

Name: Sales Aids

Solution Management applications provide the necessary functionality to manage the analyzing, composing, and recommending of the right solution to a given potential customer.

Name: Sales Job Aids

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.

Name: Sales Product Support

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

Name: Compensation & Results

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

Name: Sales Compensation

The Compensation & Results application includes all functionality necessary to manage the compensation to a seller & sales performance against quotas, new sales and billed revenue, calculation of the compensation plans and results reporting.

Name: Compensation Results Reporting

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

Name: Channel Sales Management

Compensation Results Reporting applications provide compensation based reporting.

Name: Direct Sales Force

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

Name: Telesales

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.

Name: Retail Outlets

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

Name: Dealers

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.

Name: Virtual Network Operators (Dealers)

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

Name: Affiliates

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.

Name: Funnel Management (Deleted)

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.

Name: Sales Portals

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

Name: Internal Sales Portals

Sales Portals provide a single entry place for sellers to access various sales tools. Sales Portals are used by both direct and indirect sellers. There are different content, links, and capabilities offered for a given kind of seller.

Name: Indirect Sales Portals

Internal Sales Portals provide sales tools to internal sales groups.

Name: Contract Management

Indirect Sales Portal provides sales tools to indirect sales teams.

Name: Contract Generation

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

Name: Contract Implementation

Contract Generation applications provide the functionality to generate a contract.

Name: Contract Tracking & Storage

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

Name: Campaign & Funnel Management

Contract Tracking and Storage provides the ability to view customer's existing contracts, 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.

Name: Campaign Management

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

Name: Campaign Analytics

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.

Name: Campaign Design

The Campaign Analytics applications are responsible for analyzing existing and prospective

customers to help design appropriate product recommendations.

Name: Lead Generation & Management

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

Name: Campaign Execution & Refinement

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

Name: Campaign Performance Tracking

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

Name: Funnel/Workflow Management

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

Name: Solution Design

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

Name: Solution Pricing

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 with existing and orders in the pipe and tailor them according the customer requirements into solution(s).

Name: Proposal Management

Solution Pricing Applications provide functionality to determine the pricings for solution designs.

Name: Price Optimization

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

Name: Offer Management

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

Name: Sales Negotiation

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

Name: Solution Requirements Capture

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

Name: Sales Account Management

Solution Requirement Capture application enables the capture of customer solution requirement in the pre-sale phase.

Name: Customer/Prospect Data Acquisition

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

Name: Sales Account Assignment

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

Name: Sales Account Planning

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.

Name: Sales & Marketing Reporting

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.

Name: Product Strategy / Proposition Management

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.

Name: Product Catalog Management

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.

Name: Product Lifecycle Management

Product Catalog Management is using the Catalog Management application in the Common Domain for product offering related management. The application is a repository of product listings within a service provider and include the ability to design, create, augment and map new entities and supporting data. See: Common Domain Catalog Management for more information.

Name: Product Performance Management

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.

Name: Billing Inquiry, Dispute & Adjustment Management

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.

Name: Customer Information Management

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.

Name: Customer Hierarchy & Group Management

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.

Name: Customer Profile Management

Customer Hierarchy & Group Management provides the necessary functionality to manage the customer hierarchy for both business and residential type customers.

Name: Customer Credit Management

Customer Profile Management applications provide the necessary functionality to manage customer preferences and customer details.

Name: Customer Interaction Collection & Storage

Customer Credit Management applications provide the necessary functionality to manage information about the customer's credit as well as a means to provide a credit check.

Name: Customer Subscription Management

Customer Interaction Collection & Storage provides the necessary functionality to record all interactions with the customer from all channels.

Name: Transactional Document Production

Customer Subscription Management provides the functionality necessary to store and make available the products and services presently being used by the customer.

Name: Billing Events Management

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.

Name: Transactional Document Formatter

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.

Name: Transactional Document Generator

Transactional Document Formatter is 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.

Name: Document Delivery

Transactional Document Generator processes extract files provided by other modules (typically Billing) to produce an intermediate data format.

Name: Document Archiving

Document Delivery is the final runtime executable that creates the desired print, web, PDF, XML or ASCII print files from the document production engine.

Name: Customer Order Management

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

Name: Customer Order Establishment

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.

Name: Channel Guidance and Data Capture

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

Name: Customer and Product Data Collection

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.

Name: Customer Order Capture

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

Name: Offer Configuration

The Customer Order Capture function registers the orders independently of the sales channel used (internal distribution such as Telco Points of Sales, Outsourcer, external distribution such as Dealer, Reseller..., Telco Call Centres, Customer Self-Service, or the medium used (face-to-face, phone, Web/Wap, email, mail/ fax...). It can concern a new commercial offer order (for a new or an existing customer), the update of installed offer, products or the termination of some installed offers or products...

Name: Offering Availability

The Offer configuration function enables the configuration of the commercial offer chosen by the customer. The configuration verifies the technical / functional / commercial pre-requisites, compatibility constraints of this offer against the customer Installed Products. This function invokes a network function in order to check the technical feasibility and resource availability.

Name: Customer Order Validation

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

Name: Customer Order Orchestration

Customer Order Validation is, like enrichment, widespread ordering functionality, that checks the validity of the order.

Name: Customer Order Tracking & Management

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

Name: Customer Order Lifecycle Management

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

Name: Customer Order Enrichment

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

Name: Customer Order Acceptance

Customer Order Enrichment application enables acquiring the missing parts of the order information.

Name: Customer Order Rules Management

The Customer Order Acceptance application issues valid and complete customer orders.

Name: Customer Order Workflow Management

Customer Order Rules Management application is responsible for the management of rules used in order validations, enrichment or any dynamic, decision-based action.

Name: Customer Order Item Decomposition

Customer Order Workflow Management encompasses the order item and work item decomposition as well as Customer Order Orchestration Plan Creation.

Name: Customer Order Work Item Decomposition

Customer Order Item Decomposition prepares the customer order structure for breakdown into customer order items.

Name: Customer Order Orchestration Plan Creation

Customer Order Work Item Decomposition decomposes customer order items into a set of customer order work items.

Name: Customer Order Publication [DELETED]

Customer Order Orchestration Plan Creation makes an orchestration plan out of the set of customer order work items.

Name: Customer Order Distribution[DELETED]

Name: Customer Self Management

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

Name: Customer Self Empowered Fulfillment

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) through 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 primary 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.

Name: Customer Self Empowered Assurance

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).

Name: Customer Self Empowered Billing

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.

Name: Customer Insight Management

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

Name: Customer Satisfaction Validation

Customer Insight Management enables Service Providers to leverage customer insight gained from customer transactions, interactions and activities with the Service Provider to treat the customer in a personalized manner and provide a unique customer experience. Customer Insight gained can be applied to many domains pertaining to customer experience such as customer service, cross/up-sell, retention, etc. Although Customer Insight Management builds upon traditional business intelligence and analytics for customer transactions and interactions, it is unique as it provides real-time customer treatment for various aspects to provide relevant, timely, and personalized actions.

Name: Customer Profiling

Customer Satisfaction Validation applications provides functionality to validate that predicted/expected value is delivered by the product/ 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 function ensures that the customer is satisfied and that the product/ that was actually delivered meets original or updated expectations and agreements and that the product/ is operable by the customer. Additionally, these applications monitor customer behavior and/or capture customer input beyond sale related interaction in an effort to identify indicators that can suggest imminent churn are dissatisfaction Measurements can be collected via various tools such as Net Promoter Score (NPS) and made available for action by various service provider groups and supervisory staff.

Name: Customer Experience Monitoring

Customer profiling ("Profile") provides the necessary functionality for advanced customer profiling such as automatic and statistical based profiling of customers based on explicit preferences and implicit behaviour from usage, location, patterns of similar customers, etc. Although existing BI/DW customer segmentation can also be leveraged to arrive at the customer profiling, most of these systems are broad based customer profiles and do not create an individual profile for each customer. Also, Customer Profiling differs from customer experience monitoring & the rest of the functional blocks (see below) in that it is focused on customer preferences, tastes, and behaviour (ex. Soccer Fan, Movie buff etc.) rather than operational view of the customer such as "Late Payer".

Name: Customer Context Map Building

Customer Experience Monitoring ("Monitor") provides the necessary functionality for continuous monitoring of operational factors that qualify the customer experience such as financial (billing overage, payment, abnormal fee etc.), usage (failed attempts at using a particular service, inactivity or sudden decrease in usage of certain service etc.), technical (network related such as dropped calls, internet access problems, video buffering etc.& device related such as battery draining, configuration mismatch, etc.), Customer Influence and Churn Risk Analysis and the like. This should also include monitoring of relevant events from external sources such as Social Media, 3rd Party sites

etc.

Name: Customer Operational Decisioning

Customer Context Map Building ("Interpret") provides the functionality to accumulate customer context in the systemic memory based on "observations" made on the customer through processing the data collected from customer experience monitoring and historical analysis. The context could include items such as customer transactions, interactions which are both implicit & explicit. For example, when a customer pays his/her bill the context map is updated in real time to reflect the payment pattern and keep it up-to-date. Context map can be used by decision engines to drive appropriate treatment for customers based on recent behavior. For example a "late payer" or "chronic caller" may be treated differently from a normal payer or an occasional caller.

Name: Customer Recommended Action

Customer Operational Decisioning ("Decide") provides the functionality to drive decisions re: Customer treatment and action for each specific situation based on observing what the customer is immediately experiencing. For example if a customer's bill is unusually high, and if the customer is a premium customer, the business can decide to waive certain portion of the bill for the 1st time. This action can be taken either proactively by reaching out to the customer, or reactively when the customer contacts the Service Provider. These decisions can be deterministic (i.e. business rules based), statistical (i.e. based on what treatment or recommendation has worked in the past)

Name: Customer Service Representative Toolbox

Customer Recommended Action ("Apply") provides the recommendation for customer treatment based on the customer observation and context. It provides the necessary notification framework (outbound & inbound) to execute suitable action/treatment for the customer across the relevant channel, such as SMS, self-service, email, call center. It also integrates with existing business function/services and processes for action. For ex. integrate with existing credit adjustment process if the decision is to provide credit adjustment to the customer or invoke offer management for X/Up Sell or invoke Knowledge Management for Customer Service issues.

Name: CSR fulfillment

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.

Name: CSR assurance

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.

Name: CSR Billing

A CSR assurance application provides front end support for the application flows defined by the case management applications (cf. Case Management Applications). 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.

Name: Collection

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

Name: Payment

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.

Name: Billing Inquiry Dispute & Adjustment Management

The purpose of payment application is to accept customer payment via the customer service representative (CSR).

Name: Customer Problem Management

The purpose of Billing Inquiry Dispute & Adjustment Management application is to support the customer service representative (CSR) in Billing Inquiry, Dispute & Adjustment Management

Name: Customer Problem Qualification & Reception

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.

Name: Customer Problem Lifecycle Management

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

Name: Customer Problem Diagnostics

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.

Name: Customer Problem Resolution

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

Name: Customer Problem Verification & Closure

Customer Problem Resolution applications provide the necessary functionality to automatically resolve a customer reported or affected problem back to the original state (ie, restore service). This maybe done through fault resolution or implementing a bypass to the problem.

Name: Customer Problem Reporting

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, manual follow-up may be needed with

customer service representatives, if a complaint (or commendation) was placed against the individual, which need to be tracked. Appropriate actions must be taken, especially if trends are discovered.

Name: Receivables Management

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

Name: A/R Management

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.

Name: Journalization

Accounts Receivable (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.

Name: Financial Reporting

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

Name: Payment Management

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

Name: Payment Interface Management

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.

Name: Payment Validation & Authorization

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

Name: Payment Settlement

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

Name: Bill Inquiry

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

Name: Dispute Management

Billing Inquiry applications provide capabilities to view a given customer's invoice bill and supporting details in order to answer customer questions.

Name: Adjustments

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

Name: Bill Format / Render

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

Name: Billing Account Management

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.

Name: Billing Account Configuration Management

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.

Name: Billing Account Associations Management

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

Name: Collection Management

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

Name: Collection Policy Definition and Configuration

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.

Name: Collection Policy Execution and Monitoring

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.

Name: Collection Settlement

Collection Policy Execution and Monitoring starts with the decision for whether to initiate a collection process 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.

Name: Bill Calculation

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.

Name: Customer Bill Charge Calculation

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.

Name: Discounts Calculation

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.

Name: Tax Calculation

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.

Name: Commitment Tracking

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.

Name: Bill Cycle Run Management

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

Name: Invoice Generation

Bill Cycle Run Management applications provide appropriate capability to control bill cycle activities.

Name: Case Management

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.

Name: Case Definition and Configuration

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 reside 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).

Name: Case Workflow

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.

Name: Case Correlation & Analysis

Case 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.

Name: Case Tracking & Management

Case Correlation & Analysis applications provide appropriate functionality to relate cases to other reported cases (past or present) as appropriate.

Name: Case Reporting

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 creates and manages case worklists and oversees the transfer (dispatch or assignment) of the case to appropriate internal applications or work groups, as well as affiliates or partners & tracks the case until closed and notifies appropriate parties or applications when the case has been closed/completed.

Name: Case Archival

Case Reporting applications provide Case Management based reporting.

Name: Customer SLA Management

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

Name: Customer SLA Issue Reception

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.

Name: Customer SLA Collection

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.

Name: Customer SLA Analysis

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

Name: Customer SLA Violation Management

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

Name: Customer SLA Reporting

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

Name: Charge Calculation and Balance Management

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

Name: Charge Calculation

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.

Name: Balance Management

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.

Name: Billing Event Processing

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). Balance can be managed at most granule level for example at the level of subscription. These processes will be required to support both batch and real-time processing. Types of balances include: • Monetary balances o Prepaid balances o Postpaid balances •Non-monetary balances (e.g. free minutes, WAP-only quota, tokens, etc.)

Name: Billing Event Error Management

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.

Name: Customer Loyalty Management

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)

Name: Customer Program Management

Customer Loyalty Management applications are responsible for the management of the customer loyalty programs. This includes administration of the general program, prize management including management of prize partners, as well as loyalty balance management.

Name: Customer Loyalty Prize Management

Customer Loyalty Program Management is responsible for administration of the customer loyalty programs. This includes program rules and registration, management of customer loyalty profiles within the loyalty program, and all communication with the customer regarding the loyalty program.

Name: Customer Loyalty Balance Management

Loyalty Prize Management maintains the prize lists and prize redemption costs in terms of loyalty program points. It also assures that the program customer has the points necessary to select the given prize.

Name: Customer & Network Care

Loyalty Score Management calculates the customer loyalty score according the accumulation/decrease rules. Loyalty Score Management must manage accumulation of points

from more than one product source into one or more balance profiles. Loyalty score could decrease due to prize purchase, point expiration, etc. Score details can be accessed via various contact channels.

Name: Role-Based Portal

The Customer and Network Care domain supports all tools, technology and services that enable a Service Provider and affiliate Care organizations to support customer inquiries and requests. The domain encompasses Billing, Assurance, Ordering and Provisioning domains related inquiries/issues. This domain supports voice, chat, email, postal mail, and faxes. eService is noted but is addressed in a separate domain. The domain supports all operational tools used by the customer service / work center community including desktops and associated user interfaces. The domain also supports back-office operations as well as center management.

Name: Operations Portal

The Role-Based Portal focuses on eliminating swivel chair operations, increasing the flexibility of the work distribution, driving desktop consistency and reducing cost due to functional duplication. It also promotes role and user based personalization at the agent/center/team level. The portal provides the ability to combine business functionality (portlets) into a specific role that comprises the agent's end-to-end responsibilities.

Name: Center Efficiency Tools

The Operations Portal encompasses Portal Infrastructure for internal / center use into which functional components are plugged. The Framework provides the "foundation" for the development of agent-facing functionality.

Name: Center Administration

Center Efficiency Tools provides various non-portlet enabled scripts and tools for the agent to automate specific tasks. This function can also include terminal and system emulators (Citrix, Attachmate, etc).

Name: Center Productivity Management

Center Administration provides care-center administrators tools that enable them to efficiently manage center operations. Operations would include center productivity, performance metrics collection, training as well as force and skill assignment.

Name: Center Activity Management

Center Productivity Management collects metrics, productivity and resource data across all channels as well as desktop events for management reporting.

Name: Center Time Management

Center Activity Management includes the necessary functionality to track activities performed within a work center. These activities range from orders placed, sales closed, problems resolved, ticket closed, etc. Most work centers incorporate a detailed activity tracking mechanism with associated reporting for individual agent performance and is typically rolled up to support center-level performance as well.

Name: Center Budget Management

Center Time Management supports all of the time management of a service provider Agent/CSR/LCM etc....including tracking of hours worked, hours spent in training and other activities. It includes all time attributes used in the scheduling of resources to meet center SLAs. This function would also track time associated with a specific activity whether it be a short (single contact) or long running, multiple contact and team related activity. This aspect of time may span center resources.

Name: Center Quality Management

Center Budget Management includes the tracking of all center expenses including operating expenses as well as project expenses. This function is primarily used for managing project budgets where a project can have long durations, multiple parallel or sequential

activities and may involve work by multiple support resources.

Name: Center Compliance & Training

Center Quality Management supports the tracking of all quality components of a support (ordering, outage, provisioning, etc) project for completeness, accuracy, and customer satisfaction.

Name: Center Force & Queue Management

Center Compliance & Training manages compliance with customer service / work-center methods and procedures (M&Ps) & facilitates work center training, including integration to workforce scheduling and tracking.

Name: Contact Channel Management

Center Force & Work Queue Management administers work center workforce and associated skills-based work assignments. It addresses scheduling, work distribution/assignment and planning for current and forecasted center work-loads. Center Force & Work Queue Management also addresses work queuing and work assignment received from various channels including incoming calls, email, and back-office/front-office work distribution and queuing. Work Queuing can be on-line (active customer contact) or off line (no customer "on the line").

Name: Customer/Internal Collaboration/Chat

Contact Channel Management encompasses the means by which customers of a given service provider contact Service Providers as well as how service provider agents communicate internally. It also includes the means to transfer the communication from one channel to another. Contact Channel Management addresses the routing, queuing and assignment of new active customer request based on center utilization and available agents with the appropriate Skill assignment.

Name: Voice Channel Contact

Customer/Internal Collaboration/Chat supports the tools and integration of Customer or internal collaboration/chat between customer/agent, agent/agent, and agent/support group.

Name: Off-Line Contact Channel Management

Voice Channel Contact applications provides the means for a customer to speak to a service representative, including the mechanism to query the customer (e.g. – IVR) on the nature of their request, and routing of the contact to the best available agent and presentation to the agent of select call information.

Name: Channel Infrastructure

Off-Line Contact Channel Management provides the means to capture and manage activities that cannot or were not completed via an online channel contact. It also provides the means to place an activity on the "off line" queue that originated from an off-line channel such as email, postal mail, fax, etc. Note: An activity can be completed on a different channel from which the request originated.

Name: Privacy Dashboard

Channel Infrastructure represents the cross-channel components that drive consistency and analytics of the customer experience. Channel infrastructure would manage common contact event information such as transaction state, statistics, history, etc.

Name: Privacy Profile Type Creation

The Privacy Manager application is used to manage all aspects of the privacy of Data Subjects (End users), from the creation of Privacy Profile Types, their management, to the display of Privacy Profiles and provide functionalities for their modification and evolution. The Privacy Manager provides features depending on authorization and consequently roles of users : -Administrators : the administrators are in charge of the definition of the Privacy policy and consequently the creation of the Privacy Profile Type, the maintenance, evolution, depending on the ability of underlying components that

handles Personally Identifiable Information (PII). -Customer support : the customer support is in charge of the performing some operation on Privacy Profile on behalf of end-user. -End-user (Data Subject Party) : the end-user is able to view its Privacy Profile, the value of Privacy Profile attributes, and manage it.

Name: Privacy Data Exposure

Privacy Profile Type Creation (Administrators) : feature used to create the Privacy Profile Type and the associated Privacy Profile, including definition of elements from SID where privacy applies, the default and possible values for the rules of each element.

Name: Privacy Consent

Privacy Data Exposure (End-user): feature used to provide Data Subject Party the ability to view the current privacy profile attributes for Parties: data concerned by the Privacy Profile, associated default values of rules defined, current values of rules. The dashboard also provides possibility for Party to alter this Privacy Profile, based on authorized values. It gives the end-user a 360° view of the usage authorized or possible of its PII

Name: Service Catalog Management

Privacy Consent (End-user): feature used to obtain consent from the Data Subject at the time of an evolution of the Privacy Profile. This can be initiated by the Data Subject when s/he wants to create a new usage of its PII, or by the Service when requiring an evolution of the Privacy Profile to deliver a new scenario.

Name: Service Assurance Control

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.

Name: Service Inventory Management

Service Assurance Control is responsible for the execution of proactive and reactive rule based activities to ensure that services provided to customers are continuously available and performing according to set values for performance and quality. In cooperation with monitoring and orchestration applications the Service Assurance Control will create an autonomic closed loop control of the performance and quality as well as mitigation of service problems and fall-outs.

Name: Service-Resource Inventory

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.

Name: Service Inventory Reconciliation / Synchronization

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 fulfillment, 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 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.

Name: Service Order Management

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.

Name: Service Order Orchestration

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.

Name: Product/Service Order Decomposition

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

Name: Service Order Tracking & Management

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.

Name: Service Design/Assign

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

Name: Design Solution

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

Name: Assign/Procure Network Resources

Design Solution applications determine the end to end service design.

Name: Procure Access

Assign/Procure Resources applications determine facility and equipment availability.

Name: Procure CPE

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

Name: Service Configuration Management

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

Name: Service Activation Management

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.

Name: Service Order Publication

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

Name: Service Order Establishment

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

Name: Service Data Collection

Service Order Establishment applications provide the necessary functionality to establish a valid service order.

Name: Service Order Validation

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

Name: Service Availability

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

Name: Service Address Validation

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

Name: Service Availability Validation

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

Name: Service Termination Points Determination

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

Name: Determine Access Provider

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

Name: Determine Delivery Interval

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

Name: Service Problem Management

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

Name: Service Problem Reception

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. The present operational status is made available as notifications for immediate action in case of significant operational deviation.

Name: Service Problem Monitoring

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

Name: Service Problem Analysis

Service Problem Monitoring applications provide the necessary functionality to continuously monitor the present operational status of the provider's services. The present operational status is made available as notifications for immediate action in case of significant operational deviation.

Name: Service Problem Correction & Resolution

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. Service problems impacting the availability of customer services will notify operations applications for immediate manual or automatic mitigation or correction.

Name: Service Problem Tracking & Management

Service Problem Correction & Resolution applications provide the necessary functionality

to resolve the serve problem back to a normal operational state as efficiently as possible.

Name: Service Problem Reporting

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

Name: Service Problem Model Establishment

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

Name: Service Performance Management

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

Name: Service Performance Monitoring

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.

Name: Service Performance Analysis

Service Performance Monitoring applications provide the necessary functionality to continuously collect data and monitor the performance of the service provider's services. The collected data is logged and made available for further analysis, and present performance made available as notifications for immediate action in case of significant deviation.

Name: Service Performance Reporting

Service Performance Analysis applications provide the necessary functionality to continuously analyze the performance of the various service providers' services. The analyzed data is logged and made available for reporting, and present analysis results made available as notifications for immediate action in case of significant deviation.

Name: Service Test Management

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

Name: Service Test Strategy and Policy Management

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.

Name: Service Test Lifecycle Management

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

Name: Service Test Command and Control

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

Name: Service Test Services

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

Name: Service Quality Management

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

Name: Service Quality Model Establishment

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.

Name: Service Quality Collection & Monitoring

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.

Name: Service Quality Analysis

Service Quality Collection & Monitoring applications provide the necessary functionality to continuously collect and monitor service quality as determined by Service Quality Model Establishment. The collected data is logged and made available for further analysis, and present quality level made available as notifications for immediate action in case of significant deviation. Collects service quality related information from established sources, including service performance management, service problem management, third parties, and customers

Name: Service Quality Reporting

Service Quality Analysis applications continuously analyze and evaluate the quality of services being delivered by the service provider. The analyzed data is logged and made available for reporting, and present analysis results made available as notifications for immediate action in case of significant deviation.

Name: Service Capability Orchestration

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

Name: Service Lifecycle Management

Service Capability Orchestration application will perform automated service decomposition, service/services integration, coordination, and management in service deployment, service or connected activation and service element updating. The application function fulfills the needs of orchestration for Operation Support & Readiness, Fulfilment and Assurance and Billing domains applications with regards to Hybrid ecosystem.

Name: Resource Lifecycle Management

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

Name: Fault Management

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.

Name: Resource Commissioning & Configuration Management

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

Name: Implementation Planning

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

Name: Tactical Planning

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.

Name: Capability Specification Management

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

Name: Planning Design Automation

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.

Name: Spares & Warehouse Inventory Management

'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.

Name: Strategic Planning

Spares and Warehouse Inventory Management applications are responsible for managing the spare parts for the various Elements deployed in the network. Accurate tracking of these spares is necessary to ensure that correct spares are at hand to avoid extended period of downtime and are tightly integrated with the Supply Chain applications.

Name: Resource Inventory Management

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.

Name: Resource Order Management

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.

Name: Resource Order Orchestration

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.

Name: Resource Order Tracking & Management

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

Name: Resource Service Order Validation

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

Name: Resource Order Data Collection

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

Name: Resource Design / Assign

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

Name: Resource Availability

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.

Name: Resource Order Configuration Management

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

Name: Resource Order Publication

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.

Name: Resource Service Inventory Management (deleted)

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

Name: Resource Domain Management

Name: Resource Discovery

Resource Domain Management is the application area that provides exposed resource services that are available to all other application areas, including those others in the Resource Management layer. Resource Domain Management's roles are to hide the idiosyncrasies/complexities of the Network and its building blocks (Infrastructure, IT computing, and IT applications equipment etc.) from the rest of the OSS/BSS estate, freeing it to be agile and make it technology and vendor neutral. Resource Domains are defined as a set of entities building the networks and its building blocks of, Infrastructure, IT computing, IT applications, equipment etc., which have a common set of policies applied to them based on for example technology, topology etc. The general concept of a Domain allows for overlapping, provided there are no policy conflicts. But in principle they should not operate in any cross-domain capacity. It is the responsibility of the other Resource Management layer applications to perform any cross-domain functions such as forecasting, capacity planning and design, and or for co-coordinating activation, root cause analysis and performance monitoring.

Name: Resource Activation

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

Name: Resource Fault & Performance Data Mediation

Resource activation applications translates a fulfillment request as specific control commands for a network resource or IT resource often handling proprietary messaging with individual resources.

Name: OSS Inventory/Data Synchronization Management

Resource Data Mediation applications provide integration to network resource 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 responsible for monitoring fault and performance, such as a status monitoring application. Resource Data Mediation application ensures that the application using the information from various resources is not impacted by the technology/topology/implementation changes of the underlying resources.

Name: Resource Process Management (Workflow/ Integration)

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.

Name: Resource Change Management

Resource Process Management (Workflow/Integration) involves the workflow planning and integration between resource provisioning and change processes. A vital component in this job is the logistics coordination. Delays and logistic disturbances can have a huge negative impact the resource projects and a jeopardy management with early discovery of disturbances and that warns for consequences is vital.

Name: Jeopardy Management

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.

Name: Resource Logistics

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.

Name: Voucher Management

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.

Name: Resource Performance Management

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.

Name: Resource Performance Monitoring

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

Name: Resource Performance Analysis

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

Name: Resource Performance Reporting

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

Name: Fault Surveillance

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

Name: Fault Correlation & Root Cause Analysis

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

Name: Fault Correction & Restoration

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.

Name: Fault Reporting & Analytics

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

Name: Resource Test Management

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

Name: Resource Test Strategy and Policy Management

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.

Name: Resource Test Lifecycle Management

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

Name: Resource Test Command and Control

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

Name: Resource Test Services

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

Name: Resource Verification Management

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

Name: Workforce Management

Name: Workforce Schedule Management

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.

Name: Work Order Analysis

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

Name: Work Order Assignment & Dispatch

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.

Name: Work Order Tracking & Management

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.

Name: Workforce Configuration and Setup

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

Name: Workforce Management Reporting

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.

Name: Network Number Management

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

Name: Network Number Inventory Management

Network Number Management provides the necessary functionality for Number Inventory Management and Number Portability.

Name: Number Portability

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.

Name: Number Portability Policy Management

Number Portability application manages the end to end lifecycle of a portability request. This includes reception, validation of business rules and execution of set of policies, decomposition and orchestration of the request to ensure the correct functionality. In addition, Number Portability application also provides publication, risk & effectiveness management.

Name: Number Portability Orchestration

Number Portability Policy Management is responsible for managing different types of rules and policies validations, in base of the number portability request.

Name: Number Portability Risk & Effectiveness Management

Number Portability Orchestration provides workflow and communication mechanism that ensures the orders activation according to a criteria set, allowing in this way the correct execution of orders.

Name: Number Portability Validation

Number Portability Risk & Effectiveness Management allows the identification of risks and threats to the process, with appropriate controls to minimize or eliminate the identified risks.

Name: Usage Management

Number Portability Validation can perform calculations that determine whether the information received is reliable, safe and contains the minimum information required during implementation, enabling with this the orders rejection for those who do not comply with the defined criteria.

Name: Usage Event Processing

Usage Management is the conduit for usage events of various types and formats from the different event generating functions like networks, applications, infrastructures, "Management and Control" etc. to various processes such as billing, legal compliance, and service assurance. Usage Event records are collected/processed, edited, correlated, enriched, formatted and distributed to upstream systems. It is not necessary that all usage events are always charged but might be used for enrichment of other usage events. The Usage Management function supports various types of charging for sessions and events, for example, application instance, Max/Min usage based on flexible time intervals or active users of the application in both batch and real-time.

Name: Usage Event Error Management

The Usage Event Processing functions include collection, filtering, formatting,

aggregation, enrichment, correlation, consolidation, storage, and delivery of usage event records. These functions are required to support both file and event based (batch and real-time) processing. The Usage Management function supports various types of charging for sessions and events, for example, application instance, Max/Min usage based on flexible time intervals or active users of the application in both batch and real-time. Usage event records are of various types and formats and are generated from event generating functions like networks, applications, infrastructures, "Management and Control" etc. Not all events in the scope of Usage events are always charged but might be required for correlation and enrichment of other usage events records. 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, Orchestrator.

Name: Location Management

The Usage Event Error Management function accepts usage records which have been identified as being non-process able 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., or failures due to insufficient balance to execute the Management and Control events like (Resource reservation request). 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)

Reporting back error to the Event generating system/functional block with the information that caused the failure. Specifically required for failures of Management and Control events.

Name: Resource Capability Orchestration

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).

Name: Resource Catalog Management

Resource Capability Orchestration application will perform automated Resource Task Item decomposition, integration of one or more resources, coordination, and management in resource deployment, resource instantiation and resource element updating. The application function fulfills the needs of orchestration for Operation Support & Readiness, Fulfilment and Assurance domains applications in the Resource Layer with regards to Hybrid ecosystem.

Name: Partner Strategy

Resource Catalog Management is using the Catalog Management application in the Common Domain for Resource Management. The application is a repository of resource listings within a service provider and include the ability to design, create, augment and map new entities and supporting data. For resources of different resource types such as directory numbers, addresses, cables and network devices the Catalog Management could typically be realized in separate implementation of the Catalog Management. See: Common Domain- Catalog Management for more information.

Name: Partner Order Management

Partner Strategy Management is the ability to capture and manage the detail of a company's strategy and resulting propositions/plans, that will drive its engagement with partners . This capability allows the management to define this information at the enterprise level. Finally, it provides the ability to link the partner propositions to the actual actions starting from agreement, onboarding and working with partner and tracking its performance. Partner Strategy is an action plan for meeting the objectives of an enterprise's operating strategy for working/collaborating with partners. The scope of Partner can be, but not

limited to reseller, supplier etc. Partner Propositions/Plans are concrete steps on how the strategy to engage with partner will be realized. The partner engagement is influenced by various factors but not limited to e.g. geography, regulatory, product and services offered etc. It also considers security, financial risk, environmental and legal issues, agreement etc. which are essentially important to fulfill the business objectives.

Name: Partner Strategy Definition

TBA

Name: Partner Strategy Implementation

Partner Strategy definition provides the capability to develop, read, create and update a strategy to work with partners at organization level. The partner strategy definition is influenced by various factors but not limited to e.g. geography, regulatory, product and services offered etc. It also considers security, financial risk, environmental and legal issues, agreement etc. The application provides capability to capture the factors and risks influencing the strategy definition.

Name: Wholesale / Interconnect Billing

Partner strategy implementation application provides the capability to plan, implement and follow-up the progress of strategy adoption. It also provides the capability to streamline the partner strategy at organization level. Partner Strategy Implementation is the adoption of strategy by various levels of the organization. At different levels of organization, the strategy is translated into policies etc. for implementation and usage.

Name: Tender Management

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.

Name: Partner Workflow Management

Tender Management application provides the capabilities to create and manage the tenders that the enterprise make available for its partner to bid. Every tender can have associate workflow for its creation, approval & finalization, including the workflow for the bidding process of the tender.

Name: Partner Problem Management

Partner Workflow management application provides functionalities to ensure that a consistent interaction with partner is in place. This includes interaction to support operational requirements for Fulfilment, Assurance and Billing.

Name: Partner Information Management

TBA

Name: Partner Hierarchy & Group Management

Partner Information Management ensures the delivery of a consistent, accurate and complete partner view across the enterprise domain. Thus enabling the enterprise to work closely with partner and leverage partner capabilities to new revenue opportunities, according to the defined Partner Strategy.

Name: Partner Profile Management

Partner Hierarchy & Group Management provides the necessary functionality to manage the

partner hierarchy and groups. An enterprise can work/co-operate with different hierarchy levels and groups as per defined strategy.

Name: Partner Financial Risk Management

Partner Profile Management applications provide the necessary functionalities to manage partner preferences and partner information details. This includes the two different types of information; one is the internal profile created by the enterprise for internal usages and another one is the detailed information for collaboration with the partner.

Name: Partner Interaction Collection & Storage

Partner financial risk management applications provide the necessary functionality to manage information about the partner's financial status and associated risks. It helps the enterprise to make decisions based on partner financial status while working with the partners. The financial risk associated with partners can be collected from 3rd parties/institutions and stored locally by enterprise for future internal use. In many cases the financial risk is assessed before making any new business engagement with the partner.

Name: Partner Agreement Management

Partner Interaction Collection & Storage provides the necessary functionality to record all interactions with the partners from all channels.

Name: Partner Product Offering Onboarding

Partner Agreement Management applications provide necessary functionality to facilitate an agreement with partner pertaining to a given business partnership. An enterprise can have multiple agreement with partner based on various product & services and at various levels e.g. Frame agreement, Revenue share agreement etc.

Name: Product Offer onboarding & Lifecycle Management deleted)

Partner Product Offering (Product, Service, Resource or capabilities) onboarding application provides functionalities to onboard the partner product offering and manage its lifecycle within the CSP domain. The application functionality is limited to only onboarding of the partner products, how it will be made available to the market is taken care by the existing product, service and resource domain applications of the CSP.

Name: Revenue Assurance Management

TBA

Name: Supply Chain Management

Revenue Assurance is the collection of data quality and process improvement methods that reduce leakages, improve profits, revenues and cash flows without influencing demand. Although, as its name suggest, Revenue Assurance is mainly about revenues and profits, revenue assurance activities in a communications organization has significant implications on operational and strategic aspects of the service provider. These methods can be employed in proactive, active, or reactive manners as part of providing "Revenue Assurance" for the service provider.

Name: RA Control and Configuration

Supply Chain Management provides the necessary functionality to support the planning of needed materials and services, procurement of these materials and services, stocking and shipping preparation, and transportation to their final destination.

Name: RA Tracking & Management

RA Control & Configuration establishes the policies and rules to be applied to the Revenue Assurance process. It includes baselining acceptable limits and values from which actions will be taken. RA Control & Configuration also assures that the RA process is executing according to specified rules and controls.

Name: RA Monitoring

RA Tracking & Management applications provide necessary functionality to assure that Revenue Assurance anomalies are remedied in an efficient manner. This is done by monitoring the lifecycle of revenue assurance activities, including monitoring, analysis, and initiation of correction & recovery.

Name: RA Analysis

RA Monitoring applications provide the necessary functionality to collect and monitor data from within fulfillment, assurance, and billing, as well as information from supplier/partner transactions. This includes data collected from the product, service, and resource (network) layers. RA Monitoring applications also pull data from multiple sources and bash the results. These applications also analyze processes (both inter-process and intra-process) for RA anomalies. RA Monitoring looks for situations that are outside of the established baselines and triggers alerts when those situations are detected for further analysis. RA Monitoring looks for both "immediate" anomalies as well as predicts anomalies via trend analysis. RA Monitoring can also consider proactive measures such as acceptance testing of new or updated products, business or system flows, etc.

Name: RA Correction & Recovery Initiation

RA Analysis provides the necessary functionality to investigate and diagnose revenue assurance anomalies identified via RA Monitoring. This can include both automated analysis per established RA policies and business rules as well as manual analysis/investigation.

Name: RA Reporting

RA Correction & Recovery Initiation provides the necessary functionality to initiate correction of the revenue assurance anomalies as well as recovery of the lost revenue.

Name: HR Management

RA Reporting provides the necessary functionality to report on the status of revenue assurance activities and provide management reports.

Name: Payroll Management

HR Management provides the necessary functionality for managing the service provider's workforce. This includes the means 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

Name: Performance Management & Feedback

Payroll Management provides the necessary functionality to accurately pay employees for time worked, plus other compensation less applicable withholdings and deductions while meeting legal and regulatory reporting requirements.

Name: Governmental & Regulatory Tracking & Reporting

Performance Management & Feedback provides the necessary functionality to evaluate and develop a workforce.

Name: Time Reporting & Attendance Management

Governmental & Regulatory Tracking & Reporting provides the necessary functionality to track the implementation of governmental & regulatory rules or requirements, along with the means to report as required to various Legal and Regulatory bodies.

Name: Recruitment & Staffing

Time Reporting & Attendance Management provides the necessary means for tracking work time and attendance. It also applies time rules.

Name: Ethics & Compliance

Recruiting and Staffing is the processes of ensuring the company has the right labor force to meet company objectives. This includes the right skilled labor force, the right sized labor force and a productive labor force. It also ensures that a company meets legal,

regulatory and internal requirements.

Name: Employee Records Management

Ethic & Compliance ensures the company complies with legal and regulatory requirements as it relates to hiring and labor practices. It ensures that employees and other associated with the company are trained on ethical practices. The application also ensures that the company has instituted reasonable protections against those that would practice unethical behavior.

Name: Awards & Recognition

Employee Records Management provides the necessary processes, guidelines and solutions for managing and retaining employee records.

Name: Salary Planning

Awards & Recognition provides the necessary guidelines and tools to properly and in a consistent way recognize and award employees.

Name: Corporate Communications

Salary Planning provides the necessary budgeting, compensation guidelines and analytics to support compensation plans.

Name: Community Involvement

Corporate Communications for HR has the responsibility of communicating to the employee's key corporate information through multiple communications paths.

Name: Labor Relations

Community Involvement supports good corporate citizenship by lending and or supporting a company's talent and resources for the good of a community. Community Involvement builds trust and a positive image between a corporation and its community.

Name: Corporate Training

Labor Relations has the responsibility to bring together unionized labor, corporate goals and legal requirements to establish and execute labor agreements.

Name: Benefits Management

Corporate Training has the responsibility to train the workforce to meet current and future skill demands.

Name: Financial Management

Benefits Management has the responsibility of developing and administering a company's benefit program that is cost effective, competitive and sustainable. Primary benefit areas include Healthcare and Pensions.

Name: Financial Core Operations

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

Name: General Ledger

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

Name: Financial Controls, Editing, & Reference Data

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.

Name: Accounts Payable

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.

Name: Fixed Assets

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

Name: Project Accounting

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.

Name: Employee Expense Reimbursement

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.

Name: Capital Lease Management

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

Name: Financial Core Operations Reporting

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.

Name: Financial Business Unit Reporting

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

Name: Corporate Tax

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

Name: Corporate Treasury

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

Name: Cash Reconciliation & Escheatment

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

Name: General Ledger Account Reconciliation

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.

Name: Auditing

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.

Name: Regulatory Accounting

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

Name: Asset Management

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

Name: Corporate Real Estate

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.

Name: Real Estate Property & Building Portfolio and Lease Management

Corporate real estate asset management focus on maximizing property value for investment purposes. Asset management, is to cultivate market value so ownership can increase its returns.

Name: Real Estate Facility Operations Management

Real estate property management prioritize to increase the building's Net Operating Income and value. Building portfolios manages different types of property and in different real estate markets. Lease Management plans, tracks, manage and maintain all aspects of leased real estates.

Name: Space Planning

Real Estate Facility Operations Management prioritize the day-to-day operations for the user's/occupier's needs and demands. Real Estate Facility Management function supports the Facility Managers control of the expenses and operational planning.

Name: Real Estate Asset Capital Planning

Space Planning offers a visual way to format, update and report property space information. It allows to measure space efficiency and quickly identify vacant and underutilized space, used for planning and space optimization. It supports benchmarking facility performance, and determine the total cost of occupancy.

Name: Environmental Health & Safety Monitoring and Compliance Management

Real Estate Asset Capital Planning supports the process of budgeting Real Estate Assets for the future long term plans. Analysis and market planning to find the best markets and the best locations within those markets for investment or leasing.

Name: Real Estate Capital Construction Management

HSE (Healthy, Safety & Environmental) aspects of real estates, and equipment and services related to the real estates needs to be evaluated continuously to comply to applicable laws and relevant industry standards. To achieve a good HSE management there is a need for supporting applications to have knowledge about applicable laws and regulations, setting up policies and objectives with monitoring/follow up, and auditing and reviews.

Name: Damage Claims Management

The construction process, and the documents involved for each construction phase, in addition to the number diverse stakeholders and complicated workflows calls for a specialized project management.

Name: Fleet Management

Asset claim management is for the tracking of claims regarding anything considered valuable to an organization, whether tangible or intangible. Asset claim management is used to process inventory claims for theft or damaged inventory. Similarly, for Intangible assets, claims apply to trademarks, intellectual property rights and engineering claims, copyright claims, franchise claims, and contract claims.

Name: Security Management

Fleet Management is a function which allows companies which rely on transportation in business to remove or minimize the risks associated with vehicle investment, improving efficiency, productivity and reducing their overall transportation and staff costs,

providing 100% compliance with government legislation (duty of care) and many more.
(Source Wikipedia)

Name: Corporate Security

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

Name: Employee Identification Management

Corporate security identifies and effectively mitigates or manages, at an early stage, any developments that may threaten the resilience and continued survival of a corporation. It is a corporate function that oversees and manages the close coordination of all functions within the company that are concerned with security, continuity and safety. (Source Wikipedia)

Name: Building Access Management

Securing the employees to have a correct identification with the right authorities to be used in the overall Corporate security.

Name: Application Security

Providing functions so only the right people have the right access, to premises, buildings and areas within buildings

Name: Vulnerability Management

Providing functions so only the right people and systems have the right access, according to authentication and authority. This may call for e.g. > User Management through a central user repository > User - Role Management > Authentication with Single Sign-On > Authentication with "Strong Authentication" if needed > Authorization that is Role and Rule based, and Central Authentication based

Name: Anomaly Management

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

Name: Lawful Interception

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

Name: PKI and Digital Certificates

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

Name: Knowledge Management

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

Name: Intellectual Asset Management

Knowledge Management (KM) application supports the identification, collation, labeling, storage and sharing of knowledge. Knowledge includes insights, experiences, intellectual properties (both external and internal), organizational processes and practices that are vital for the enterprise operation and development. It ensures that an organization is having access to the same set of Information and Data about the Knowledge which is acquired with the time and past experience.

Name: Enterprise Information and Collaboration Management

Create, read, update and delete to enable the life cycle management for Internal & external intellectual assets used by the enterprise.

Name: BI Delivery Mechanism(Deleted)

Enterprise Information and Collaboration Management application is responsible for managing the Information of insights related to enterprise processes and practices, market etc. It provides tools and technologies for the development and enhancements of enterprise operations through using/sharing the Information.

Name: BI Reporting(Deleted)

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.

Name: BI Performance Management(Deleted)

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.

Name: BI Supporting Applications(Deleted)

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.

Name: BI Analytics(Deleted)

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.

Name: BI Data Management(Deleted)

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.

Name: DM Data Storage & Archival(Deleted)

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

Name: DM Access & Transformation(Deleted)

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

Name: DM Data Integration & Context(Deleted)

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

Name: DM Data Presentation & Distribution(Deleted)

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.

Name: Content Management

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.

Name: Knowledge Hosting and Sharing

Content Management Application enables enterprise to Acquire, Document, Host and Share knowledge.

Name: Knowledge Acquisition & Documentation

Knowledge Hosting and Sharing application enables knowledge management to make the available Knowledge accessible to the right stake holders. It allows storage, discovery and listing of available knowledge and also applying policies and rules associated with the Knowledge items

Name: CM Portal & Discovery (Deleted)

Knowledge Acquisition and Documentation application enable identifying the enterprise vital knowledge, labeling the identified knowledge item and documenting it in the knowledge base.

Name: CM Distribution & Acquisition(Deleted)

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

Name: Business Intelligence (BI)(Deleted)

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.

Name: Data Management(Deleted)

Business Intelligence (BI) refers to skills, technologies, applications and practices used to help a 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 (BI/DW) 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 the enterprise.

Name: Fraud Management

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.

Name: Regulatory & Compliance Management

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.

Name: Administrative Services

Applications to stay on top of changing laws, regulations, industry specific regulations, standards, and internal policies.

Name: Legal

Legal Administrative Services provides legal services like assistance and advice on issues such as procurement, contracting, public law and related activities. Record Retention management assure compliance with federal and state laws, legal requirements or expectations, enterprise policies and procedures for the management of data and information related to the enterprise's operation . Advertising Administrative Services are primarily dealing with the enterprise's common advertising needs like Corporate advertising (that is more public relations than sales promotion) and Recruitment advertising.

Name: Records Retention Management

Legal Administrative Services provides legal services like assistance and advice on issues such as procurement, contracting, public law and related activities.

Name: Advertising

Record Retention Management assure compliance with the retention aspects of federal and state laws, legal requirements or expectations, enterprise policies and procedures for the management of data and information.

Name: Project Management

Advertising Administrative Services are primarily dealing with the enterprise's common advertising needs like Corporate advertising (that is more public relations than sales promotion) and Recruitment advertising.

Name: Transportation & Travel Service

Project Management Tools application for resource and time planning, follow up of resource and time utilization and reporting of project progress and follow up results.

Name: Supply Chain Planning

Online Reservations and Agent-Assisted Bookings providing a robust online booking tool. Transportation Management function that provide planning of materials to be shipped to and from different locations.

Name: Procurement

Supply Chain Planning provides the necessary functionality to plan materials and services which will be required by the business for both customer orders and internal needs.

Name: Transportation Management

Procurement Management provides the necessary functionality to manage the requisitions for material and placing the orders with the contracted supplier/partner. This includes orders placed in conjunction with a customer order as well as orders placed as part of service provider expansions of product, service, or network. A Supplier/Partner Order can also include a simple transaction with a supplier/partner concerning an application purchased via a product catalog, and the app is delivered.

Name: Logistics Management

Transportation Management applications provide workflow and orchestration for the planning of materials to be shipped to and from storage locations. This is done in conjunction with both the suppliers and the Logistics fulfillment process in order to optimize the utilization of internal and 3rd party carriers.

Name: Supply Chain Order Tracking Management

Logistics Management is integral to the supply chain and provides the necessary functionality to manage receipt of fulfillment orders, inventory control choices, and

packing requirements. Logistics also manages inbound shipments, outbound shipments and communication between suppliers. As well as involves overseeing the key links in the supply chain, such as shipping decisions, inventory control choices and packing requirements.

Name: Data Management

Supply Chain Order Tracking Management provides the necessary functionality to track the movement of shipments from point of origin through cross-docks, and to the final destination.

Name: Data Store Management

The Data Management (DM) application(s) provides functionalities to collect, store and make data available for consumption by applications inside and outside organization. They provide functionalities to ensure that the requirements for data security, integrity, quality, privacy are met and they comply to enterprise guidelines and standards.

Name: Data Storage and Archival

Data Store Management application (s) provides the functionalities to manage the data stores including lifecycle, structure, meta models and auditing to ensure that the Data Stores are available for use by Data Management applications.

Name: Data Distribution Management

Data Storage and Archival application provides functionalities to manage the lifecycle of data. Including read, creation, updating, deletion and data archival as per compliance policies. This includes log information for audit and reporting purposes to ensure that the stored data follows the data compliance guidelines.

Name: Data Compliance and Policy Management

Data distribution management application provides functionalities to control the access to the data on request or according to configuration or subscription. The distribution of data is done in accordance to Compliance and Policies.

Name: Data Transformation and Formatting

Data Compliance and Policy management application provides functionalities to define and manage the data compliance policies and rules e.g. the data privacy, data security and policies for trust management etc. It makes the policies and rules available for use by other Data Management applications.

Name: Enterprise Application Integration

Data Transformation and Formatting application works as a mediation layer to enable Data Management applications to provide seamless interface to make the data ready for storage and make it available for consumption as per application specific format. It also provides functionalities to secure data for e.g. (encryption of credit/debit card details) as defined by data compliance guidelines.

Name: Business Process Management & Workflow

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 The following are two example solutions that can be found in the EAI sub-domain: • Managed File Transfer, referring to software for moving data, overcoming the limitations found in conventional FTP (e.g. support to multiple protocols, automation, security, auditability, monitoring, etc.). • Cache and Distributed Caching, which goals

are to provide performance and scalability to applications. 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.

Name: API Management

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 Framework 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 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 Framework 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.

Name: API Gateway

“APIBroker”, “APIGateway” or simply, “APIRuntime” High-performance, scalable, and low latency engine capable of mediating HTTP requests between API consumers and service enablers; Cache: Although completely optional to use, many times it is desirable or required to configure caching at the broker level for specific service enabler operation responses. By caching those responses, the broker can improve its responsiveness by reducing the number of requests to an underlying service enabler to whenever its responses are not already cached. Mediation of high throughput of HTTP requests between API consumers and services; Awareness and support of Web protocols semantics (MIME types, HTTP Authorization and Caching headers, etc.); Header transform: modifications of header names and/or header information (e.g., service enabler-specific header to IANA-based header) Support of Data Format, Data Model transformations and Protocol Bridging between most or all common Web standards (WS-*, SOAP, XML, REST, JSON, etc.); Parameter transform: modifications of parameter names and/or parameter values Method transform: modifications of the method specified in API request (e.g., POST to DELETE) Error information transform: modifications of error information in the body part of API response Status code transform: modifications of status code in the API response (e.g., 302 “Found” to 303 “See Other”) Information masking: filtering some information in the API response based on query parameters in API request or based on API provider’s policy Abstraction: conceptually transformations of the meanings of parameters or decrease of the number of request parameters Protocol transform: transformations of protocol to send API requests/responses (e.g., SOAP to REST) Mash-up (Composition): assembling a new API with existing APIs provided by service enabler. Content-based routing, fail-over, load balancing, and broadcasting of requests; Route: The broker Route task is the most commonly used task in a broker. A service enabler consumer issues a request to a given service; the broker Route task is responsible for forwarding that request to its underlying service enabler. Beyond the basic behavior of routing, the Route task should allow the parameterization of request timeout, HTTP keep alive connection, HTTP basic or digest authentication, URL decode, HTTP X-Forwarded-For/Host/Server, HTTP referrer, exception shielding configuration, HTTP status code, content based routing by regular expressions or xPath, etc. Support of standard authentication and authorization protocols (WS-Federation, SAML, OAuth, etc.), for both internal and external applications, API developers and users; Validate: The broker Validate task ensures that only valid messages (according to their contract’s schema) are routed to the remote host. This capability lowers dramatically the number of malformed messages that are presented to a given service enabler, and by doing so contributes to maximize the performance and scalability of that service enabler. Policy, Charging ; Rules Function: The Broker decision task makes it possible to have decision trees within a workflow or policy evaluation, at any nesting level. This is the basis for many possible micro-workflow related activities, making possible to configure a decision point structure where multiple option are present. The values tested in those options can be static or dynamically retrieved at runtime from the broker runtime context or from any part of the currently processed message. Diagnose: The Broker Diagnose task dynamically updates underlying management systems such as the Windows Management Instrumentation performance counters so that they can be monitored and reported upon by the monitoring service. Log:

The broker Log task enables the logging of any request or response at any time during the processing of a strategy. The task should be able to execute synchronously or asynchronously, and target a designated file system path, database server, HTTP URL, or email address. If configurable to run only for a specific request or response message of a specific user (or user role) the task can be targeted to a specific operation of a specific service enabler. These granularities together with the possibility to deliver the log information in different channels offer great flexibility for both operation and debug scenarios. CDR: creation of Call Detail Record for calculating API usage fee. Traffic Control: The broker limits the access from the valid service consumers based on the contract with service consumers or service enablers or based on the conditions of API broker itself or service enablers. Flow control (Inbound): access limitations based on the contract between API provider and application developers (e.g., throughput/quota/concurrent connections limit) Flow control (Outbound): access limitation based on the contract between API provider and service enablers or the conditions of service enablers (e.g., throughput/quota/concurrent connections limit) Application Management: managing account information for recognizing applications (e.g., API key/OAuth2.0's client_id, client_secret) and application developers. Data Encryption Key Management: managing data encryption keys to encrypt data in a case of sending sensitive data through API. Market or Store: In order to accomplish the task of commercial or business mediation, the Broker can implement for itself or communicate to some other external marketplace / store service. For example the broker should be able to count and track requests for any given request or response, and optionally cause the broker to refuse serving any more requests for a specific user if a configured request limit per service consumer or if a configured time frame is reached. Protect: The broker Protect task may impose access restrictions to some service consumers, in order to protect service enablers from abuse or undesired usage. Some common examples are the configuration of an IP address range restriction or a limit to the maximum message size accepted. API Lifecycle Management application Supports the processes required for designing, developing, testing, deploying, operating, reporting and retiring APIs; APICatalog Management: a common database containing metadata related to: API creation driven by project definition templates and configuration wizards, API dependencies registry, APIs search, API contracts management, API proxies and stubs code-generators, etc.; Access control policies based on a Role-Based Access Control (RBAC) system that restrict permissions for APIs creation and delivery, thus enabling different stakeholders experiences (for example: Catalog Manager, Service Developer, Service Operator, Service Owner, Product Manager, etc.); Configuration of all API Runtime behaviors (see previous component) using a model-driven language or other type of DSL (Domain-Specific Language); Real-time monitor and report QoS (requests per second, exceptions, latency, etc.); Developers Portal Technical/commercial API Catalogue; Easy to search and discover APIs; API documentation and code examples; Distribution of API keys and data encryption keys; Performance and usage reports; Technical support (online, email, forums, etc.).

Name: API Lifecycle Management

High-performance, scalable, and low latency engine capable of mediating HTTP requests between API consumers and service enablers

Name: Developers Portal

API Lifecycle Management supports the processes required for designing, developing, testing, deploying, operating, reporting and retiring APIs;

Name: Catalog Management

API integration developers Portal is based on a Technical / commercial API Catalogue with functions to easy search and discover APIs, find API documentation and code examples, performance and usage reports and linking to technical support (online, email, forums, etc.).

Name: Fallout Management

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

Name: Fallout Auto Correction

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 steps are addressed, the order flow will presumably continue from that point within the ordering flow.

Name: Fallout Correction Assistance

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

Name: Fallout Manual Correction Queue Handling

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

Name: Fallout Technician Dashboard

Fallout Manual Correction Queue Handling applications provide 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.

Name: Fallout Reporting

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.

Name: Fallout Notification

Fallout Reporting applications provide fallout management specific reporting.

Name: Fallout Rules Engine

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

Name: Fallout Orchestration

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

Name: Fallout Management Interface Bus

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

Name: Orchestration Management

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

Name: Supplier/Partner Management (Deleted)

Orchestration Management is a common domain application for automated instantiation, decomposition, coordination, and management in the area of deployment, activation and infrastructure element updating. It fulfills the needs of orchestration when applied in one or more business domains of a service provider's environment. Task Work Item here is referred as generic term which encompasses any work that Orchestration application is supposed to perform. Orchestration will follow applied policy rules for security, quality, deployment and performance.

Name: Supplier/Partner Settlements (Deleted)

Deleted