation or deletion of an object’s relationships to other objects.

**Supported Business Services**

**Consumed Contracts**

* Service Specification
* Resource Inventory Management Systems

**Exposed Contracts**

* Customer Order Management
* Service Order Management
* Service Problem Management
* Service Performance Management
* Service Level Agreement Management
* Service Quality Monitoring
* Revenue Assurance

### Service-Resource Inventory

**Application Identifier:** 6.2.1

**Overview**

Service-Resource Inventory is a shared function between Service Inventory and Resource Inventory, and, depending on the needs of an individual organization, may be implemented in a Service Inventory Management system, a Resource Inventory Management system, some combination of both, or even in a standalone application which bridges the gap between Service and Resource Inventory Management.

Service-Resource Inventory entails managing the relationship between RFSes and the resources and resource domain managers which implement the services on the network. Resources may all be directly managed by the carrier’s Resource Inventory systems, or may also include references to resources from a Supplier/Partner asset management system.

Typically, this inventory does not track all possible network resources involved in delivery of the service (this is the realm of Resource Inventory Management systems themselves), but rather:

         Any stand-alone physical or logical resources whose assignment is critical to service fulfilment, and whose tracking is critical to service operations, assurance, and billing. Examples may include: modem or other special CPE equipment which may not be tracked directly as part of the provider network, static IP addresses and other network identifiers, etc.

         Assignment-level resources which represent a larger resource structure supporting the service, often referred to as an Access Point. Examples include: the ADSL DSLAM port assigned to a service, a data circuit service’s assigned customer facing router interface or subinterface, etc.

**** In some cases, the Service-Supporting Resource Inventory may also track the domain manager applications (e.g. Resource Inventory and/or Activation systems) which manage the resource in question, although in a mature SOA implementation, the Service-Supporting Resource Inventory can often be agnostic of which resource layer systems actually master the resource data.

**Functionality**

* Service-Resource Relationship Creation
* Service-Resource Relationship Update
* Service-Resource Relationship Update Notifications
* Service-Resource Relationship Deletion
* Service-Resource Relationship Retrieval
* Service-Resource Relationship Reconciliation / Synchronization

**Supported Business Services**

**Consumed Contracts**

* Service Specification
* Resource Inventory Management Systems

**Exposed Contracts**

* Customer Order Management
* Service Order Management
* Service Problem Management
* Service Performance Management
* Service Level Agreement Management
* Service Quality Monitoring
* Revenue Assurance

### Service Inventory Reconciliation / Synchronization

**Application Identifier:** 6.2.2

**Overview**

This function entails reconciliation of the data in a Service Inventory Management system with inventory discovered from another source and/or synchronization of mismatched service inventory records.

When new service inventory information is discovered, the Service Inventory Reconciliation / Synchronization system will try to match the newly discovered information with an entity or entities already existing in the Service Inventory.

If no match is found, the Service Inventory Reconciliation / Synchronization system will typically assume that a new entity has been discovered and add the entity to the inventory. Alternately, as decided by the service provider as part of their procedures, the Service Inventory Reconciliation system may record this event as an exception, implicitly or explicitly triggering a workflow to resolve the exception. For example, this may happen if the service provider always expects to have the planned service inventory in their Service Inventory Management systems before the actual services are activated.

If a match is found and there are no unexpected discrepancies, the Service Inventory Reconciliation / Synchronization system will update the inventory as needed. For example, records may be updated to fill in missing attributes or update attribute values which have changed. If a match is found and there are unexpected discrepancies, the Service Inventory Reconciliation system will typically raise an exception so that service provider personnel can correct the problem. Exceptions may be managed within the application itself, via a report, or via a generalized worklist tool.

**Functionality**

* Service instance comparison
* Service reconciliation exception management

**Supported Business Services**

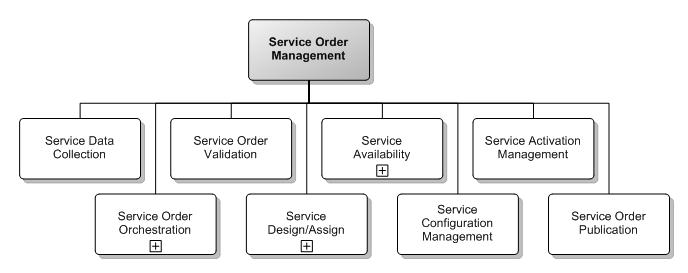
**Consumed Contracts**

* Service Specification
* Resource Inventory Management Systems

**Exposed Contracts**

* Customer Order Management
* Service Order Management
* Service Problem Management
* Service Performance Management
* Service Level Agreement Management
* Service Quality Monitoring
* Revenue Assurance

## 6.3 Service Order Management



1. 6.3 Service Order Management

### 

### Service Order Management

**Application Identifier:** 6.3

**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 Business Services**

*To Be Added*

### Service Data Collection

**Application Identifier:** 6.3.1

**Overview**

Service Order Data Collection applications gather any needed service data to aid in the verification and issuance of a complete and valid service order.

**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 Business Services**

*To Be Added*

### Service Order Validation

**Application Identifier:** 6.3.3

**Overview**

Service Order Validation applications provide the required functionality to validate a service order request.

**Functionality**

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

**Supported Business Services**

*To Be Added*

### Service Availability

**Application Identifier:** 6.3.5

**Overview**

Service Availability applications validate that the service or services are available and feasible at the specified customer/service location.

**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 Business Services**

*To Be Added*

### Service Activation Management

**Application Identifier:** 6.3.7

**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:

* Plan service activation- Access, plan and gather additional information for service activation
* Service configuration activation- Implement and activate the specific service configuration against the service configuration plan (including activation of CPE if part of the service offering)
* Activation notifications - Provide notifications on successful activation; in cases of exceptions send fallouts to Service Order Orchestration and manage rollbacks activities (if applicable)

**Supported Business Services**

*To Be Added*

### Service Order Orchestration

**Application Identifier:** 6.3.2

**Overview**

Service Order Orchestration applications provide workflow and orchestration of the service order across the Service Order Management area.

**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 Business Services**

*To Be Added*

### Service Design/Assign

**Application Identifier:** 6.3.4

**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 Business Services**

*To Be Added*

### Service Configuration Management

**Application Identifier:** 6.3.6

**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:

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

**Supported Business Services**

*To Be Added*

### Service Order Publication

**Application Identifier:** 6.3.8

**Overview**

Service Order Publication applications issue valid and complete service orders, and stores the order into an appropriate data store.

**Functionality**

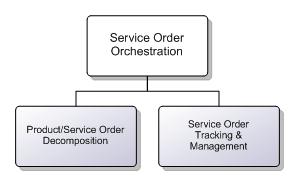
The Service Order Publication application issues valid and complete service orders, and stores the order into an appropriate data store.

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 Business Services**

*To Be Added*

## 6.3.2 Service Order Orchestration



1. 6.3.2 Service Order Orchestration

### Service Order Orchestration

**Application Identifier:** 6.3.2

**Overview**

Service Order Orchestration applications provide workflow and orchestration of the service order across the Service Order Management area.

**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 Business Services**

*To Be Added*

### Product/Service Order Decomposition

**Application Identifier:** 6.3.2.1

**Overview**

Product/Service Order Decomposition applications decompose product orders into service orders, and a service order into resource order requests, and then distributes each request to perform the work.

**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 Business Services**

*To Be Added*

### Service Order Tracking & Management

**Application Identifier:** 6.3.2.2

**Overview**

Service Order Tracking & Management applications provide the functionality necessary to track and manage the distributed requests decomposed by Product/Service Order Decomposition.

**Functionality**

The Service Order Tracking & Management application performs the following:

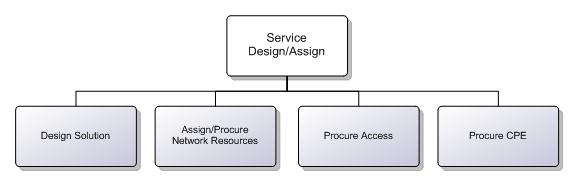
* Oversees the transfer of Service Order Requests to appropriate resource providers.
* Tracks the various resource orders until completed.
* Raises jeopardies as appropriate if specified dates and milestones are not met, and escalates jeopardies to appropriate management levels.
* Completes the service 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 Business Services**

*To Be Added*

## 6.3.4 Service Design/Assign



1. 6.3.4 Service Design/Assign

### Service Design/Assign

**Application Identifier:** 6.3.4

**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 Business Services**

*To Be Added*

### Design Solution

**Application Identifier:** 6.3.4.1

**Overview**

Design Solution applications determine the end to end service design.

**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 Business Services**

*To Be Added*

### Assign/Procure Network Resources

**Application Identifier:** 6.3.4.2

**Overview**

Assign/Procure Resources applications determine facility and equipment availability.

**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 Business Services**

*To Be Added*

### Procure Access

**Application Identifier:** 6.3.4.3

**Overview**

Procure Access applications obtain access paths to the customer or service location.

**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 Business Services**

*To Be Added*

### Procure CPE

**Application Identifier:** 6.3.4.4

**Overview**

Procure CPE applications determine customer premise equipment needs and availability as well as assign assets or orders CPE.

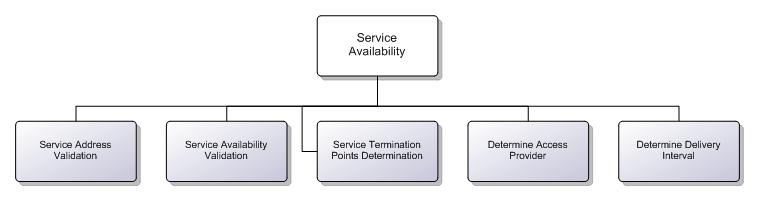
**Functionality**

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 Business Services**

*To Be Added*

## 6.3.5 Service Availability



1. 6.3.5 Service Availability

### Service Availability

**Application Identifier:** 6.3.5

**Overview**

Service Availability applications validate that the service or services are available and feasible at the specified customer/service location.

**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 Business Services**

*To Be Added*

### Service Address Validation

**Application Identifier:** 6.3.5.1

**Overview**

Service Address Validation applications validate the service address against appropriate address databases.

**Functionality**

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

**Supported Business Services**

*To Be Added*

### Service Availability Validation

**Application Identifier:** 6.3.5.2

**Overview**

Service Availability Validation applications validate that the service is available and supportable at the requested location.

**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 Business Services**

*To Be Added*

### Service Termination Points Determination

**Application Identifier:** 6.3.5.3

**Overview**

Service Termination Points Determination applications determine the appropriate service provider entry point.

**Functionality**

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

**Supported Business Services**

*To Be Added*

### Determine Access Provider

**Application Identifier:** 6.3.5.4

**Overview**

Determine Access Provider applications identify and select available access providers or access technology at the given location.

**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 Business Services**

*To Be Added*

### Determine Delivery Interval

**Application Identifier:** 6.3.5.5

**Overview**

The Determine Delivery Interval applications calculate the service delivery due date.

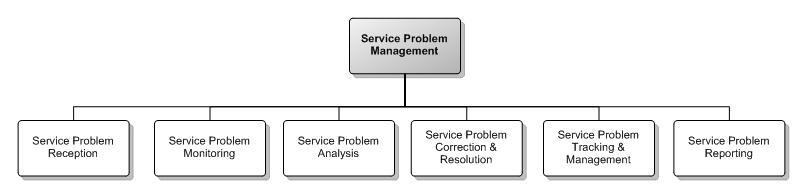
**Functionality**

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 Business Services**

*To Be Added*

## 6.5 Service Problem Management



1. 6.5 Service Problem Management

### Service Problem Management

**Application Identifier:** 6.5

**Overview**

Service Problem Management applications are responsible for receiving service affecting customer problems as well as network troubles/faults, relating the various problems, and resolving them in an efficient manner.

**Functionality**

Service Problem Management functionality includes:

* Service Problem Reception
* Service Problem Analysis
* Service Problem Correction & Resolution
* Service Problem Tracking & Management
* Service Problem Reporting

**Supported Business Services**

*To Be Added*

### Service Problem Reception

**Application Identifier:** 6.5.1

**Overview**

Service Problem Reception applications provide appropriate functionality to receive problems that are perceived to be service affecting.

**Functionality**

Service Problem Reception applications provide appropriate functionality to receive customer problems that are perceived to be service affecting as well as resource troubles (faults).

**Supported Business Services**

*To Be Added*

### Service Problem Monitoring

**Application Identifier:** 6.5.2

**Overview**

Service Problem Monitoring applications provide the necessary functionality to monitor the operational status of the provider's services.

**Functionality**

Service Problem Monitoring applications are responsible for displaying the operational status of services. These applications are responsible for collecting the status messages and correlating them to service topology and comparing the availability against established service level agreements.

**Supported Business Services**

*To Be Added*

### Service Problem Analysis

**Application Identifier:** 6.5.3

**Overview**

Service Problem Analysis applications provide necessary functionality to diagnose the service problem.  The application will also correlate customer problems with resource troubles, and prioritize the problem appropriately.

**Functionality**

Service Problem Analysis applications provide necessary functionality to diagnose the service problem.  This may involve:

* Verification that the service configuration matches the product features
* Correlation and consolidation of the various customer problems and resource troubles into a single root service problem
* Prioritization of currently open service problems, giving consideration to problem impact, service level agreement, etc.
* Issuing service tests, including one time tests or a series of tests over a period of time.
* Analysis of test results
* Analysis of relevant fault of performance data
* Analysis of customer problem information

**Supported Business Services**

*To Be Added*

### Service Problem Correction & Resolution

**Application Identifier:** 6.5.4

**Overview**

Service Problem Correction & Resolution applications provide the necessary functionality resolve the serve problem back to a normal operational state as efficiently as possible.

**Functionality**

Service Problem Correction & Resolution applications provide the necessary functionality resolve the serve problem back to a normal operational state as efficiently as possible.

This may involve automated or manual restoration activities.  It may also reconfiguration, re-assignments, temporary work-arounds, and/or dispatches of field technicians.

**Supported Business Services**

*To Be Added*

### Service Problem Tracking & Management

**Application Identifier:** 6.5.5

**Overview**

Service Problem Tracking & Management applications provide necessary functionality to assure that service problems are remedied as efficiently as possible.

**Functionality**

Service Problem Tracking & Management applications provides necessary functionality to assure that service problems are assigned, coordinated, and restored efficiently, escalating as needed.

**Supported Business Services**

*To Be Added*

### Service Problem Reporting

**Application Identifier:** 6.5.6

**Overview**

Service Problem Reporting applications provide the necessary functionality to report on the status of open service problems.

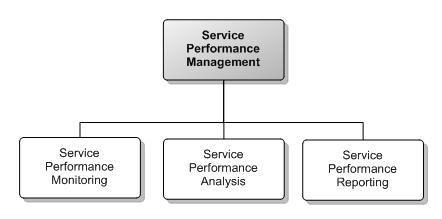
**Functionality**

Service Problem Reporting applications provide the necessary functionality to report on the status of open service problems.  This includes operational reports, management reports, reports against various metrics, as well as information needed by other BSS or OSSes.

**Supported Business Services**

*To Be Added*

## 6.7 Service Performance Management



1. 6.7 Service Performance Management

### Service Performance Management

**Application Identifier:** 6.7

**Overview**

Service Performance Management Applications monitor, analyze, and report on the end-end service performance. This can include a real-time, end-to-end view to ensure that each service is functioning correctly as well as 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-to-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 Business Services**

*To Be Added*

### Service Performance Monitoring

**Application Identifier:** 6.7.1

**Overview**

Service Performance Monitoring applications provide the necessary functionality to collect data and monitor the performance of the service provider's services.

**Functionality**

Service Performance Monitoring applications provide functionality to collect data and monitor the performance of the service provider's services.  Functionality includes:

* Service performance data collection, including end-to-end service data
* Collection of relevant resource data
* Service performance monitoring data accumulation
* Service performance event correlation and filtering
* Service Data aggregation and trending

**Supported Business Services**

*To Be Added*

### Service Performance Analysis

**Application Identifier:** 6.7.2

**Overview**

Service Performance Analysis applications provide the necessary functionality to analyze the performance of the various service providers’ services.

**Functionality**

Service Performance Analysis applications provide the necessary functionality to analyze the performance of the various service providers’ services.  This includes:

* Analyzing performance data received from Service Performance Monitoring, considering service topology
* Determining the root causes of service performance degradations
* Provide recommendations for performance improvements

**Supported Business Services**

*To Be Added*

### Service Performance Reporting

**Application Identifier:** 6.7.3

**Overview**

Service Performance Reporting provides the necessary functionality required to generate reports about the performance of the service provider's services.

**Functionality**

Service Performance Reporting provides the necessary functionality required to generate reports about the performance of the service provider's services.

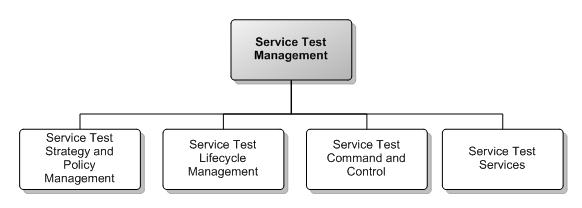
These reports may be generated as part of the normal periodic operations ("scheduled"), or may be as a result of a specific analysis request ("in-demand").  Report types include near real time, historical view, and trend analysis.

Relevant performance reports are also provided to service/network planning to perform network updates.

**Supported Business Services**

*To Be Added*

## 6.8 Service Test Management



1. 6.8 Service Test Management

### Service Test Management

**Application Identifier:** 6.8

**Overview**

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

**Functionality**

Following are some of the capabilities of Resource Test Management:

* Service Test Strategy and Policy Management
* Service Test Lifecycle Management
* Service Test Command and Control
* Service Test Services

**Supported Business Services**

*To Be Added*

### Service Test Strategy and Policy Management

**Application Identifier:** 6.8.1

**Overview**

Service Test Strategy and Policy Management applications provides the necessary functionality to manage the rules that define the strategies for conducting various service tests.

**Functionality**

Service Test Strategy and Policy Management applications provide the necessary functionality to manage the local rules that define the strategies for conducting a test as well as how the test results should be interpreted.

Strategies can range from simple to complex.

Additional functionality includes providing:

* Test rules defining the strategies for carrying out the test
* Policies on interpretation of test results.

**Supported Business Services**

*To Be Added*

### Service Test Lifecycle Management

**Application Identifier:** 6.8.2

**Overview**

Service Test Lifecycle Management applications provides the necessary functionality to manage the end-to-end lifecycle of a test of a resource.

**Functionality**

Service Test Lifecycle Management applications provides the necessary functionality to manage the end-to-end lifecycle of a test of a service.

Functionality includes:

* scheduling
* retrieval of appropriate inventory data
* setting up the test configuration
* acquisition and management of test resources
* test execution
* tear down of the test configuration
* test results interpretation
* reporting of test results back to the client
* management of service testing rules

**Supported Business Services**

*To Be Added*

### Service Test Command and Control

**Application Identifier:** 6.8.3

**Overview**

The Service Test Command and Control application provides the necessary functionality to access, command, and control the devices required for service testing.

**Functionality**

The Service Test Command and Control application provides the necessary functionality to:

* Access the various service test devices
* Command and control the various service test devices required to perform service testing

**Supported Business Services**

*To Be Added*

### Service Test Services

**Application Identifier:** 6.8.4

**Overview**

Service Test Services applications provides the means to access the testing capabilities.

**Functionality**

Service Test Services applications provides the means to access the testing capabilities.  They include both a means to perform manual testing via a user interface (GUI) as well as a means to initiate a test from another system (a set of APIs).

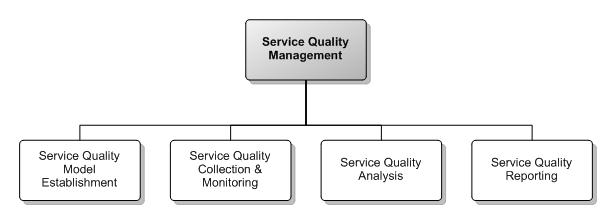
Additional functionality includes:

* Automated invocation of a test and retrieval of results
* Manual test initiation and control

**Supported Business Services**

*To Be Added*

## 6.9 Service Quality Management



1. 6.9 Service Quality Management

### Service Quality Management

**Application Identifier:** 6.9

**Overview**

Service Quality Management (SQM) applications are designed to allow operators to monitor and manage the levels of service they are delivering. Service quality measurements are collected and compared against established quality indicators, and the conclusions made available to interested parties.

**Functionality**

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

* Service Quality Model Establishment
* Service Quality Monitoring
* Service Quality Analysis
* Service Quality Reporting

**Supported Business Services**

*To Be Added*

### Service Quality Model Establishment

**Application Identifier:** 6.9.1

**Overview**

Service Quality Model Establishment applications provide the necessary functionality to establish what will be monitored and how it will be monitored in terms of service quality.

**Functionality**

Service Quality Model Establishment functionality includes:

* Definition of the service quality model and its dependencies
* Establishment of KQIs and SLOs
* Accepting input from customer contracts or service definitions.
* Establishment of data sources for monitoring of the above

**Supported Business Services**

*To Be Added*

### Service Quality Collection & Monitoring

**Application Identifier:** 6.9.2

**Overview**

Service Quality Collection & Monitoring applications provide the necessary functionality to collect and monitor service quality as determined by Service Quality Model Establishment.

**Functionality**

Service Quality Collection & Monitoring collects service quality related information from established sources, including service performance management, service problem management, third parties, and customers.

**Supported Business Services**

*To Be Added*

### Service Quality Analysis

**Application Identifier:** 6.9.3

**Overview**

Service Quality Analysis applications analyze and evaluate the quality of services being delivered by the service provider.

**Functionality**

Service Quality Analysis functionality includes the following:

* Analysis of the service quality data collected by Service Quality Monitoring
* Comparison of the collected data to the KQIs and SLOs established by SQM Establishment.
* Evaluate the service quality trends over time
* Provide conclusions to relevant areas to make improvements
* Correlation of information from various sources to determine root cause and impact

**Supported Business Services**

*To Be Added*

### Service Quality Reporting

**Application Identifier:** 6.9.4

**Overview**

Service Quality Reporting applications generate various reports on service quality and makes them available for consumption.

**Functionality**

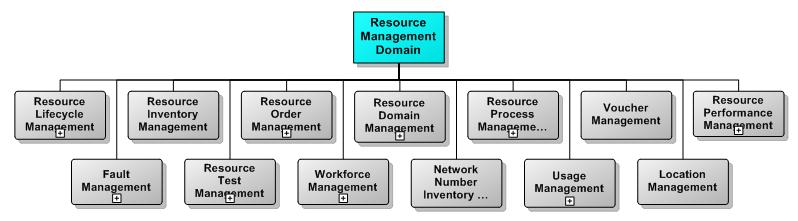
Service Quality Reporting applications generate various reports on service quality and makes them available for consumption.

Service Quality Reporting also supplies visual aids to both customers and operators to glean information about service quality impacts.

**Supported Business Services**

*To Be Added*

# 7. Resource Management Domain



1. 7. Resource Management Domain

### Resource Lifecycle Management

**Application Identifier:** 7.1

**Overview**

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 Business Process Framework.

Eight specialist resource development and management applications are proposed here, in order to their normal sequencing.

1.     Strategic Planning

2.     Capability Specification

3.     Tactical Planning

4.     Resource Specification

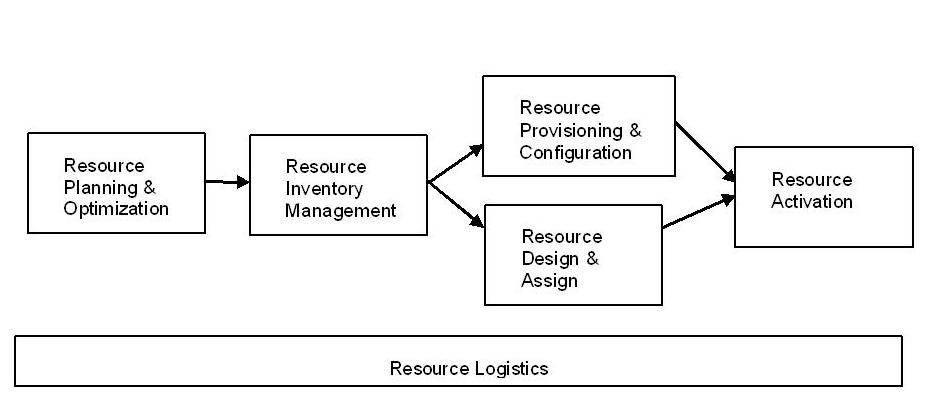
5.     Implementation Planning

6.     Planning Design Automation

7.     Spares & Warehouse Inventory

8.     Resource Commissioning & Configuration

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.



***Resource Fulfillment Process***

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

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Resource Inventory Management

**Application Identifier:** 7.2

**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 server, applications, 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; passive resources including cable pairs and external plant and passive 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.). A critical aspect of this is the recording of what resources are consumed by service instances at the physical and technology layers.

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 Business Services**

*To Be Added*

### Resource Order Management

**Application Identifier:** 7.3

**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 Business Services**

*To Be Added*

### Resource Domain Management

**Application Identifier:** 7.4

**Overview**

*To Be Added*

**Functionality**

The basic concept is to define resource domains that expose consistent services (NGOSS Implementation Contracts) to other Application Map 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 Application Map 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 Application Map 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 Business Services**

*To Be Added*

### Resource Process Management (Workflow/Integration)

**Application Identifier:** 7.5

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Voucher Management

**Application Identifier:** 7.6

**Overview**

The Voucher management application handles all aspects of prepaid recharge vouchers. A voucher has a unique serial number and may have a PIN code by which it is identified. The PIN code may be covered, and scratched off in order to use the voucher. Other forms of vouchers include e-vouchers that may have a pin generated only after activation. Customers can use vouchers to recharge their balances by various methods including contacting the call center and providing the CSR with the voucher or via self-service system

The application performs automation of the voucher lifecycle, and should support a wide variety of voucher types. Voucher Management should also provide encryption, voucher tracking, as well as address fraud and handle various distribution channels. As such voucher can be placed on the entire gamut of the Resources Domain with strong affiliation to the Billing vertical because of the monetary value of the vouchers

**Functionality**

Voucher Management Applications generally provide the following functionality:

* Voucher Ordering – including the ability to generate, modify, authorize and associate a PIN with serial numbers Dispatch the order to the manufacturer
* Voucher Distribution to dealers- shipment and validation of reception of actual vouchers
* Voucher Life Cycle Management- activation, locking, expiration and maintenance of purchased vouchers
* Reporting- Various querying and reporting of related data

**Supported Business Services**

*To Be Added*

### Billing Data Mediation (Deleted)

**Application Identifier:** 7.7 (This Application ID has been deliberately unused!)

**Overview**

This application was deleted and replaced by Usage Management.

### Real-time Billing Mediation (Deleted)

**Application Identifier:** 7.8 (This Application ID has been deliberately unused!)

**Overview**

This application was deleted and replaced by Usage Management.

### Resource Performance Management

**Application Identifier:** 7.9

**Overview**

Resource Performance Management applications monitor, analyze, and report on the performance of the service provider's resources.

**Functionality**

Resource Performance Management includes the following:

* Resource Performance Monitoring
* Resource Performance Analysis
* Resource Performance Management Reporting

**Supported Business Services**

*To Be Added*

### Fault Management

**Application Identifier:** 7.10

**Overview**

Fault Management applications provide necessary functionality to manage faults associated with specific resources. This includes the detection, isolation, resolution, and reporting of various faults.

**Functionality**

Fault Management applications are responsible for the management of faults, or troubles, associated with the service provider's resources.  Functionality includes:

* Fault Monitoring
* Fault Correlation & Root Cause Analysis
* Fault Correction & Restoration
* Fault Reporting & Analytics

**Supported Business Services**

*To Be Added*

### Resource Test Management

**Application Identifier:** 7.11

**Overview**

Resource Test Management applications are focused on ensuring that the various resources are working properly. The resource test applications are part of both the fulfillment and the assurance process. In the fulfillment process, the resource test 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. As part of the testing process, these applications also interface with the trouble process, which can trigger an automatic test.

**Functionality**

Following are some of the capabilities of Resource Test Management:

* Resource Test Strategy and Policy Management
* Resource Test Lifecycle Management
* Resource Test Command and Control
* Resource Test Services

**Supported Business Services**

*To Be Added*

### Workforce Management

**Application Identifier:** 7.12

**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 resources in areas of service assurance, provisioning, routine work, and preventive maintenance.

**Functionality**

Workforce Management applications provide the following:

* Workforce Schedule Management
* Work Order Analysis
* Work Order Assignment & Dispatch
* Work Order Tracking & Management
* Workforce Management Reporting
* Workforce Configuration and Setup

**Supported Business Services**

*To Be Added*

### Network Number Inventory Management

**Application Identifier:** 7.13

**Overview**

Network Number Inventory Management provides the required functionality to manage dialable (telephone numbers) and non-dialable (network routing number) numbers. It can include both land-line and mobility numbers. It also handles ip type addresses (V4 or V6) along with any other network numbers of interest to a service provider.  Numbers can be private or public.

**Functionality**

Network Number Inventory Management functionality includes the following:

* Number Acquisition & Inventory Establishment
* Number Search
* Number Reservation
* Number Assignment
* Number Aging
* Number Tracking and Reporting

**Supported Business Services**

*To Be Added*

### Usage Management

**Application Identifier:** 7.14

**Overview**

Usage Management is the conduit for usage events from the network to various processes such as billing, legal compliance, and service assurance. Network usage event records are collected/processed, edited, correlated, enriched, formatted and distributed to upstream systems.

The Usage Management function supports both session and event based charging in both batch and real-time. Usage event records that are found to have errors are processed per business rules.

**Functionality**

Usage Management functionality includes:

* Usage Events Processing
* Usage Events Error Management

**Supported Business Services**

*To Be Added*

### Location Management

**Application Identifier:** 7.15

**Overview**

Location Management provides the required functionality to manage the physical and logical attributes of location data for the service provider.  It can include addresses (street, city, state/province, & country), geospatial information (lat/long), as well as common code information (such as CLLI - Common Language Location Identifier).  This location inventory can include both customer location data as well as service provider location data (anything of interest to the service provider to support their operational needs).

**Functionality**

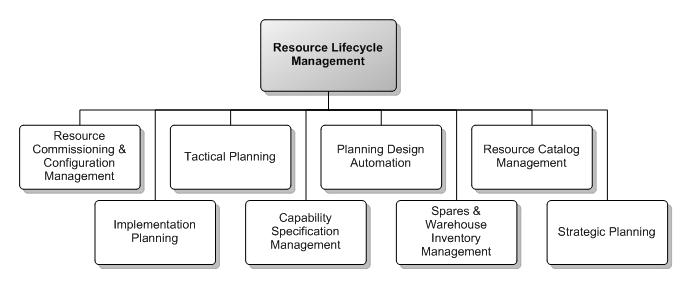
The common capabilities of Location Management applications include:

* Location structure customization – Location management application should provide facilities for creating, modifying and deleting data structures according to business rules of Service Providers or national and international location regulations. Also utilities for defining sets of location attributes, levels and hierarchies should be available.
* Location search – the ability to search for a provided location/address, including the ability to return near matches if an exact match is not found.
* Repository integrity – ability to maintain data integrity in the whole location repository. It’s especially important if there are many external data sources that deliver new addresses for the repository.
* Location replenishment – means to update the repository with new/updated location information from external sources.
* Location profiling – application should generate different views for different business cases (e.g. different format of address strings)
* Change history – tracking all changes of location data, making available attributes according their historical values in certain periods.

**Supported Business Services**

*To Be Added*

## 7.1 Resource Lifecycle Management



1. 7.1 Resource Lifecycle Management

### Resource Lifecycle Management

**Application Identifier:** 7.1

**Overview**

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 Business Process Framework.

Eight specialist resource development and management applications are proposed here, in order to their normal sequencing.

1.     Strategic Planning

2.     Capability Specification

3.     Tactical Planning

4.     Resource Specification

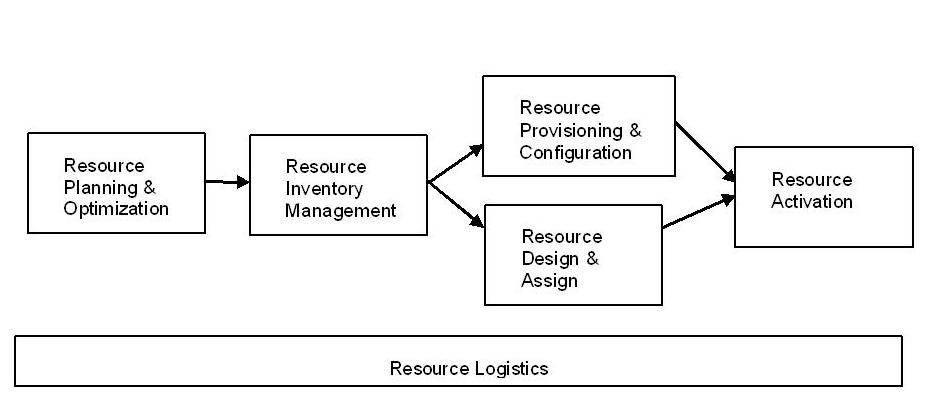
5.     Implementation Planning

6.     Planning Design Automation

7.     Spares & Warehouse Inventory

8.     Resource Commissioning & Configuration

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.



***Resource Fulfillment Process***

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

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Resource Commissioning & Configuration Management

**Application Identifier:** 7.1.1

**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:

* Resource commissioning process - Manage the commissioning process of a resource and ensuring that operational status are configured
* Resource Configuration Management - Database and manage the configuration of the individual resources
* Resource Configuration Logs - Record the history of configuration changes
* Resource Configuration Verification Versus Design - Work with other applications like discovery Application to ensure that the resource configuration matches the designed configuration
* Resource Topology Verification Versus Inventory Mgmt. Systems - 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 Business Services**

*To Be Added*

### Implementation Planning

**Application Identifier:** 7.1.2

**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 provide the following:

* Implement Tactical Plans Locally - implement tactical plans locally at individual CSP sites and at street level.
* Provide Physical Implementation Information - provide levels of implementation details that tactical planning does not need to specify, such as duct routes and the frame appearances of device ports.

Identify Shortfalls in Physical Infrastructure - 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.

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

**Supported Business Services**

To be determined by the NGOSS Contract Implementation Program

### Tactical Planning

**Application Identifier:** 7.1.3

**Overview**

Tactical Planning predominately supports the Operations Support and Readiness area of the Business Process Framework.

**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 Application Map 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.

* Implementing Strategic plans at All Technology Layers- Implementing strategic plans at all technology layers. This is the major internal planning role and is reactive to Strategic Planning
* Support Network Rearrangement- Network rearrangement to support planned engineering works. This is an additional, significant internal planning role.
* Remedial Relocation of Network Capacity in Response to Unpredicted Demand- 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- Detailed design and implementation of interconnect with other operators
* Reactive Planning for Fulfillment- Planning reactive to Fulfillment to deploy capacity required for individual services to customers, building access network on demand as required.
* Reactive Planning for Fault Mgmt.- Planning reactive to Fault Management in order to support network repair
* Reactive Planning for Performance Management - Planning reactive to Performance Management in order 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 Business Services**

*To Be Added*

### Capability Specification Management

**Application Identifier:** 7.1.4

**Overview**

This application involves the creation, editing, storage and retrieval of capability specifications. The capability specifications represent the general, common and invariant characteristics of resource that may be realized in more than one type of specific resource. Examples of capability are Layer2, Data, radio and Transport. These specifications are used in the creation of new capability instances mainly in Strategic Planning and are further specified into Resource Instances by Tactical and Implementation Planning.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Planning Design Automation

**Application Identifier:** 7.1.5

**Overview**

‘Planning Design Automation’ is an additional, value-add application, which should also be part of Application Map, but is not present in Application Map r2. It provides automation for both Tactical and Strategic Planning.

**Functionality**

Planning Design Automation provides significant support for Planning as follows

* Applies algorithmic and heuristic analysis of the network - Applies algorithmic and heuristic analysis of the network, to suggest network-wide or local optimizations.

Such applications make use of market forecasts and utilization trends and can be used to optimize the network for capacity and resilience. It provides design automation and complex analysis for both Strategic and Tactical Planning.

* Use Generalized Capability View of the Network- Use a more generalised view of the network than found in Resource Management

Such systems do not deal with device detail, but the general capability provided by the resource, such as transport, data and physical plant. This also helps the analytical engines cope with the volume of data required to represent large networks.

Design Automation is often considered to be part of Strategic Planning, but this is an oversimplification. Strategic Planning does benefit from automation in order, for example, to determine the optimum topology of a green field national, where geography and population distribution need to be taken into account. However, it is entirely possible to operate Strategic Planning processes without Design Automation, as is true with Tactical Planning. In fact much of both planning areas have in the past been operated largely without support from Design Automation applications. Design automation supports Tactical Planning with optimization functions, such as optimizing for capacity or resilience, automated traffic engineering and traffic load balancing in data networks and among server platforms.

* Supports forecasting functionality

This can be applied at different levels of detail and over different time frames. Some types of forecast are more relevant to Strategic and others more relevant to Tactical Planning. Both product volume forecasts and utilization trends are relevant to this automation function.

**Supported Business Services**

*To Be Added*

### Spares & Warehouse Inventory Management

**Application Identifier:** 7.1.6

**Overview**

*To Be Added*

**Functionality**

Key Functions:

* Database of all spares -Capacity Management and optionally interface to Asset Tracking
* Barcode/RFID 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 Business Services**

*To Be Added*

### Resource Catalog Management

**Application Identifier:** 7.1.7

**Overview**

Resource Catalog Management is a realization of the Cross domain Catalog Management application in the Resource Domain. The applications are repositories of resource listing within a service provider and include the ability to design, create, augment and map new entities and supporting data. The type of catalog management application is an implementation choice of the enterprise.

Since resource catalogs usually contain a verity of resource types such as directory numbers, addresses, cables and network devices they would typicality be a standalone implementations covering the basic functionalities in Cross Domain, The layering relation between the service and resource catalog will be realized in the other Resource Lifecycle Applications.

See: Cross Domain- Catalog Management for more information.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Strategic Planning

**Application Identifier:** 7.1.8

**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 the Business Process Framework.

**Functionality**

Such systems are used as follows.

* Analyze demand forecasts and utilization trends
* Determine optimum network deployments -Determine optimum network deployments, such as tier structuring and resilient topologies.
* Support Strategic Network Sizing Decisions -Support strategic decisions as to which locations and which links to grow or shrink across the network
* Determine 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.

* Introduce new technologies into the network
* Determine Network vendors, Devices and Configuration - Determine which vendors are to be used, which vendor devices are to be purchased and the configurations of those devices that will be deployed.
* Determine the role of different technologies in the network.

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.

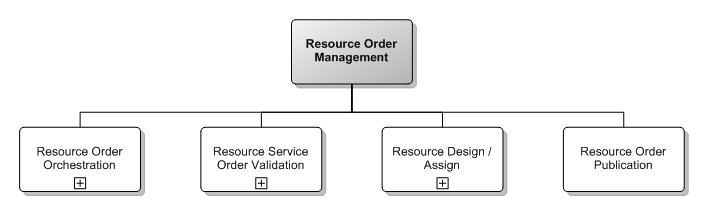
* Specify the Generalized Resource Device and Technology Requirements- Specify the resource device and technologies in sufficient detail to enable Tactical Planning to create device and technology instances.
* Support Radio Spectrum Allocation- Support Radio spectrum allocation a specialist area within Strategic Planning.
* Determining interconnect sites and capacity to other CSPs -
* Support Strategic Data Centre locations, sizing, interconnectivity and resilience
* Selection of application server vendors and infrastructure applications, such as those found in IMS.
* Support Partner Management with volume requirements- Support Partner Management to ensure that network vendors are aware of the changes in demand that a change in CSP strategy will make on them.

This aspect of Partner Management 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 Business Services**

To be determined by the NGOSS Contract Implementation Program.

## 7.3 Resource Order Management



1. 7.3 Resource Order Management

### Resource Order Management

**Application Identifier:** 7.3

**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 Business Services**

*To Be Added*

### Resource Order Orchestration

**Application Identifier:** 7.3.1

**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 Business Services**

*To Be Added*

### Resource Service Order Validation

**Application Identifier:** 7.3.2

**Overview**

Resource Service Order Validation applications provide the required functionality to validate a resource order request.

**Functionality**

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

**Supported Business Services**

*To Be Added*

### Resource Design / Assign

**Application Identifier:** 7.3.3

**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 - Physical, logical, and software design of resources including definition of configuration variables and initial parameters.
* Graphical Resource Presentation- Graphical presentation and visualization of resources, interconnections, or topology
* End-to-end resource design - 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 Business Services**

*To Be Added*

### Resource Order Publication

**Application Identifier:** 7.3.4

**Overview**

Resource Order Publication applications issue valid and complete resource orders, and stores the order into an appropriate data store.

**Functionality**

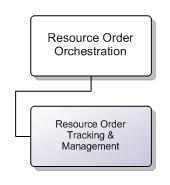
The Resource Order Publication application issues valid and complete resource orders, and stores the order into an appropriate data store.

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 Business Services**

*To Be Added*

## 7.3.1 Resource Order Orchestration



1. 7.3.1 Resource Order Orchestration

### Resource Order Orchestration

**Application Identifier:** 7.3.1

**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 Business Services**

*To Be Added*

### Resource Order Tracking & Management

**Application Identifier:** 7.3.1.1

**Overview**

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

**Functionality**

The Resource Order Tracking & Management application performs the following:

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

**Supported Business Services**

*To Be Added*

## 7.3.2 Resource Service Order Validation



1. 7.3.2 Resource Service Order Validation

### Resource Service Order Validation

**Application Identifier:** 7.3.2

**Overview**

Resource Service Order Validation applications provide the required functionality to validate a resource order request.

**Functionality**

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

**Supported Business Services**

*To Be Added*

### Resource Order Data Collection

**Application Identifier:** 7.3.2.1

**Overview**

Resource Order Data Collection applications gather any needed resource data to aid in the verification and issuance of a complete and valid resource order.

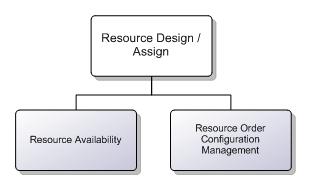
**Functionality**

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 Business Services**

*To Be Added*

## 7.3.3 Resource Design / Assign



1. 7.3.3 Resource Design / Assign

### Resource Design / Assign

**Application Identifier:** 7.3.3

**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 - Physical, logical, and software design of resources including definition of configuration variables and initial parameters.
* Graphical Resource Presentation- Graphical presentation and visualization of resources, interconnections, or topology
* End-to-end resource design - 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 Business Services**

*To Be Added*

### Resource Availability

**Application Identifier:** 7.3.3.1

**Overview**

Resource Availability applications validate that the resource or resources specified on the resource order are available at the specified customer/service location.

**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
* Determination of delivery interval

**Supported Business Services**

*To Be Added*

### Resource Order Configuration Management

**Application Identifier:** 7.3.3.2

**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**

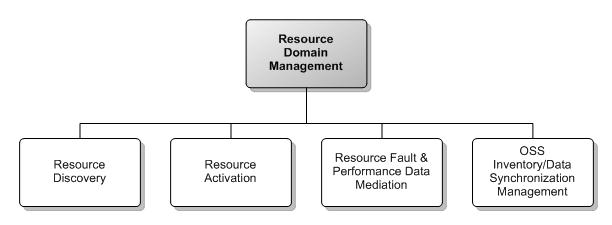
The Resource Configuration Management application generates a resource plan to fulfill a resource order. This includes the following:

* Resource Parameter allocation- Allocating the right resource parameters to fulfill resource orders
* Resource Parameter reservation- Reserve the right resource parameters based on resource specification and resource inventory
* Update of Resource Inventory- Update information in the resource inventory as to configuration of specific resources
* Compose a resource configuration plan- 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
* Cross Resource Considerations- Appropriately consider cross resource dependencies as part of the above configuration activities.

**Supported Business Services**

*To Be Added*

## 7.4 Resource Domain Management



1. 7.4 Resource Domain Management Applications

### Resource Domain Management

**Application Identifier:** 7.4

**Overview**

*To Be Added*

**Functionality**

The basic concept is to define resource domains that expose consistent services (NGOSS Implementation Contracts) to other Application Map 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 Application Map 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 Application Map 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 Business Services**

*To Be Added*

### Resource Discovery

**Application Identifier:** 7.4.1

**Overview**

The resource Discovery applications are responsible for automatically discovering the resources and their details through a 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 Business Services**

*To Be Added*

### Resource Activation

**Application Identifier:** 7.4.2

**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 Business Services**

*To Be Added*

### Resource Fault & Performance Data Mediation

**Application Identifier:** 7.4.3

**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 Business Services**

*To Be Added*

### OSS Inventory/Data Synchronization Management

**Application Identifier:** 7.4.4

**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**

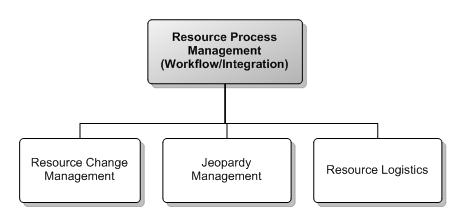
OSS Inventory/Data Synchronization Management represents the applications that ensure OSS Inventory data generated in each application is available to other applications as required. OSS Inventory will contain at least resource capacity and service utilization modeling. The synchronization may not be 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 Application Map 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 Application Map 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 Business Services**

*To Be Added*

## 7.5 Resource Process Management (Workflow/Integration)



1. 7.5 Resource Process Management (Workflow/Integration)

### Resource Process Management (Workflow/Integration)

**Application Identifier:** 7.5

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Resource Change Management

**Application Identifier:** 7.5.1

**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**

This is required to develop and implement planning.

* Provides the orchestration between planning duties and to manual network engineering activities
* Interfaces to Workforce Management
* Supports interface to financial control in order to authorize the expenditure - Supports interface to financial control in order to authorize the expenditure required to purchase the required resources.
* Supports links to vendors ERP- via B2B portals and to internal network engineering duties for in-station and street activities
* Support project management of build projects
* Coordinate project activities with the suppliers
* Provide jeopardy management
* Support collaborative project management across business boundaries,

These functions 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 Business Services**

*To Be Added*

### Workforce Management (Deleted)

**Application Identifier:** 7.5.2 (This Application ID is intentionally unused)

**Overview**

The Workforce Management TAM Application has been promoted to L1, and the L2

has been deleted.

### Jeopardy Management

**Application Identifier:** 7.5.3

**Overview**

This is a function that should be found in any process or workflow management system and warns when a delay in the due date of a task or process step will prevent subsequent tasks from starting, or affect the overall end date of the process.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Resource Logistics

**Application Identifier:** 7.5.4

**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**

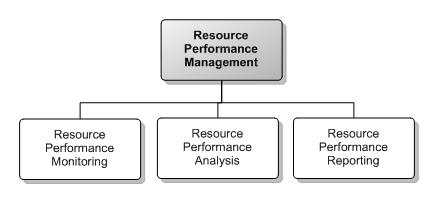
Key functions of resource logistics applications are:

* 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 - workforce management (preventative maintenance, change management)
* Resource problem management (fault management)
* Resource Need Identification- resource logistics applications output to supply chain management applications to identify resource needs and order placement.

**Supported Business Services**

*To Be Added*

## 7.9 Resource Performance Management



1. 7.9 Resource Performance Management

### Resource Performance Management

**Application Identifier:** 7.9

**Overview**

Resource Performance Management applications monitor, analyze, and report on the performance of the service provider's resources.

**Functionality**

Resource Performance Management includes the following:

* Resource Performance Monitoring
* Resource Performance Analysis
* Resource Performance Management Reporting

**Supported Business Services**

*To Be Added*

### Resource Performance Monitoring

**Application Identifier:** 7.9.1

**Overview**

Resource Performance Monitoring applications provide functionality to support data collection and performance monitoring of the service provider's resources.

**Functionality**

Resource Performance Monitoring applications provide functionality to support data collection and performance monitoring of the service provider's resources.  Functionality includes:

* Performance data collection, including near-real time.
* Performance monitoring data accumulation
* Performance event correlation and filtering
* Data aggregation and trending

**Supported Business Services**

*To Be Added*

### Resource Performance Analysis

**Application Identifier:** 7.9.2

**Overview**

Resource Performance Analysis applications provide the necessary functionality to analyze the performance of the various service provider's resources.

**Functionality**

Resource Performance Analysis applications provide the necessary functionality to analyze the performance of the various service provider's resources.  This includes:

* Analyzing performance data received from Resource Performance Monitoring
* Determining the root causes of resource performance degradations
* Provide recommendations for performance improvements and trend analysis

**Supported Business Services**

*To Be Added*

### Resource Performance Reporting

**Application Identifier:** 7.9.3

**Overview**

Resource Performance Reporting provides the functionality required to generate reports about the performance of the service provider's resources.

**Functionality**

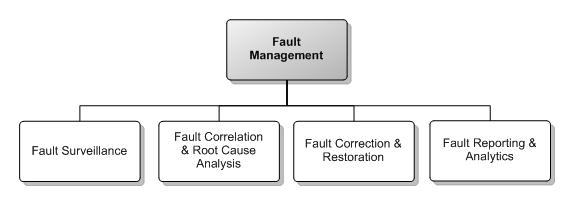
Resource Performance Reporting provides the functionality required to generate reports about the performance of the service provider's resources.

These reports may be generated as part of the normal periodic operations ("scheduled"), or may be as a result of a specific analysis request ("on-demand").

**Supported Business Services**

*To Be Added*

## 7.10 Fault Management



1. 7.10 Fault Management

### Fault Management

**Application Identifier:** 7.10

**Overview**

Fault Management applications provide necessary functionality to manage faults associated with specific resources. This includes the detection, isolation, resolution, and reporting of various faults.

**Functionality**

Fault Management applications are responsible for the management of faults, or troubles, associated with the service provider's resources.  Functionality includes:

* Fault Monitoring
* Fault Correlation & Root Cause Analysis
* Fault Correction & Restoration
* Fault Reporting & Analytics

**Supported Business Services**

*To Be Added*

### Fault Surveillance

**Application Identifier:** 7.10.1

**Overview**

Fault Surveillance applications provide the necessary functionality to monitor the operational status of the service provider's resources.

**Functionality**

Fault Surveillance applications are 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. These applications are responsible for collecting the status messages and correlating them to resource topology.

**Supported Business Services**

*To Be Added*

### Fault Correlation & Root Cause Analysis

**Application Identifier:** 7.10.2

**Overview**

Fault Correlation & Root Cause Analysis collects the various fault events in the network as well as other relevant information such as network topology, and relates these events, reducing the number of raw events to some smaller number.  Root Cause Analysis (RCA) enables the end user to quickly determine the root cause of a problem in the network. These applications have a unique role in mediating network alarms with topology and configuration data.

**Functionality**

Fault Correlation & Root Cause Analysis functionality includes the following:

* Alarm Correlation (the ability to collect all relevant fault events along with other relevant information and reduce them to some smaller manageable number).  This can include:
  + 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), including
    - intra and inter-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
    - Provide alarm to other systems
    - Store the alarms and root cause for extended periods
* 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
  + 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 Business Services**

*To Be Added*

### Fault Correction & Restoration

**Application Identifier:** 7.10.3

**Overview**

Fault Correction & Restoration applications are responsible for repair or replacement of faulty resources.

**Functionality**

Fault Correction & Restoration applications are responsible for repair or replacement of faulty resources or using redundant equipment to replace the faulty resource after a fault has been detected.

**Supported Business Services**

*To Be Added*

### Fault Reporting & Analytics

**Application Identifier:** 7.10.4

**Overview**

Fault Reporting & Analytics applications provide the necessary functionality to provide reports about the various faults within the service provider's network.

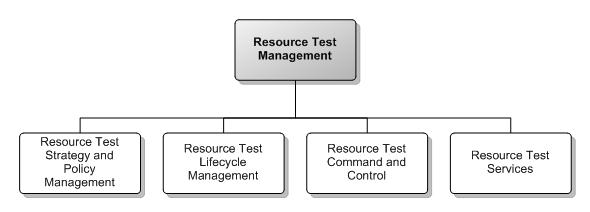
**Functionality**

Fault Reporting & Analytics applications provide the necessary functionality to provide reports about the various faults within the service provider's network, including the archival of these reports.  This can include standard periodic operational reports as part of running the network to special reports requested by Root Cause Analysis.  This function also collects necessary data to generate fault metrics to support various assurance metrics.

**Supported Business Services**

*To Be Added*

## 7.11 Resource Test Management



1. 7.11 Resource Test Management

### Resource Test Management

**Application Identifier:** 7.11

**Overview**

Resource Test Management applications are focused on ensuring that the various resources are working properly. The resource test applications are part of both the fulfillment and the assurance process. In the fulfillment process, the resource test 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. As part of the testing process, these applications also interface with the trouble process, which can trigger an automatic test.

**Functionality**

Following are some of the capabilities of Resource Test Management:

* Resource Test Strategy and Policy Management
* Resource Test Lifecycle Management
* Resource Test Command and Control
* Resource Test Services

**Supported Business Services**

*To Be Added*

### Resource Test Strategy and Policy Management

**Application Identifier:** 7.11.1

**Overview**

Resource Test Strategy and Policy Management applications provides the necessary functionality to manage the rules that define the strategies for conducting various resource tests.

**Functionality**

Resource Test Strategy and Policy Management applications provide the necessary functionality to manage the local rules that define the strategies for conducting a test as well as how the test results should be interpreted.

Strategies can range from simple (e.g. - check the status of a router) to complex (e.g. - perform an end-to-end test on a circuit and sectionalize the problem).

Additional functionality includes providing:

* Test rules defining the strategies for carrying out the test
* Policies on interpretation of test results.

**Supported Business Services**

*To Be Added*

### Resource Test Lifecycle Management

**Application Identifier:** 7.11.2

**Overview**

Resource Test Lifecycle Management applications provides the necessary functionality to manage the end-to-end lifecycle of a test of a resource.

**Functionality**

Resource Test Lifecycle Management applications provides the necessary functionality to manage the end-to-end lifecycle of a test of a resource.]

Functionality includes:

* scheduling
* retrieval of appropriate inventory data
* setting up the test configuration
* acquisition and management of test resources
* test execution
* tear down of the test configuration
* test results interpretation
* reporting of test results back to the client
* management of resource testing rules
* management of test head resource capacity
* management of test head availability
* management of test results

**Supported Business Services**

*To Be Added*

### Resource Test Command and Control

**Application Identifier:** 7.11.3

**Overview**

The Resource Test Command and Control application provides the necessary functionality to access, command, and control the devices required for resource testing.

**Functionality**

The Resource Test Command and Control application provides the necessary functionality to:

* Access the various resource test devices
* Command and control the various resource test devices or network elements required to perform resource testing
* Manage test heads

**Supported Business Services**

*To Be Added*

### Resource Test Services

**Application Identifier:** 7.11.4

**Overview**

Resource Test Services applications provides the means to access the testing capabilities.

**Functionality**

Resource Test Services applications provides the means to access the testing capabilities.  They include both a means to perform manual testing via a user interface (GUI) as well as a means to initiate a test from another system (a set of APIs).

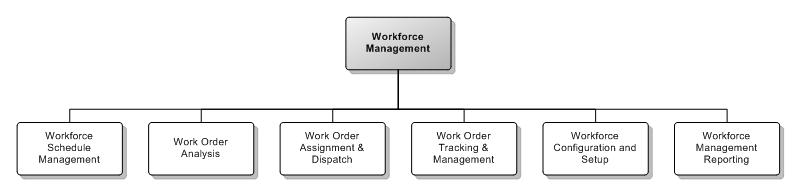
Additional functionality includes:

* Automated invocation of a test and retrieval of results
* Manual test initiation and control

**Supported Business Services**

*To Be Added*

## 7.12 Workforce Management



1. 7.12 Workforce Management

### Workforce Management

**Application Identifier:** 7.12

**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 resources in areas of service assurance, provisioning, routine work, and preventive maintenance.

**Functionality**

Workforce Management applications provide the following:

* Workforce Schedule Management
* Work Order Analysis
* Work Order Assignment & Dispatch
* Work Order Tracking & Management
* Workforce Management Reporting
* Workforce Configuration and Setup

**Supported Business Services**

*To Be Added*

### Workforce Schedule Management

**Application Identifier:** 7.12.1

**Overview**

Workforce Schedule Management applications provide the necessary functionality to manage the work schedule, appointment schedule and resource schedule of the dispatchable workforce.

**Functionality**

Workforce Schedule Management applications provide the necessary functionality to manage the work schedule, appointment schedule and resource schedule of the dispatchable workforce. Functionality includes the ability to view availability of appropriate staff (resource schedule) as well as being able to schedule an appointment (appointment schedule) or particular work (work schedule). Division of schedules into resource, appointment, and work allows mapping the same resources to different types of work, while balancing appointments and work between several resource sources. Both viewing and scheduling may be based on availability of a collection of staff and not a specific technician, and can include external resources. Availability might be based on windows of time (i.e. - AM or PM) or a specific time.

**Supported Business Services**

*To Be Added*

### Work Order Analysis

**Application Identifier:** 7.12.2

**Overview**

Work Order Analysis applications provide the necessary functionality to analyze the work order and determine what manual activities are necessary.  For such manual activities proper dependencies are set.

**Functionality**

Work Order Analysis applications provide the necessary functionality to analyze the work order and determine what manual activities are necessary.  For such manual activities proper dependencies are set.

**Supported Business Services**

*To Be Added*

### Work Order Assignment & Dispatch

**Application Identifier:** 7.12.3

**Overview**

Work Order Assignment & Dispatch applications provide the required functionality to assign manual activities (work orders and work items) to dispatchable staff as well as dispatch technicians on assigned work orders and items.

**Functionality**

Work Order Assignment & Dispatch applications provide the required functionality to assign manual activities (work orders and work items) to dispatchable staff as well as dispatch technicians on assigned work orders and items.

Functionality includes:

* performing assignments taking into consideration the following criteria:
  + work order priority
  + associated SLAs
  + work order due date
  + required skills to perform work
  + dependencies between work items/orders
  + job location relative to other assignments made to the dispatchable staff
  + workload of staff
  + staff availability hours
* periodic bulk assignments
* as needed dynamic assignments
* dispatch of assignments to dispatchable staff.

**Supported Business Services**

*To Be Added*

### Work Order Tracking & Management

**Application Identifier:** 7.12.4

**Overview**

Work order Tracking & Management applications provide the necessary functionality to manage and monitor the execution of the various manual activities via dispatchable staff.

**Functionality**

Work order Tracking & Management functionality includes the following:

* Issuing a valid and complete work order.  The work order might be based on an order or a proactive or reactive assurance activity.  This work request can be received from a system such as Service Order Management, Resource Order Management, or Service Problem Management.
* Closing of completed work orders
* Managing the transition of the order through its various states.
* Managing updates to orders, including in-flight changes and cancelations
* Monitoring the status and progress of the various manual activities, including the various states of the work order
* Initiating re-assignments as needed based on changing priorities, technician progress on other job assignments, etc.
* Escalating issues as required when a due date is in jeopardy
* Establishing and managing information transfer between the operator's workforce management system(s) and those of external third parties (when the infrastructure is owned and operated by third parties)
* Coordinating work between dependent or related work orders.

**Supported Business Services**

*To Be Added*

### Workforce Configuration and Setup

**Application Identifier:** 7.12.5

**Overview**

Workforce Configuration and Setup applications provide the necessary functionality to appropriately configure the Workforce Management application, including the setup of working areas, staff information, activity types and related information, etc.

**Functionality**

Workforce Configuration and Setup applications functionality includes:

* Classification of different types of manual activities
* Management of the various geographical working areas (turfs).
* Management of the dispatchable technicians, including skill sets.
* Management of technician training and/or coordination and interface with HR systems regarding the training.
* Management of staff availability, including vacation time.
* Configuration of the appointment schedule.
* Forecasting the workload and respective assignable staffing requirements on a daily, weekly, and longer period basis.

**Supported Business Services**

*To Be Added*

### Workforce Management Reporting

**Application Identifier:** 7.12.6

**Overview**

Workforce Management Reporting applications provide the necessary functionality to report on the status pertinent Workforce information, including activity and staff data.

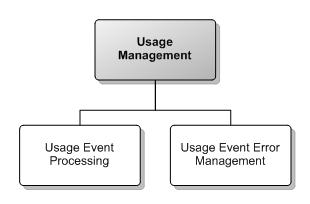
**Functionality**

Workforce Management Reporting applications provide the necessary functionality to report on the status of open work orders as well as technician information such as availability, utilization, and overall performance.    It also includes forecasting of the workload and respective assignable staffing requirements on a daily, weekly, and longer period basis.

**Supported Business Services**

*To Be Added*

## 7.14 Usage Management



1. 7.14 Usage Management

### Usage Management

**Application Identifier:** 7.14

**Overview**

Usage Management is the conduit for usage events from the network to various processes such as billing, legal compliance, and service assurance. Network usage event records are collected/processed, edited, correlated, enriched, formatted and distributed to upstream systems.

The Usage Management function supports both session and event based charging in both batch and real-time. Usage event records that are found to have errors are processed per business rules.

**Functionality**

Usage Management functionality includes:

* Usage Events Processing
* Usage Events Error Management

**Supported Business Services**

*To Be Added*

### Usage Event Processing

**Application Identifier:** 7.14.1

**Overview**

The Usage Event Processing functions include collection, filtering, formatting, aggregation, enrichment, correlation, consolidation, storage, and delivery of network usage event records. These functions are required to support both file and event based (batch and real-time) processing. The Usage Event Processing function support both session based and event based charging. Usage event records are produced by network elements and other system components. The network elements that may produce usage event records include, but are not limited to, components of the wireline, wireless, and IP networks. The components include, but are not limited to, application servers, service delivery platforms, messaging servers, switches, routers, and other network elements.

**Functionality**

Usage Event Processing includes the following functionality:

* Usage Event Collection
* Usage Event Correlation
* Usage Event Mediation
* Usage Event Guidance
* Usage Event Enrichment
* Usage Event Distribution

**Supported Business Services**

*To Be Added*

### Usage Event Error Management

**Application Identifier:** 7.14.2

**Overview**

The Usage Event Error Management function accepts usage records which have been identified as being non-processable due to edit, rate, guide, routing, etc. failures - i.e., unable to identify the owner of the usage (customer), unable to apply a valid rate, etc. The Usage Event Error Management function provides users with the ability to:

* Categorize unbilled usage events
* Provide features to identify the error cause
* Provide correction capabilities (via mechanized script or manual correction)
* Provide re-distribution features to send the usage to the proper destination(s)

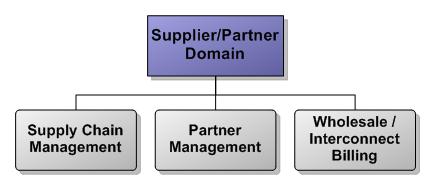
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

# 8. Supplier/Partner Domain



1. 8. Supplier/Partner Domain

### Supply Chain Management

**Application Identifier:** 8.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Partner Management

**Application Identifier:** 8.2

**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 - Agreement definition for each service, product, channel or location
* Direct and indirect settlement
* Real-time settlement
* Drill down reconciliation - Drill down reconciliation at summary and detailed levels
* Partner event processing and revenue share accounting
* Partner payment handling

**Supported Business Services**

### Wholesale / Interconnect Billing

**Application Identifier:** 8.3

**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.

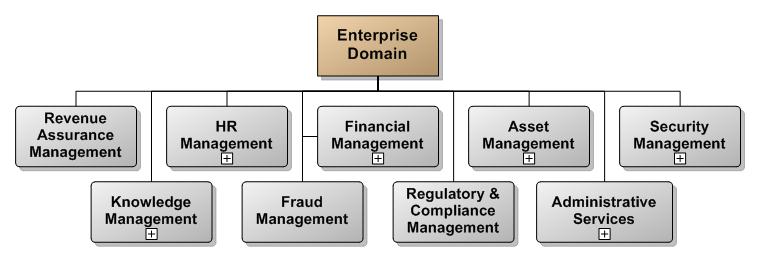
**Functionality**

* Reference Data Creation and Management
* Product and Service Definition - 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 - Partners’ accounting activities (Partner event processing)
* Partners Business 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
* Monitoring tools - Automated tools to ease and expedite dispute management.

**Supported Business Services**

* 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.

# 9. Enterprise Domain



1. 9. Enterprise Domain

### Revenue Assurance Management

**Application Identifier:** 9.1

**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 - 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.
* Rating and Billing Verification - 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
* Equipment and system testing - Proactively test equipment and systems and processes to verify that they provide accurate information- e.g., using test call generation
* Trouble Reports and Alarms - 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 Business Services**

*To Be Added*

### HR Management

**Application Identifier:** 9.2

**Overview**

HR Management Application – for improving workforce efficiency and productivity, planning future workforce needs, finding and developing the right talent, educating the workforce to ensure each employee has the right skills and aligning corporate strategies with team and individual goals

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Financial Management

**Application Identifier:** 9.3

**Overview**

Financial Management - for financial management functionality including accounting, reporting, analysis and treasury management, plus internal controls and documentation of all financial processes and transactions.

**Functionality**

Financial Management functionality includes:

* Financial Core Operations
* Employee Expense Reimbursement
* Capital Lease Management
* Financial Core Operations Reporting
* Financial Business Unit Reporting
* Corporate Tax
* Corporate Treasury
* Cash Reconciliation & Escheatment
* General Ledger Account Reconciliation
* Auditing
* Regulatory Accounting

**Supported Business Services**

*To Be Added*

### Asset Management

**Application Identifier:** 9.4

**Overview**

Asset Management - for understanding the physical and financial assets deployed in the enterprise and optimizing the economics associated with those investments along the lifecycle from introduction through maintenance to eventual disposal.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Security Management

**Application Identifier:** 9.5

**Overview**

Security Management Applications are part of Enterprise Management. They provide a Unified approach to Security, and the foundation technologies to:

* Protect systems and network infrastructure against unauthorized access to or modification of information, whether in storage, processing or transit
* Restrict provision of service to only authorized users
* Prevent any denial of service to authorized users
* Provide the measures necessary to detect, document, and counter such threats

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Knowledge Management

**Application Identifier:** 9.6

**Overview**

Knowledge Management (KM) comprises a range of practices used in an organization to identify, create, represent, distribute and enable adoption of insights and experiences. Such insights and experiences comprise knowledge, either embodied in individuals or embedded in organizational processes or practice (from Wikipedia).

*Note: Actual applications can be related to both Knowledge Management and the business functional areas for which the application provides functionality.*

**Functionality**

Knowledge Management applications provide the following key functionality:

* Business Intelligence
* Data Management
* Content Management

**Supported Business Services**

*To Be Added*

### Fraud Management

**Application Identifier:** 9.7

**Overview**

Investigating, preventing and responding to activities that indicate fraudulent use of networks or systems. This is achieved by effective Fraud Management systems coupled with the instrumentation and monitoring that enables potential fraudulent activities to be identified. There are close linkages between fraud identification and anomaly detection.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Regulatory & Compliance Management

**Application Identifier:** 9.8

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Administrative Services

**Application Identifier:** 9.9

**Overview**

*To Be Added*

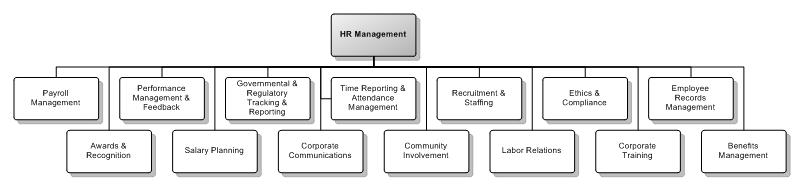
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 9.2 HR Management



**Title**

1. 9.2 HR Management

### HR Management

**Application Identifier:** 9.2

**Overview**

HR Management Application – for improving workforce efficiency and productivity, planning future workforce needs, finding and developing the right talent, educating the workforce to ensure each employee has the right skills and aligning corporate strategies with team and individual goals

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Payroll Management

**Application Identifier:** 9.2.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Performance Management & Feedback

**Application Identifier:** 9.2.2

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Governmental & Regulatory Tracking & Reporting

**Application Identifier:** 9.2.3

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Time Reporting & Attendance Management

**Application Identifier:** 9.2.4

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Recruitment & Staffing

**Application Identifier:** 9.2.5

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Ethics & Compliance

**Application Identifier:** 9.2.6

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Employee Records Management

**Application Identifier:** 9.2.7

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Awards & Recognition

**Application Identifier:** 9.2.8

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Salary Planning

**Application Identifier:** 9.2.9

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Corporate Communications

**Application Identifier:** 9.2.10

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Community Involvement

**Application Identifier:** 9.2.11

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Labor Relations

**Application Identifier:** 9.2.12

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Corporate Training

**Application Identifier:** 9.2.13

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Benefits Management

**Application Identifier:** 9.2.14

**Overview**

*To Be Added*

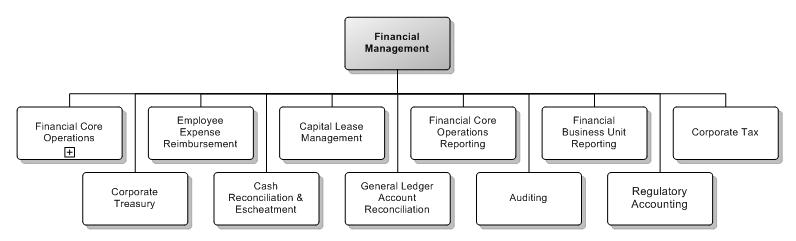
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 9.3 Financial Management



1. 9.3 Financial Management

### Financial Management

**Application Identifier:** 9.3

**Overview**

Financial Management - for financial management functionality including accounting, reporting, analysis and treasury management, plus internal controls and documentation of all financial processes and transactions.

**Functionality**

Financial Management functionality includes:

* Financial Core Operations
* Employee Expense Reimbursement
* Capital Lease Management
* Financial Core Operations Reporting
* Financial Business Unit Reporting
* Corporate Tax
* Corporate Treasury
* Cash Reconciliation & Escheatment
* General Ledger Account Reconciliation
* Auditing
* Regulatory Accounting

**Supported Business Services**

*To Be Added*

### Financial Core Operations

**Application Identifier:** 9.3.1

**Overview**

Financial Core Operations applications provide the required functionality to manage the major financial processes of a corporation.

**Functionality**

Financial Core Operations functionality supports the following:

* General Ledger
* Accounts Payable
* Project Accounting
* Financial Controls, Editing & Reference Data
* Fixed Asset Management

**Supported Business Services**

*To Be Added*

### Employee Expense Reimbursement

**Application Identifier:** 9.3.2

**Overview**

Employee Expense Reimbursement applications provide the tools to effectively manage the employee travel and expense process.

**Functionality**

Employee Expense Reimbursement functionality supports the following:

* Downloads of expense data from credit cards and P-cards
* Attachment of electronic receipts to expense reports from faxed images
* Detection of duplicate expenses
* Electronic routing of expense reports for approval
* Integration with Accounts Payable applications

**Supported Business Services**

*To Be Added*

### Capital Lease Management

**Application Identifier:** 9.3.3

**Overview**

Capital Lease Management applications provide the required functionality to enable the service provider Capital Services legal entity to support business customer purchases of our products and services by converting one-time, upfront costs into monthly payments.

**Functionality**

Capital Lease Management functionality supports the following:

* Complete contract tracking from origination through asset disposition
* Complex transaction management for various types of leases
* Flexible reporting

**Supported Business Services**

*To Be Added*

### Financial Core Operations Reporting

**Application Identifier:** 9.3.4

**Overview**

Financial Core Operations Reporting applications are financial repositories and reporting tools for data associated with the Financial Core Operations applications.

**Functionality**

Financial Core Operations Reporting supports reporting for the following data categories:

* General Ledger
* Accounts Payable
* Project Accounting
* Financial Controls, Editing & Reference Data
* Fixed Asset Management
* Affiliate Billing
* Cost Allocations
* Intercompany Revenue Eliminations

**Supported Business Services**

*To Be Added*

### Financial Business Unit Reporting

**Application Identifier:** 9.3.5

**Overview**

Financial Business Unit Reporting applications are financial repositories and profitability reporting tools for the service provider and all its subsidiaries.

**Functionality**

Financial Business Unit Reporting supports the following:

* Profitability reporting which provides information on revenues, expenses, volumes and force data
* Storage of budget data
* Budget to Actual variance reporting and year over year comparisons
* Process cost and product group profitability reporting

**Supported Business Services**

*To Be Added*

### Corporate Tax

**Application Identifier:** 9.3.6

**Overview**

Corporate Tax applications provide the required functionality to calculate and submit tax filings for all service provider companies and affiliates.

**Functionality**

Corporate Tax supports the following:

* Sales & Use Tax
* Income Tax
* Property Tax
* Fixed Asset Tax
* Gross Receipt Tax
* 1099 Processing
* Network Asset Leasing
* Integration with Accounts Payable applications

**Supported Business Services**

*To Be Added*

### Corporate Treasury

**Application Identifier:** 9.3.7

**Overview**

Corporate Treasury applications provide the required functionality to manage service provider funds and bank accounts.

**Functionality**

Corporate Treasury supports the following:

* Tracking of bank accounts and associated data attributes
* Management of foreign exchange rates
* Cash position management
* Intercompany cash settlements

**Supported Business Services**

*To Be Added*

### Cash Reconciliation & Escheatment

**Application Identifier:** 9.3.8

**Overview**

Cash Reconciliation & Escheatment applications provide the required functionality to perform bank statement reconciliations, manage unclaimed checks, and recover unclaimed funds payable to the service provider.

**Functionality**

Cash Reconciliation & Escheatment supports the following:

* Bank Statement Reconciliations
* Replacement check approvals
* Escheatment of unclaimed checks to the proper jurisdictions
* Recovery of unclaimed funds payable to the service provider that may be held by various jurisdictions
* Integration with Accounts Payable applications

**Supported Business Services**

*To Be Added*

### General Ledger Account Reconciliation

**Application Identifier:** 9.3.9

**Overview**

General Ledger Account Reconciliation applications provide the required functionality to support comparisons between balances in the general ledger and other subsidiary ledgers to assure that accounts are correct.

**Functionality**

General Ledger Account Reconciliation supports reconciliation for the following data categories:

* Investment Accounts
* Accounts Payable
* Accounts Receivable
* Payroll
* Fixed Assets
* Other Balance Sheet and Income Statement Accounts

**Supported Business Services**

*To Be Added*

### Auditing

**Application Identifier:** 9.3.10

**Overview**

Auditing applications provide the required functionality to attest to the accuracy of the financial records.

**Functionality**

Auditing functionality supports:

* Documentation of audit findings and associated resolutions
* SOX compliance

**Supported Business Services**

*To Be Added*

### Regulatory Accounting

**Application Identifier:** 9.3.11

**Overview**

Regulatory Accounting applications provide the required functionality to comply with federal regulations. In the US, it is specially 47, Part 64 (Telecommunication - Miscellaneous Rules Relating to Common Carriers).

**Functionality**

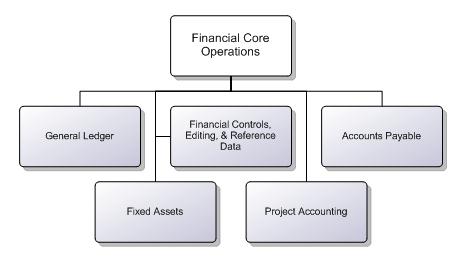
Regulatory Accounting functionality supports:

* Cost allocations and associated cost allocation manuals
* Affiliate billing
* International settlements

**Supported Business Services**

*To Be Added*

## 9.3.1 Financial Core Operations



1. 9.3.1 Financial Core Operations

### Financial Core Operations

**Application Identifier:** 9.3.1

**Overview**

Financial Core Operations applications provide the required functionality to manage the major financial processes of a corporation.

**Functionality**

Financial Core Operations functionality supports the following:

* General Ledger
* Accounts Payable
* Project Accounting
* Financial Controls, Editing & Reference Data
* Fixed Asset Management

**Supported Business Services**

*To Be Added*

### General Ledger

**Application Identifier:** 9.3.1.1

**Overview**

General Ledger applications provide the required functionality to create a book of final entry summarizing all of a company's financial transactions, through offsetting debit and credit accounts.

**Functionality**

General Ledger functionality supports the following:

* Tight internal controls and access to legal entity and ledger data
* Maintenance of the Chart of Accounts and General Ledger reporting structures
* Compliance with multiple legislative, industry or geographic requirements
* Spreadsheet integration for journals, budgets, reporting, and currency rates
* Multi-ledger financial reporting for real-time, enterprise-wide visibility
* Robust drilldowns to underlying transactions
* Automated month-end close processing

**Supported Business Services**

*To Be Added*

### Financial Controls, Editing, & Reference Data

**Application Identifier:** 9.3.1.2

**Overview**

Financial Controls, Editing & Reference Data applications provide the required functionality to enable financial feeders to pre-edit and validate transactions prior to sending them to the financial ledgers for posting. It also covers the receipt of those transactions by the financial applications and the validation features prior to transaction posting.

**Functionality**

Financial Controls, Editing & Reference Data functionality supports the following:

* Maintenance of financial reference data
* Financial editing and associated error correction processes
* Financial batch validation and associated error correction processes
* Data translation and replacement processes

Transaction routing rules and processes

**Supported Business Services**

*To Be Added*

### Accounts Payable

**Application Identifier:** 9.3.1.3

**Overview**

Accounts Payable applications provide the required functionality to maintain a ledger containing the accounts of all of a company's creditors.

**Functionality**

Accounts Payable functionality supports the following:

* Invoice management and payments
* Global accounting and tax requirements
* Supplier management
* Invoice and payment status inquiries

Electronic payments

**Supported Business Services**

*To Be Added*

### Fixed Assets

**Application Identifier:** 9.3.1.4

**Overview**

Fixed Asset applications provide the required functionality to manage the long-term assets of a business at a summarized level. Detailed, subsidiary asset records are not covered by this group of applications.

**Functionality**

Fixed Asset functionality supports the following:

* Total Cost of Ownership tracking
* Depreciation calculation
* Journal creation for purchase, depreciation, disposal and transfers
* Integration with Accounts Payable and Project Accounting applications
* Asset reporting

**Supported Business Services**

*To Be Added*

### Project Accounting

**Application Identifier:** 9.3.1.5

**Overview**

Project Accounting applications provide the required functionality to create financial reports specifically designed to track the financial progress of projects, which can then be used by managers to aid project management.

**Functionality**

Project Accounting functionality supports the following:

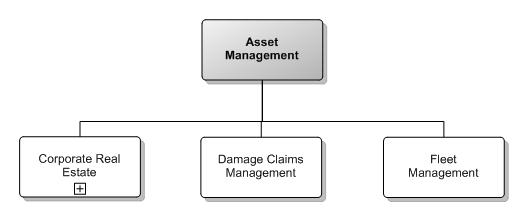
* Budget creation at any level in multiple currencies
* Expenditure posting to projects
* Status reporting
* Comparison of budget, actual, commitment, and revenue amounts
* Cost distribution using auto-allocation rules
* Transaction controls based on expenditure category, expenditure type, employee, or non-labor resource
* Budgetary controls to check available project funds with hard or soft controls

Asset capitalization

**Supported Business Services**

*To Be Added*

## 9.4 Asset Management



1. 9.4 Asset Management

### Asset Management

**Application Identifier:** 9.4

**Overview**

Asset Management - for understanding the physical and financial assets deployed in the enterprise and optimizing the economics associated with those investments along the lifecycle from introduction through maintenance to eventual disposal.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Corporate Real Estate

**Application Identifier:** 9.4.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Damage Claims Management

**Application Identifier:** 9.4.2

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Fleet Management

**Application Identifier:** 9.4.3

**Overview**

*To Be Added*

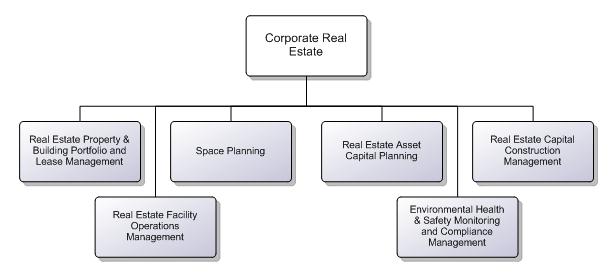
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 9.4.1 Corporate Real Estate



1. 9.4.1 Corporate Real Estate

### Corporate Real Estate

**Application Identifier:** 9.4.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Real Estate Property & Building Portfolio and Lease Management

**Application Identifier:** 9.4.1.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Real Estate Facility Operations Management

**Application Identifier:** 9.4.1.2

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Space Planning

**Application Identifier:** 9.4.1.3

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Real Estate Asset Capital Planning

**Application Identifier:** 9.4.1.4

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Environmental Health & Safety Monitoring and Compliance Management

**Application Identifier:** 9.4.1.5

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Real Estate Capital Construction Management

**Application Identifier:** 9.4.1.6

**Overview**

*To Be Added*

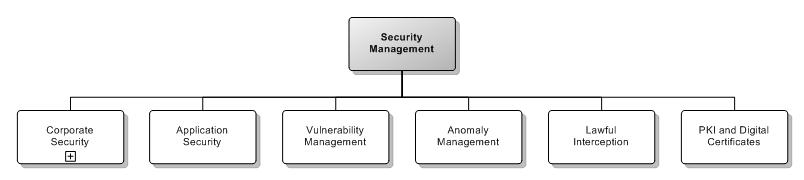
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 9.5 Security Management



1. 9.5 Security Management

### Security Management

**Application Identifier:** 9.5

**Overview**

Security Management Applications are part of Enterprise Management. They provide a Unified approach to Security, and the foundation technologies to:

* Protect systems and network infrastructure against unauthorized access to or modification of information, whether in storage, processing or transit
* Restrict provision of service to only authorized users
* Prevent any denial of service to authorized users
* Provide the measures necessary to detect, document, and counter such threats

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Corporate Security

**Application Identifier:** 9.5.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Application Security

**Application Identifier:** 9.5.2

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Vulnerability Management

**Application Identifier:** 9.5.3

**Overview**

Assessing networks and systems for vulnerabilities and taking proactive action to reduce the vulnerabilities or limit the impacts if they are exploited. This is achieved by documenting and managing element configuration, recording any vulnerability as they are discovered, and applying in a timely manner the software patches and upgrades that address known vulnerabilities

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Anomaly Management

**Application Identifier:** 9.5.4

**Overview**

Identifying and preventing any misuse of a network or system that falls outside normal system operation, by monitoring network and system activity and determining whether it is normal or anomalous, based on rules, signatures or heuristics. This is achieved by a combination of Instrumentation and Monitoring, Event and Log Correlation and Intrusion Detection Systems

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Lawful Interception

**Application Identifier:** 9.5.5

**Overview**

Providing the interception technologies that meet statutory obligations for lawful interception for any service that requires it

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### PKI and Digital Certificates

**Application Identifier:** 9.5.6

**Overview**

Enabling users to securely and privately exchange data using digital certificates that are obtained and shared through a trusted authority, and enabling secure authentication of devices equipped with digital certificates. This is achieved by Public Key Infrastructure systems that provides digital certificates that can identify an individual, an organization or a device; and include directory services that can store and, when necessary, revoke the certificates

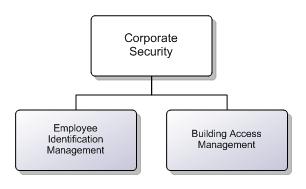
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 9.5.1 Corporate Security



1. 9.5.1 Corporate Security

### Corporate Security

**Application Identifier:** 9.5.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Employee Identification Management

**Application Identifier:** 9.5.1.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Building Access Management

**Application Identifier:** 9.5.1.2

**Overview**

*To Be Added*

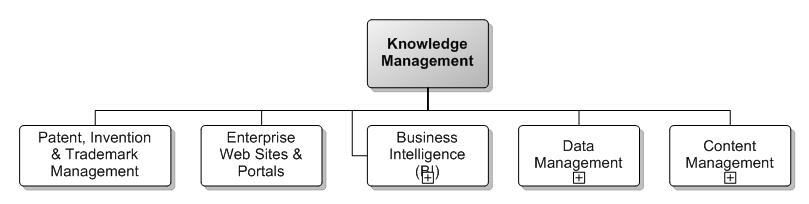
**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

## 9.6 Knowledge Management



1. 9.6 Knowledge Management

### Knowledge Management

**Application Identifier:** 9.6

**Overview**

Knowledge Management (KM) comprises a range of practices used in an organization to identify, create, represent, distribute and enable adoption of insights and experiences. Such insights and experiences comprise knowledge, either embodied in individuals or embedded in organizational processes or practice (from Wikipedia).

*Note: Actual applications can be related to both Knowledge Management and the business functional areas for which the application provides functionality.*

**Functionality**

Knowledge Management applications provide the following key functionality:

* Business Intelligence
* Data Management
* Content Management

**Supported Business Services**

*To Be Added*

### Patent, Invention & Trademark Management

**Application Identifier:** 9.6.1

**Overview**

Patent, Invention & Trademark Management functionality to manage the enterprise's patents, inventions, innovations, and trademarks.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Enterprise Web Sites & Portals

**Application Identifier:** 9.6.2

**Overview**

Enterprise Web Sites & Portals provide necessary functionality to provide non-business intelligence based knowledge.

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Business Intelligence (BI)

**Application Identifier:** 9.6.3

**Overview**

**Business Intelligence** (**BI**) refers to skills, technologies, applications and practices used to help a [business](http://en.wikipedia.org/wiki/Business) acquire a better understanding of its commercial context. Business Intelligence may also refer to the collected information itself (from Wikipedia).

Business Intelligence/Data Warehousing (BIDW) is the delivery of business information required to effectively manage corporate operations. It includes both tactical and strategic decision making activities, compliance and regulatory reporting, and operational & transactional management/monitoring. These functions are performed by a virtual team from various IT organizations within AT&T.

**Functionality**

BI technologies provide historical, current, and predictive views of business operations. Common functions of Business Intelligence are (but not limited to):

* Delivery Mechanisms
* Reporting
* Performance Management
* Supporting Applications
* Analytics
* Data Management

**Supported Business Services**

*To Be Added*

### Data Management

**Application Identifier:** 9.6.4

**Overview**

The Data Management (DM) architecture consumes data from sources and provides consistent data to client applications via a shared set of web services and bulk data management procedures.

**Functionality**

The Data Management (DM) architecture includes (but not limited to):

* Data Storage & Retrieval
* Data Access & Transformation
* Data Integration & Context
* Data Audit & Correction
* Data Presentation & Distribution (incl framework)

**Supported Business Services**

*To Be Added*

### Content Management

**Application Identifier:** 9.6.5

**Overview**

**Content management**, or **CM**, is the set of processes and technologies that support the collection, managing, and publishing of information in any form or medium. (From Wikipedia)

**Functionality**

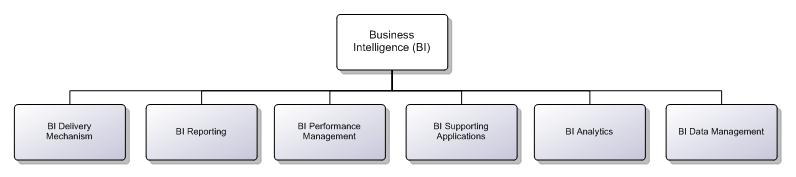
Content management (CM) includes (but not limited to):

* Content Repository & Archival
* Content Authoring & Compilation (incl framework)
* Content Distribution & Acquisition
* Content Portal & Discovery

**Supported Business Services**

*To Be Added*

## 9.6.3 Business Intelligence (BI)



1. 9.6.3 Business Intelligence (BI)

### Business Intelligence (BI)

**Application Identifier:** 9.6.3

**Overview**

**Business Intelligence** (**BI**) refers to skills, technologies, applications and practices used to help a [business](http://en.wikipedia.org/wiki/Business) acquire a better understanding of its commercial context. Business Intelligence may also refer to the collected information itself (from Wikipedia).

Business Intelligence/Data Warehousing (BIDW) is the delivery of business information required to effectively manage corporate operations. It includes both tactical and strategic decision making activities, compliance and regulatory reporting, and operational & transactional management/monitoring. These functions are performed by a virtual team from various IT organizations within AT&T.

**Functionality**

BI technologies provide historical, current, and predictive views of business operations. Common functions of Business Intelligence are (but not limited to):

* Delivery Mechanisms
* Reporting
* Performance Management
* Supporting Applications
* Analytics
* Data Management

**Supported Business Services**

*To Be Added*

### BI Delivery Mechanism

**Application Identifier:** 9.6.3.1

**Overview**

The BI Delivery Mechanism layer consists of the technologies utilized to present information to end user in the format requested and through the desired user interface.

**Functionality**

BI Delivery Mechanism application functionality includes the following:

* Desktop Gadgets
* Office Suites
* Mobile
* Disconnected
* Portals/Business Mashups
* Customer Facing BI

**Supported Business Services**

*To Be Added*

### BI Reporting

**Application Identifier:** 9.6.3.2

**Overview**

The BI Reporting layer has technologies for building and formatting reports and graphical representations of the data. The Reporting layer contains Search because the selection, filtering, and query building is generally the first step in generating a report.

**Functionality**

BI Reporting Layer application functionality includes the following:

* Dashboards
* Alerts
* Advanced Data Visualization, WA-UE
* Search
* Geospatial
* Interactive ad hoc
* Canned/Production

**Supported Business Services**

*To Be Added*

### BI Performance Management

**Application Identifier:** 9.6.3.3

**Overview**

The BI Performance Management is a set of technologies for measuring and planning the performance of business processes or physical resources such as network components or IT servers and services. Technologies for measurement may differ depending on resource type and are utilized lower in the architecture stack. Performance data is aggregated in the Analytics layer, but business rules are applied in this layer.

**Functionality**

The BI Management Layer includes the following functionality:

* Metrics/KPIs
* Planning
* Scorecards
* Strategy/Objectives Management

**Supported Business Services**

*To Be Added*

### BI Supporting Applications

**Application Identifier:** 9.6.3.4

**Overview**

BI Supporting Applications is a layer that contains components for managing metadata and providing supplemental information to the layers above, such as reference hierarchies and dimensions for organization or product filtering. Its position in the stack shows that these components generally support the Delivery Mechanism, Reporting, and Performance Management layers – these layers comprise the ‘Information Delivery’ layer indicated in high level conceptual models of BI/BI/Data Warehousing. Several components in this layer are considered to be more in the Knowledge Management domain and are not specific to BI, therefore, they were placed out of scope.

**Functionality**

The BI Supporting Application Layer includes the following functionality:

* Collaboration
* Life-cycle mgt.
* Localization
* QA
* Software Version Control
* Metadata - Management, Repositories
* ECM
* eLearning
* MDM

**Supported Business Services**

*To Be Added*

### BI Analytics

**Application Identifier:** 9.6.3.5

**Overview**

The BI Analytics layer represents the true analytic engines used for mathematical and statistical analysis of data - calculating correlations, trends, and patterns using complex algorithms and modeling. The results from these analyses are passed to the above layers for presentation and aggregation.

**Functionality**

The BI Analytics Layer includes the following functionality:

* Data/text Mining
* Guided Analysis
* NLP
* Guided Search
* Time Series
* OLAP
* Operational DSS
* Predictive Analytics
* Usage Analytics
* Statistical Analysis(basic)
* Web Analytics

**Supported Business Services**

*To Be Added*

### BI Data Management

**Application Identifier:** 9.6.3.6

**Overview**

The BI Data Management layer represents the modeling and universe of the data needed.

**Functionality**

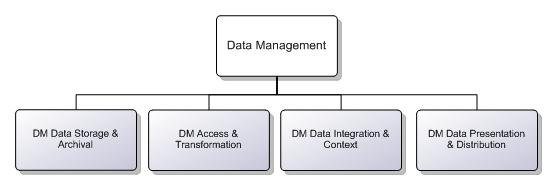
The BI Data Management layer includes but is not limited to:

* Developing data architectures
* Practices and procedures dealing with data
* Executing these aspects on a regular basis with the BI framework.

**Supported Business Services**

*To Be Added*

## 9.6.4 Data Management



1. 9.6.4 Data Management

### Data Management

**Application Identifier:** 9.6.4

**Overview**

The Data Management (DM) architecture consumes data from sources and provides consistent data to client applications via a shared set of web services and bulk data management procedures.

**Functionality**

The Data Management (DM) architecture includes (but not limited to):

* Data Storage & Retrieval
* Data Access & Transformation
* Data Integration & Context
* Data Audit & Correction
* Data Presentation & Distribution (incl framework)

**Supported Business Services**

*To Be Added*

### DM Data Storage & Archival

**Application Identifier:** 9.6.4.1

**Overview**

DM Data Storage & Archival applications provides appropriate functionality to retain data for a specified period of time for some business purpose.

**Functionality**

DM Data Storage & Archival includes the following:

* Data Storage
* Data archiving

**Supported Business Services**

*To Be Added*

### DM Access & Transformation

**Application Identifier:** 9.6.4.2

**Overview**

The Data Access & Transformation Layer (DATL) provides access, retrieval and transformation services to extract enterprise data from multiple Target Databases.

**Functionality**

DM Access & Transformation includes the following:

* Data Access
* Data Retrieval
* Data Transformation (Data services and mapping of data into the enterprise data model)

**Supported Business Services**

*To Be Added*

### DM Data Integration & Context

**Application Identifier:** 9.6.4.3

**Overview**

The DM Data Integration & Context Layer provides data mgmt services to “enable” scale to access enterprise data. The DM Data Integration & Context Layer provides data aggregation, normalization.

**Functionality**

DM Integration & Context Layer Consist of the following:

* Data Aggregation
* Data Normalization
* Meta data
* Data Modeling
* SOA creation
* Data dictionary

**Supported Business Services**

*To Be Added*

### DM Data Presentation & Distribution

**Application Identifier:** 9.6.4.4

**Overview**

DM Data Presentation & Distribution (incl framework) - Main goal of data is to turn into information and to turn information into action. Hence Data should be presented in a meaningful way.

**Functionality**

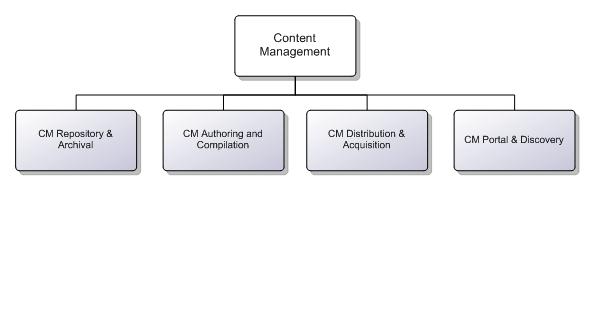
DM Data Presentation & Distribution functionality includes the following:

* Presentation & distribution of structured & unstructured data
* Various access methods of retrieving or consuming data

**Supported Business Services**

*To Be Added*

## 9.6.5 Content Management



1. 9.6.5 Content Management

### Content Management

**Application Identifier:** 9.6.5

**Overview**

**Content management**, or **CM**, is the set of processes and technologies that support the collection, managing, and publishing of information in any form or medium. (From Wikipedia)

**Functionality**

Content management (CM) includes (but not limited to):

* Content Repository & Archival
* Content Authoring & Compilation (incl framework)
* Content Distribution & Acquisition
* Content Portal & Discovery

**Supported Business Services**

*To Be Added*

### CM Repository & Archival

**Application Identifier:** 9.6.5.1

**Overview**

CM Repository & Archival – database repository for content storage, archival tools for preserving versions of content and managing lineage. Support for federation, backup, recovery, and other OA&M functions.

**Functionality**

CM Repository & Archival is the actual storage and archival of the repository content. The following storage types are (but not limited to):

* File systems
* Data Bases
* Data Warehouses

**Supported Business Services**

*To Be Added*

### CM Authoring and Compilation

**Application Identifier:** 9.6.5.2

**Overview**

CM Authoring and Compilation – authoring tools used to collaboratively create or enhance content and implement it via a review and testing process, compilation tools used to compile content into physical formats needed for on-line tools that support work center personnel by serving content as part of a scripted dialog with a customer. Content may be enriched with meta-tags to associate content based on content of call and template.

Example, caller is Mrs. Jones and is calling about the account she provided and that account has inventory. Script is “Good morning [caller], I see your account [account provided by caller] has [list if inventory] services. How may I help you?”

**Functionality**

CM Authoring and Compilation consists of the following (but not limited to):

* Creator - responsible for creating and editing content.
* Editor - responsible for tuning the content message and the style of delivery, including translation and localization.
* Publisher - responsible for releasing the content for use.
* Administrator - responsible for managing access permissions to folders and files, usually accomplished by assigning access rights to user groups or roles. Admins may also assist and support users in various ways.

**Supported Business Services**

*To Be Added*

### CM Distribution & Acquisition

**Application Identifier:** 9.6.5.3

**Overview**

CM Distribution & Acquisition are tools for acquiring content or migrating content to/from repositories. These tools are for dynamically or statically distributing content to users or other applications. The tools integrate with security, pub/sub brokers, application APIs and traditional interfaces.

**Functionality**

CM Distribution & Acquisition includes but is not limited to:

* Sales Aids
* Job Aids
* Product Support
* etc.

**Supported Business Services**

*To Be Added*

### Sales Aids (Deleted)

**Application Identifier:** 9.6.5.3.1 (This Application ID has been deliberately unused!)

**Overview**

This Application was promoted to level 1, so the level 4 was deleted.

### Job Aids (Deleted)

**Application Identifier:** 9.6.5.3.1.1 (This Application ID has been deliberately unused!)

**Overview**

This Application was promoted to level 2, so the level 5 was deleted.

### Product Support (Deleted)

**Application Identifier:** 9.6.5.3.1.2 (This Application ID has been deliberately unused!)

**Overview**

This Application was promoted to level 2, so the level 5 was deleted.

### CM Portal & Discovery

**Application Identifier:** 9.6.5.4

**Overview**

CM Portal & Discovery – portal technologies supported and implemented to provide access to the content by people or systems. Discovery services used to search through content and find specific instances based on a particular context or search parameter

**Functionality**

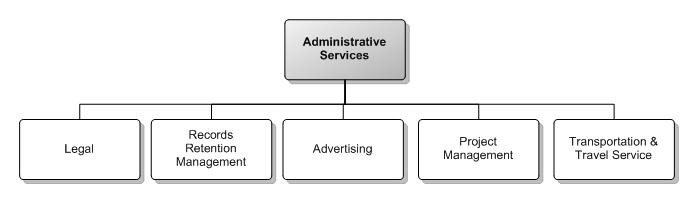
CM Portal & Discovery functionality includes but is not limited to:

* Portals
* Search engines
* Filters

**Supported Business Services**

*To Be Added*

## 9.9 Administrative Services



1. 9.9 Administrative Services

### Administrative Services

**Application Identifier:** 9.9

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Legal

**Application Identifier:** 9.9.1

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Records Retention Management

**Application Identifier:** 9.9.2

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Advertising

**Application Identifier:** 9.9.3

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Project Management

**Application Identifier:** 9.9.4

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

### Transportation & Travel Service

**Application Identifier:** 9.9.5

**Overview**

*To Be Added*

**Functionality**

*To Be Added*

**Supported Business Services**

*To Be Added*

# 10. Application Integration Infrastructure



1. Figure 1: Application Integration Infrastructure

## 10.1 Introduction

The Applications Map is an integral part of Frameworx. Integrating applications into a cohesive, automated and flexible infrastructure to enable ‘lean’ operations is as important as the application’s functionality itself. This section of the Applications Framework 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 communications industry is very dynamic and such ‘hard-wired’ approaches badly serve the business.

* It is critical to separate business process control from the individual applications.
* The key is for the individual 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 communications 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.

Business Services defined interfaces between applications. In Frameworx parlance, these are defined as contract interfaces. Frameworx Business Service define the interfaces to Services made available by the application. The data and metadata in Business Service specifications use information defined in the Information Framework.

## 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 known 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 communications 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 Frameworx 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



1. 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 a Frameworx 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 Business Service defined interfaces

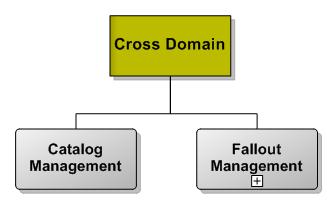
Business Service defined interfaces are a key concept within the Frameworx architecture. This approach allows applications to locate each other and discover what services they offer through a repository of Business Services. A Business Service is a well-formed interface by which the functionality of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

Business Services 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 Frameworx adapters of existing components and consequently alter the communications between components. This enables a new component to enhance an existing business process dynamically.

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

# 11. Cross Domain Applications



1. 11. Cross Domain Applications

### Catalog Management

**Application Identifier:** 11.1

**Overview**

Catalog Management is a cross domain, multilayer application that operates as a master repository for componentized entities of products, services and / or resources within one or more domains of a service provider’s environment.

Catalog Management includes the abilities to create and design new entities, map entity definitions, manage complex rules, support componentization of entities and manage their relationships and dependencies. Additional aspects include versioning, change management, enhanced viewing, as well as editing and tracking capabilities

**Functionality**

The common capabilities of Catalog Management applications will have the following features:

* Entity handling- A catalog management application should be able to create, modify and delete entities.
* Entity data implementation – The catalog will provide the capability to implement a flexible data model with the ability to structure entities and attributes as desired by the user and to extend the model according to the requirements.
* Integrity rules – Apply integrity rules at the entity level. Rules are required to maintain data integrity in the catalog. Human errors during product and service configuration cause major problems in testing and production phases, and automatic mechanisms that can eliminate such errors in advance are mandatory
* Compatibility rules- define rules on operational entities which are applied by downstream systems when instantiating the catalog entities in the operational systems. For example when instantiating products out of ProductSpec
* Componentization – Ability to group entities. A catalog user needs flexibility and openness in configuring data catalog entities. One of the configuration options that enable high re-usability is the possibility to group entities and re-use the group level
* Component relation management – Ability to manage hierarchical, inheritance and reuse relations between components. Re-usability is a major requirement for management of a catalog. Re-usability is achieved through inheritance and through the re-use of standalone entities as well as entity hierarchies
* Entity state management: The ability to manage the state of an entity during its lifecycle (e.g. planned, deployed, in operation, replaced by, locked…)
* Inter layer aspects of a catalog management application including
* Inter layer dependency-rules management – Manage rules that governs the relationships between entities in different layers. A catalog that manages different layers needs to maintain the rules within the layer and between the layers. For example, how product definition translate to different services provisioning rules, and so on.
* Inter catalog data integrity management Data consistency should be kept not only in the specific layers of products, services and resources but also between layers. A specific product can be provisioned in multiple ways by different services supporting different technologies, and the specific rules and dependencies make it a mandatory requirement to enable management of the inter-layer dependencies.
* Versioning – Manage multi-versions of the same entity is a very important aspect in a catalog. The complexity starts with the ability to manage multiple versions for single entities, however in real life it is required to support much more complex scenarios where entities relate to other entities that have a different lifecycle and a different versions map, however the validity and maintenance of the versions needs to be maintained.
* Change management – Manage the implications of catalog changes to determine the consequences of any given change. In addition, catalog users should be able to track and locate the history of changes in the catalog in an easy and accessible manner.
* Inquiry handling - Catalog data requires easy storage and retrieval of information. Historical changes should be stored and easily retrieved, including changes done on the entity level or changes done by different users. Retrieval process should return simple queries but also complex queries retrieving data entities that comply with complex conditions, in order to enable easier analyzing and slicing of the catalog data.
* Revision control –. A catalog provides a work environment that permits users to work in parallel without interfering with each other’s efforts, to manage the relevant permissions on the data or on activity level, and to support the different user interfaces required. The catalog provides the capability to manage access and change control at various levels such as user or group.
* Data driven Security – control access to the data by its actual values, so a user may not see offerings in which the customer type (which is an attribute) is Business if he (the use) is allowed to see only residential customers information.
* View Management – Generating different views for users that manage different data layers. As a master catalog can support multiple lines of business and multiple layers, it should be dynamic enough to provide different display options for the different cases. For example, a network implementer may require a visual graph that will show relations between services in a graphical manner, while a product manager will require a dedicated view that displays only the product offerings that are under his domain of responsibility. Creating different custom views for different roles is a mandatory requirement in such a catalog.
* Partner integration for both export and import of catalog entities:
  + Export to external partners: A Catalog Management application should include the ability to allow partners (e.g. Content Providers, or other SPs) to browse in catalog in real time or batch mode. Not all data shall be exposed; security and access control (as mentioned above) are essential features
  + Import from external partners: External partners may want to populate catalogs with their own (entities) specifications and be able to create associations with existing entities. Access control, validation and testing must be set appropriately.

**Supported Business Services**

*To Be Added*

### Fallout Management

**Application Identifier:** 11.2

**Overview**

Fallout Management applications manage the manual steps within an order flow. These steps might be due to an error, an exception, or simply a planned manual step.

Fallout can come from order management applications within the customer, service, or resource layers

After the fallout/manual step is addressed, the order flow will presumably continue from that point within the ordering flow.

**Functionality**

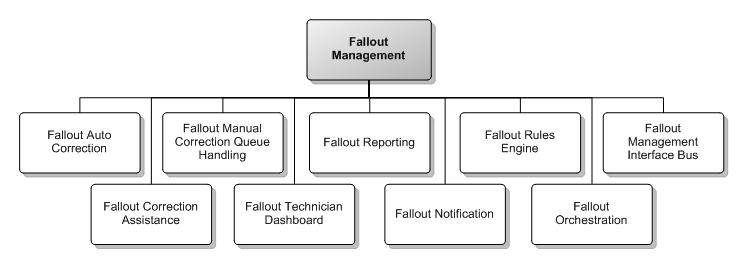
Fallout Management applications provide the following key functionality:

* Auto Correction
* Correction Assistance
* Manual Correction Queue Handling
* Fallout Dashboard
* Fallout Interface Bus
* Fallout Reporting
* Fallout Notification
* Fallout Rules Engine
* Fallout Orchestration

**Supported Business Services**

*To Be Added*

## 11.2 Fallout Management



1. 11.2 Fallout Management

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After the fallout/manual step is addressed, the order flow will presumably continue from that point within the ordering flow.

**Functionality**

Fallout Management applications provide the following key functionality:

* Auto Correction
* Correction Assistance
* Manual Correction Queue Handling
* Fallout Dashboard
* Fallout Interface Bus
* Fallout Reporting
* Fallout Notification
* Fallout Rules Engine
* Fallout Orchestration

**Supported Business Services**

*To Be Added*

### Fallout Auto Correction

**Application Identifier:** 11.2.1

**Overview**

Fallout Auto Correction applications attempt to fix order errors before they go to a human for handling.

**Functionality**

Fallout Auto Correction applications attempt to fix order errors before they go to a human for handling. This is accomplished by recognizing the type of error and performing various corrective actions via the Fallout Rules Engine, accessing and/or correcting information in various repositories / systems throughout the fulfillment domain.

**Supported Business Services**

*To Be Added*

### Fallout Correction Assistance

**Application Identifier:** 11.2.2

**Overview**

Fallout Correction Assistance applications collects relevant information for errors or situations that cannot be handled via Auto Correction.

**Functionality**

Fallout Correction Assistance applications collects relevant information for errors or situations that cannot be handled via Auto Correction. The intent is to reduce the time required by the technician in diagnosing and fixing the fallout.

**Supported Business Services**

*To Be Added*

### Fallout Manual Correction Queue Handling

**Application Identifier:** 11.2.3

**Overview**

Fallout Manual Correction Queue Handling applications provides the required functionality to place error fallout into appropriate queues to be handled via various staff or workgroups assigned to handle or fix the various types of fallout that occurs during the fallout process.

**Functionality**

Fallout Manual Correction Queue Handling applications provides the required functionality to place error fallout into appropriate queues to be handled via various staff or workgroups assigned to handle or fix the various types of fallout that occurs during the fulfillment process. This includes the ability to create and configure queues, route errors to the appropriate queues, as well as the ability for staff to access and address the various fallout instances within the queues.

**Supported Business Services**

*To Be Added*

### Fallout Technician Dashboard

**Application Identifier:** 11.2.4

**Overview**

Fallout Technician Dashboard applications provide staff the means to access to a variety of tools and information to assist in the handling of order fallout.

**Functionality**

Fallout Technician Dashboard applications provides a means for fallout management staff to easily access information about the given order. It can include:

* Auto logon capability into various applications needed to analyze and fix fallout
* Automatically position the analyst on appropriate screens pre-populated with information about the given order

**Supported Business Services**

*To Be Added*

### 

### Fallout Reporting

**Application Identifier:** 11.2.5

**Overview**

Fallout Reporting applications provide fallout management specific reporting.

**Functionality**

Fallout Reporting provides various reports regarding Fallout Management, including statistics on fallout per various times periods (per hour, week, month, etc.) as well as information about specific fallout.

**Supported Business Services**

*To Be Added*

### Fallout Notification

**Application Identifier:** 11.2.6

**Overview**

Fallout Notification applications provides the means to alert people or workgroups of some fallout situation. Email, paging, rules for notification alert

**Functionality**

Fallout Notification applications provides the means to alert people or workgroups of some fallout situation. This can be done via a number of means, including email, paging, etc. This function is done via business rules.

**Supported Business Services**

*To Be Added*

### Fallout Rules Engine

**Application Identifier:** 11.2.7

**Overview**

The Fallout Rules Engine provides the capability to handling various errors or error types based on built rules.

**Functionality**

The Fallout Rules Engine provides the capability to handling various errors or error types based on built rules. These rules can facilitate auto correction, correction assistance, placement of errors in the appropriate queues for manual handling, as well as access to various systems via the Fallout Interface Bus.

**Supported Business Services**

*To Be Added*

### Fallout Orchestration

**Application Identifier:** 11.2.8

**Overview**

Fallout Management Orchestration applications provide workflow and orchestration for the Fallout Management area.

**Functionality**

The Fallout Orchestration application provides workflow and orchestration capability across Fallout Management.

**Supported Business Services**

*To Be Added*

### Fallout Management Interface Bus

**Application Identifier:** 11.2.9

**Overview**

Fallout Interface Bus applications provides a variety of tools to facilitate Fallout Management access to other applications and repositories to facilitate proper Fallout Management.

**Functionality**

Fallout Interface Bus applications provides a variety of tools to facilitate Fallout Management access to other applications and repositories to facilitate proper Fallout Management.  This can include various general access techniques such as messaging, publish and subscribe, etc. as well as specific APIs and contracts to perform specific queries or updates to various applications or repositories within the fulfillment domain.

**Supported Business Services**

*To Be Added*

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# 12. Appendix: Frameworx Basics

This Application Framework (Application Framework – TAM) 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 communications operator. It is a fundamental part of the overall TM Forum Lean Operator program and TM Forum’s core technical roadmap: Frameworx that the communications industry worldwide is using as a guide to help the evolution of its processes and systems.

The core aim behind Frameworx 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

## What is Frameworx?

Frameworx 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 Frameworx tools, and the clearly defined methodology for using them, assist the user to define, design and build Frameworx compliant solutions that can easily integrate into any Frameworx compliant environment. As such, Frameworx delivers measurable improvements in development and software integration environments through use of standards processes, reuse of components, and repeatable cycles.

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

Automating 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

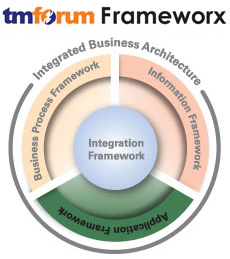
Defining integration architecture

Defining integration interfaces

The elements of Frameworx align directly with the steps in this process automation approach.  As a result, Frameworx gives service providers the tools they need to undertake automation projects with confidence. Frameworx-based solutions use industry-accepted IT concepts and technologies to deliver a more productive development environment and efficient management infrastructure.  Frameworx is prescriptive for only those few ‘cardinal points’ where interoperability is of over-riding importance. Frameworx 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 Frameworx fit together to provide an end-to-end system for OSS development, integration and operations.  The elements of Frameworx 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.

#### Frameworx is based on 4 key frameworks:



1. Figure 1: Frameworx

#### Business Process Framework

The business process framework (TMF GB 921, the Business Process Framework) 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 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 Business Framework (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 operational processes and IT operational processes.

As with other 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 business process framework provides an external, neutral point of resolution of internal process differences.

#### Enterprise-wide Information Framework

This framework (TMF GB922 – the Information Framework (SID)) 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, 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 Information Framework 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 Information Framework is a reference library for defining information in an OSS.

#### Integration Framework

For today’s Communications Service Provider, software rather than the network is the enabling function. This is driving the rate of service innovation to new levels. To cope, Service Providers are turning to software technologies, such as Service Oriented Architecture, and industry standards to gain business agility and flexibility. These are provided by the TM Forum [Frameworx](http://www.tmforum.org/Frameworx/1911/home.html) Integrated Business Architecture.

As an important component of [Frameworx](http://www.tmforum.org/Frameworx/1911/home.html), the Integration Framework shows how the [Business Process](http://www.tmforum.org/BusinessProcessFramework/1647/home.html), [Information](http://www.tmforum.org/InformationFramework/1684/home.html), and [Application Frameworks](http://www.tmforum.org/ApplicationFramework/2322/home.html) interact to:

1. Develop a catalogue of Business Services based on Service Oriented principles. TM Forum's Business Services are an extension of [NGOSS](http://www.tmforum.org/SolutionFrameworks/8428/home.html) contracts and define functional and non-functional aspects of a service
2. Develop a platform or domain-based enterprise architecture that provides the business agility required to compete in today's market

From large scale enterprise architecture redesigns to smaller scale integration projects, the Integration Framework provides the key tools needed for success.

#### Application Framework

This document (TMF GB929 – The Application Framework) 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.

## What are the Business Benefits of Using Frameworx?

Frameworx 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.

Frameworx delivers measurable improvements in development and software integration environments.

With Frameworx, 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 Frameworx 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 Frameworx frameworks are used.

Automation enables lower operational expenditure.  With Frameworx, 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 Frameworx 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.

## Core Frameworx principles

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

#### Enable an operator’s business transformation.

The core aim behind Frameworx 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.

Frameworx 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.

Frameworx has been specified to maximize the opportunities for re-use of business process components and integration with legacy systems. Frameworx 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 Business Service interfaces for each component.

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

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

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

Frameworx is aimed at the industry in general and is not restricted to any one sector in particular. Frameworx 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 Frameworx 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

Frameworx 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

Frameworx based applications represent a move away from standalone 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.

Frameworx 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 Business Service Interfaces between applications.

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

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

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

# 13. Change Log

# 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 Framework 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** |
| 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. |
| 3.3 | March 2009 | Piyush Sarwal | Post Release 3.0 Member Evaluation fix release. |
| 3.4 | March 31st 2009 | Tina O’Sullivan | Minor edits prior to posting. |
| 3.5 | 17 June 2009 | Alicja Kawecki | Minor updates to reflect TM Forum Approved status |
| 3.6 | July 2009 | Deena Freed | Made bug fix updates to TAM model and converted into document format. |
| 3.7 | 17th Aug 2009 | Piyush Sarwal | Re-entered sections which were removed in the conversion process |
| 3.8 | 20-Aug-09 | Tina O’Sullivan | Corrected template items which got distorted in conversion process. |
| 3.9 | 3-Sep-09 | Piyush Sarwal | Corrected errors from auto generate |
| 4.0 | June 12, 2010 | Piyush Sarwal | Edit version of the auto generated document |
| 4.1 | June 22, 2010 | Alicja Kawecki | Updated Notice, added footer, made minor cosmetic corrections, processed for web posting and ME |
| 4.2 | April 2011 | Application Framework Team | Submitted for Approval |
| 4.3 | May 2011 | Alicja Kawecki | Updated Notice, corrected header and footer, made minor cosmetic corrections for web posting and ME |
| 4.4 | July 2011 | Piyush Sarwal | Revised to address CR raised during Member Evaluation |
| 4.5 | September 2011 | Alicja Kawecki | Updated to reflect TM Forum Approved status |
| 4.6 | February 2012 | Piyush Sarwal | Updated for Fx R12.0 |
| 4.7 | April 2012 | Alicja Kawecki | Updated Notice, minor formatting and cosmetic corrections prior to web posting and Member Evaluation |
| 4.8 | October 2012 | Alicja Kawecki | Updated to reflect TM Forum Approved status |

### Release History

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| --- | --- | --- | --- |
| **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 | Review comments and other corrections post Member Evaluation of Release 3.0. |
| 3.1 | March 2009 | TAM Team | Review comments and other corrections post Member Evaluation of Release 3.1. |
| 3.2 | Sept 2009 | Application Framework Team | Review comments and other corrections post Member Evaluation of Release 3.2. |
| 4.0 | June 2010 | Application Framework Team | * Addition of Cross Domain Section * New Contribution to Catalog Management, Customer Problem Management, Service Test Management, Resource Test Management, Knowledge Management Service Performance Management, Resource Performance Management, Fault Management, Case Management, Fallout Management, and a number of updates to the Enterprise domain. * Definition updates also occurred to Customer Information Management, Service Inventory, Service Order Management, and Resource Order Management, |
| 4.5 | April 2011 | Application Framework Team | * Combines SLA function into a single application (function was split across Service and Customer Layer * Introduces Combined Charging Function * Improves Catalog Management section * Improves Workforce Management section * Improves Service Quality Management |
| 5.0 / Frameworx 12.0 | March 2012 | Application Framework Team | * Bill Calculation text was updated, Tax Applying was renamed Tax Calculation, and Invoice Generation (L3) was added * Receivables Management text was updated (all L2s associated with Receivables Management) and Payment Management was added as an additional L2 with L3s. * Voucher Management definition updated. * Billing Events L1 with L2s was added * Usage Management L1 with L2s was added, replacing Realtime Billing Mediation and Billing Data Mediation. * Location Management L1 added. * Network Number Inventory Management L1 added.   Sales & Marketing domain major updates and restructure. |

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