



## **MEF Specification**

### **MEF 50.1**

## **MEF Services Lifecycle Process Flows**

**August 2017**

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## 1. List of Contributing Member Companies

The following Member companies of the MEF participated in the development of this document and have requested to be included in this list.

Member Company
CenturyLink
Charter Communications
Ciena
Ericsson
Level 3 Communications Inc.
Oracle Communications
PCCW Global
PLDT Corp. Business Solutions
TDS Telecom
XO Communications

**Table 1 Contributing Member Companies**

## 2. Abstract

This document specifies process flows for the Third Network lifecycle, including Product Service Resource (PSR) Definition Lifecycle and Product Service Resource (PSR) Instance Lifecycle, examined from the perspective of external commercial product considerations and internal service and resource considerations. In addition, we examine these areas from the perspectives of TM Forum's Strategy Infrastructure Product Lifecycle and Operations Lifecycle.

The process model is composed of a series of process flows woven together to form the Third Network service lifecycle. Each process flow is composed using process elements that define processes performed within a Service Provider's organization. At the core, a single process describes functional activities or tasks required to deliver results or outputs. The process flows are graphically defined using UML activity diagrams and represent the process elements in an end-to-end process view both across the Service Provider's business, as well as between different organizations such as the Service Provider and partner or end Customer. Therefore, each process flow examines some specific scenario in which the processes achieve an overall business purpose for the Service Provider (e.g., order handling of Third Network services). The TM Forum's Business Process Framework, also referred to as the enhanced Telecom Operations Map (eTOM) [1], has an extensive definition of process elements and decomposition of these process elements applicable to a Service Provider's business. As such, this document leverages these process element definitions as the building blocks to creating the Third Network process flows. In a few instances, process elements required for Third Network did not exist in the eTOM framework and have been defined in this document.

### 3. Terminology and Acronyms

This section defines the terms used in this document. In many cases, the normative definitions to terms are found in other documents. In these cases, the third column is used to provide the reference that is controlling, in other MEF or external documents.

Term	Definition	Reference
Business Process Framework	The eTOM Business Process Framework is a reference framework for categorizing all the business activities used by an enterprise involved in delivering on-line Information, Communications and Entertainment services.	TMF GB921D [8]
Customer	A Customer is the organization purchasing, managing, and/or using Connectivity Services from a Service Provider. This may be an end user business organization, mobile operator, or a partner network operator.  <i>In the context of this document, the services can refer to any MEF Services.</i>	MEF 55 [9]
eTOM	enhanced Telecom Operations Map (a.k.a. Business Process Framework)	TMF GB921P [7]
Ethernet Virtual Connection (EVC)	An association of two or more UNIs that limits the exchange of Service Frames to UNIs in the Ethernet Virtual Connection.	MEF 10.3 [10], MEF 7.3 [11]
External Network-to-Network Interface (ENNI)	A reference point representing the boundary between two Operator networks that are operated as separate administrative domains.	MEF 26.2 [3]

Term	Definition	Reference
Lifecycle Service Orchestration (LSO)	Open and interoperable automation of management operations over the entire lifecycle of Layer 2 and Layer 3 Connectivity Services. This includes fulfillment, control, performance, assurance, usage, security, analytics and policy capabilities, over all the network domains that require coordinated management and control in order to deliver the service.	MEF 55 [9]
LSO Reference Architecture	A layered abstraction architecture that characterizes the management and control domains and entities, and the interfaces among them, to enable cooperative orchestration of Connectivity Services.	MEF 55 [9]
Operator Virtual Connection (OVC)	An association of OVC End Points	MEF 26.2 [3]
OVC End Point	A logical entity at a given External Interface that is associated with a distinct set of frames passing over that External Interface i.e., UNI, ENNI.	MEF 26.2 [3]
Orchestrated	Relating to automated service management across potentially multiple operator networks which includes fulfillment, control, performance, assurance, usage, security, analytics, and policy capabilities, which are achieved programmatically through APIs that provide abstraction from the particular network technology used to deliver the service.	MEF 55 [9]
Partner	An organization providing Products and Services to the Service Provider in order to allow the Service Provider to instantiate and manage Service Components external to the Service Provider domain.	MEF 55 [9]
Process	A Process describes a systematic, sequenced set of functional activities that deliver a specified result. In other words, a Process is a sequence of related activities or tasks required to deliver results or outputs.	TMF GB921CP [6]
Process Element	Process elements can be considered as the building blocks or components, which are used to 'assemble' end-to-end business Processes. A process element defines a process performed in an organization.	TMF GB921CP [6]

Term	Definition	Reference
Process flow	<p>A process flow graphically represents the behavior of process elements in an "end-to-end" or "through" Process view across the business (i.e., Enterprise). Such Process flows are not constrained to bridge across the entire Enterprise, they can have any scope that is meaningful and helpful to analyze (e.g., Service Activation Testing). Thus, process flows examine some specific scenario in which the processes achieve an overall business purpose.</p> <p><i>The MEF is using the UML activity diagram notation for documenting Process flows.</i></p>	TMF GB921P [7]
Product	<p>A Product is an implementation of a Service with specific technical and commercial details. A Product can also be considered a specific implementation of a Product Specification for the benefit of a third party.</p> <p>Products are defined by <i>Product Specifications</i>, which are values populated into MEF defined attributes of MEF defined services, and are presented to the market as Product Offerings. On top of the MEF Attributes, a Product can include non-MEF attributes defining commercial, operational or platform details.</p> <p>A Product can be physical or in virtual or cyber form. Every Product is made or provisioned at a cost and each is sold at a price. Products are often assigned specific IDs.</p>	This document
Product Instance	Specific implementation of a Product Offering dedicated to the benefit of a party.	MEF 55 [9]
Product Lifecycle	The sequence of phases in the life of a Product Offering, including definition, planning, design and implementation of new Product Offerings, changes for existing Product Offerings, and the withdrawal and retirement of Product Offerings.	This document
Product Offering	A Product Offering represents what is externally presented to the market for the market's use. A Product Offering can be assembled from a reusable <i>Product Specification</i> (sometimes referred to as a product spec).	This document

Term	Definition	Reference
Product Service Resource (PSR) Definition Lifecycle	<p>The Product Service Resource (PSR) Definition Lifecycle encompasses definition, planning, design and implementation of new products for customers, as well as new features and enhancements for existing products and services. Communications Product lifecycles depend upon the nested lifecycles of services, resources and infrastructure. The term " PSR Definition Lifecycle " is usually used to broadly describe the lifecycle of a Product definition (as a general term, not necessarily restricted to an instance of a Product Offering) involving a large number of processes defined within the Strategy, Infrastructure and Product area of TMF's Business Process Framework (eTOM), particularly the L2 processes defined within the Product Lifecycle Management vertical:</p> <ul style="list-style-type: none"> <li>• Marketing and Offer Management</li> <li>• Service Development and Management</li> <li>• Resource Development and Management</li> <li>• Supply Chain Development and Management</li> </ul> <p>The lifecycle on individual Product, Service and Resource instances are normally not the focus of the PSR Definition Lifecycle, but are considered within the Operations area of TMF's Business Process Framework (eTOM).</p>	This document
Product Service Resource (PSR) Instance Lifecycle	<p>The PSR Instance Lifecycle encompasses selling, order handling, service configuration, resource provisioning, activation, testing, customer interactions, service management, resource management and supplier/partner interactions relevant to a service instance. In general, the PSR Instance Lifecycle interacts with the business processes that affect operational aspects of a service instance within the Operations Support &amp; Readiness, Fulfillment, and Assurance verticals of the TMF's Business Process Framework (eTOM).</p>	This document

Term	Definition	Reference
Product Specification	<p>A Product Specification defines the template or detailed description from which Product Offerings can be defined.</p> <p>The Tele Management Forum Information Framework (SID) defines a Product Specification as a detailed description of a tangible or intangible object made available externally in the form of a <i>Product Offering</i> to Customers or other Parties playing a Party Role. A Product Specification may consist of other Product Specifications supplied together as a collection. Members of the collection may be offered in their own right. Product Specifications may also exist within groupings, such as Product Categories, Product Lines, and Product Types.</p>	TMF GB922 [13]
Resource	A physical or non-physical component (or some combination of these) within a Service Provider's infrastructure or inventory.	TMF GB922 [13]
SAT	Service Activation Testing	MEF 48 [5]
Service	Represents the Customer experience of a Product Instance that has been realized within the Service Provider's and / or Partners' infrastructure.	TMF GB922 [13]
Service Activation Testing	The process of executing a collection of test procedures to be applied to a given traffic entity (e.g., EVC, OVC, etc.) in order to collect behavioral information about the traffic and compare this with predefined expectations.	MEF 48 [5]
Service Instance	Specific implementation of a Service.	This document
Service Level Agreement (SLA)	The contract between the Customer and Service Provider or Operator specifying the agreed to service level commitments and related business agreements.	MEF 10.3 [10]
Service Level Specification (SLS)	The technical specification of the service level being offered by the Service Provider to the Customer.	MEF 10.3 [10]
Service Provider	<p>The organization providing UNI to UNI Ethernet Service(s).</p> <p><i>In the context of this document, the services can refer to any Third Network Services.</i></p>	MEF 33 [4]
Service Qualification Questionnaire	A standardized MEF questionnaire that can be populated by the selling carrier and distributed to buying carriers.	This document

Term	Definition	Reference
Service Specification	The detailed description of the characteristics and behavior of a Service.	MEF 55 [9]
SOAM	Service Operations, Administration and Maintenance	This document
Third Network	The Third Network combines the on-demand agility and ubiquity of the Internet with the performance and security assurances like that of Carrier Ethernet 2.0 (CE 2.0). The Third Network enables services between not only service access points residing on physical ports, such as Ethernet ports, but also service access points residing on interfaces running on a blade server in the cloud to connect to Virtual Machines (VMs) or Virtual Network Functions (VNFs).	MEF Reference wiki
TMF	TM Forum	TMF GB921P [7]
Unified Modeling Language (UML)	Unified Modeling Language (UML) is a graphical language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system. The UML offers a standard way to write a system's blueprints, including conceptual things such as business processes and system functions as well as concrete things such as programming language statements, database schemas, and reusable software components.	OMG UML [12]
User Network Interface (UNI)	The physical demarcation point between the responsibility of the Service Provider and the responsibility of the Subscriber.	MEF 10.3 [10]

Table 2 Terminology and Acronyms

## 4. Scope

This document defines a MEF service type agnostic process model for Third Network Lifecycle Management. If required, specializations of this agnostic model are created as needed for Third Network services.

The process model includes identification of process elements and the organization of process elements into process flows that define dynamic behavior within a Service Provider (intra-operator) and between a Service Provider and its partners (inter-operator). The process model also encompasses interactions with the Customer; although processes within the Customer context are not in scope.

Service Lifecycle Management encompasses Product Service Resource (PSR) Definition Lifecycle Management and Product Service Resource (PSR) Instance Lifecycle Management.

Primarily, this document defines high-level business process elements and process flows for Third Network PSR Instance Lifecycle Management (from "Lead-to-Response" to "Customer Termination-to-Settlement"). This includes both inter-operator and intra-operator scenarios. However, the emphasis is placed on inter-operator interactions. Secondly, this document defines high-level business process elements and process flows for Third Network PSR Definition Lifecycle Management (from "Business Insight-to-Plan" to "Product Spec-to-Market Launch"). This includes both inter-operator and intra-operator scenarios. Again, the emphasis is placed on inter-operator interactions.

This document leverages the TM Forum's Business Process Framework, also referred to as the enhanced Telecom Operations Map (eTOM). Where needed, this document identifies extensions to the eTOM model for Third Network Lifecycle Management. The emphasis is for Level 1 to Level 3 process elements.

The process model defined in this document is applicable to the lifecycle of MEF-defined services. Examples of MEF-defined services include EVC-based services defined in MEF 6.2 [2] as well as OVC-based services defined in MEF 51 [14] and MEF 33 [4].

## **5. Compliance Levels**

The document does not specify normative requirements. This document provides a consistent reference model intended to represent a well-structured Service Provider's business operations environment for Third Network services.

## **6. Introduction**

Third Network Lifecycle Management is focused on identifying and modeling the lifecycle stages of MEF-defined services, including EVC-based per MEF 6.2, and OVC-based per MEF 51 [14] and MEF 33. Third Network Lifecycle Management includes PSR Definition Lifecycle Management and PSR Instance Lifecycle Management.

This document leverages the enhanced Telecom Operations Map (eTOM) for the process element definitions. It defines Process flows in the context of Third Network service definitions and where necessary identifies extensions to the eTOM model for process element definitions.

PSR Definition Lifecycle Management encompasses definition, planning, design and implementation of new products for customers, as well as new features and enhancements for existing products and services.

PSR Definition Lifecycle Management for Third Network includes, but is not limited to, the following stages:

1. Business Insight-to-Plan
  - Establishes what types of products are offered to the market and how they will be sold.
2. Product Proposal-to-Specification

- Develops specific product specifications and establishes requirements for services, resources and partners to support them.
3. Service Proposal-to-Deployment
    - Develop the Technical Designs that support the required products using design process steps at the Service and Resource level.
  4. Partner Requirement-to-Onboarding
    - Establishes a relationship between a Service Provider and a Partner, and on-boards one or more of their product offerings.
  5. Product Spec-to-Market Launch
    - Makes products available to the market as specific product offerings and ensures that orders for the products can be successfully fulfilled.

The PSR Instance Lifecycle Management encompasses selling, order handling, service configuration, resource provisioning, activation, testing, customer interactions, service and resource assurance, and supplier/partner interactions relevant to a service instance.

PSR Instance Lifecycle Management for Third Network Services includes, but is not limited to, the following stages.

1. Lead-to-Response
  - Markets products and enables initial customer inquiries of product offerings and prices.
2. Lead Response-to-Contract
  - Checks customer eligibility and product availability and feasibility. Also performs partner requisition feasibility.
3. Contract-to-Order
  - Captures customer order for new product offer, modification of an existing product, or deletion of an existing product.
4. Order-to-Delivery
  - Creates, activates, and tests the service, and delivers the service to the customer.
5. Problem-to-Resolution

- Performs Service Operations, Administration and Maintenance (SOAM) activities specific to Fault Management and in-service test and troubleshooting.
6. SLS Violation-to-Resolution
    - Performs SOAM activities specific to Performance Monitoring.
  7. Usage-to-Charging
    - Manages billing events, resource data collection and distribution, and resource mediation and reporting.
  8. Charging-to-Settlement
    - Generates invoices and manages customer payments.
  9. Customer Termination-to-Settlement
    - Terminates the relationship with the customer.

Figure 1 illustrates the PSR Definition and PSR Instance Lifecycle Management stages for a Service Provider.

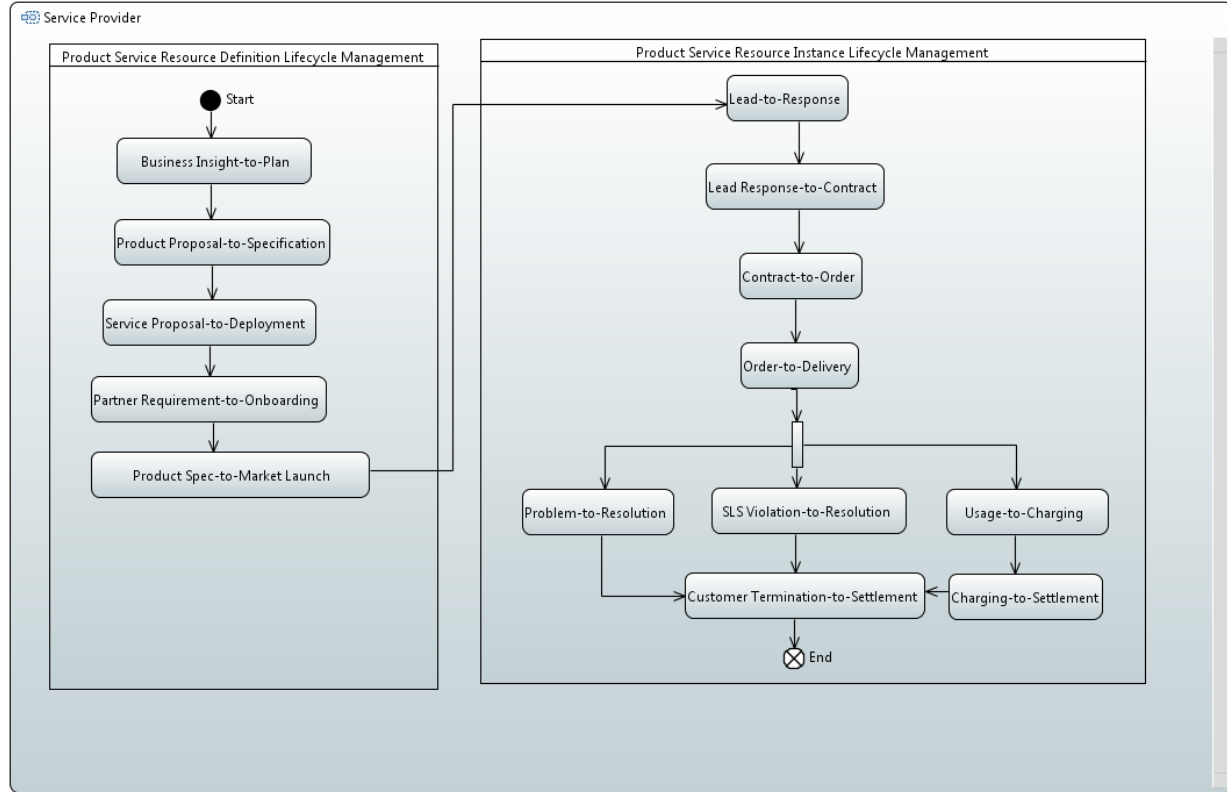


Figure 1 – PSR Definition and PSR Instance Lifecycle Stages

The following sections will describe each stage of the PSR Definition and PSR Instance Lifecycle Management.

## 7. Product Service Resource Definition Lifecycle Management

Communications Product lifecycles depend upon the nested lifecycles of services, resources and infrastructure. The "PSR Definition Lifecycle" interacts with a large number of processes defined within the Strategy, Infrastructure and Product area of TMF's Business Process Framework (eTOM), particularly the L2 processes defined within the Product Lifecycle Management vertical:

- Market & Sales Domain
- Product Domain
- Customer Domain
- Service Domain
- Resource Domain
- Engaged Party Domain

This section defines the process model for the stages of PSR Definition Lifecycle management.

### 7.1 Business Insight-to-Plan

This section defines the process elements and process flow for the Business Insight-to-Plan stage of the PSR Definition Lifecycle.

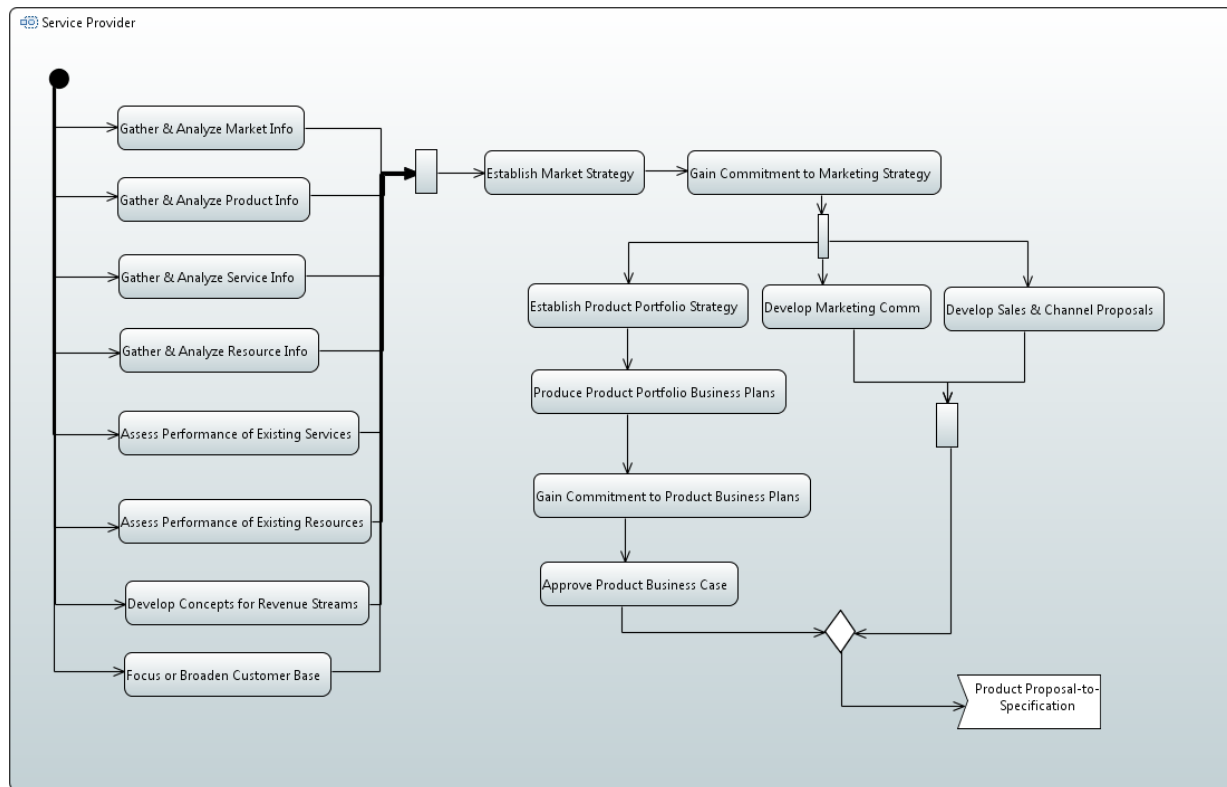
The inspiration, rationale and requirements for new (or changed) Products arise from many sources:

- Evolving market expectations
- Decisions to address specific market segments
- Standards work within MEF that formalizes and standardizes products and service variants tuned for specific market segments such as Carrier Backhaul or Cloud Access
- The standardization of popular variants of "custom solutions" to improve the operational efficiency of delivering and maintaining them
- New technology, new vendor equipment and new paradigms in the network that provide new capabilities in the network to be monetized
- Leveraging existing infrastructure and technologies to extract value by exposing these existing capabilities as external product offerings
- Addressing competitive threats - responding to the products offered by competitors. This encompasses pricing, bundling, technology, geographic footprint

- The success (or failure) of existing products

The overall strategy may be constrained by several factors including:

- Existing infrastructure
- Available suppliers/partners



**Figure 2 – Business Insight-to-Plan Process Flow**

The process flow in Figure 2 illustrates the activities applicable to performing market analysis and establishing product strategies that enable the development of specific Products and Product Offerings.

There are a wide variety of inputs that contribute to establishing an overall market strategy. These inputs are obtained through specific activities focused on gathering and analyzing appropriate input and insights. The types of inputs include market information, new product ideas, new service ideas and new resource ideas, as well as the assessment of how existing implementations of products, services and resources are performing. In addition, analysis of potential revenue streams and the customer base may reveal additional opportunities.

Once a market strategy is established, this will provide essential input into Product Portfolio strategy, which in turn will affect a Supply Chain Strategy with respect to “Make or Buy” decisions. Once these overall strategies are defined, Product Portfolio Business Plans may be established and commitments made to move forward.

In parallel to these activities are the developments of Marketing Promotion strategies and Sales proposals. These are important components of an overall Market Strategy.

When organizational commitment is made for both the Product Business Plans and the Market Strategy, work may begin on the development of specific Product Definitions.

Table 3 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Gather & Analyze Market Information	1.1.1.1	No	Research market information and develop market forecasts.
Establish Market Strategy	1.1.1.2	No	Develop and document the enterprise market strategy.
Gain Commitment to Marketing Strategy	1.1.1.5	No	Gain enterprise commitment to the market strategy and segmentation.
Develop Sales & Channel Proposals	1.1.5.2	No	Create and document proposals for sales processes and sales channels, and gain approval for them.
Market Performance Management	1.1.12	No	Market Performance Involves managing, tracking, monitoring, analyzing, improving and reporting on the performance of market key performance indicators
Develop Marketing Communication	1.1.14.3	No	Manage all activities and stakeholder engagement to develop and agree on a marketing communication message and the selection of the appropriate channel or channels to deliver a message, as well as production of the communication.
Gather & Analyze Product Information	1.2.1.1	No	Research information relating to product ideas and opportunities and identify product opportunities.
Establish Product Portfolio Strategy	1.2.1.2	No	Define and agree the product and offer portfolio structure to be used within the enterprise.
Produce Product Portfolio Business Plans	1.2.1.3	No	Develop product and product portfolio business plans to guide product development within the enterprise.
Gain Commitment to Product Business Plans	1.2.1.4	No	Gain enterprise commitment to the product portfolio strategy and individual product plans.
Approve Product Business Case	1.2.2.3	No	Develop and gain approval for a business case to develop and deliver the required capabilities, including identification of potential suppliers/partners.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Gather & Analyze Service Information	1.4.1.1	No	Research and analyze customer, technology, competitor and marketing information to identify new service directions and industry best practice, and potential enhancements to existing services.
Assess Performance of Existing Services	1.4.3.2	No	Analyze the performance of existing services to identify inadequacies and required improvements.
Gather & Analyze Resource Information	1.5.1.1	No	Research and analyze customer, technology, competitor and marketing information to identify new resource requirements and industry resource capabilities and availability.
Assess Performance of Existing Resources	1.5.3.2	No	Analyze the performance of existing resources to identify inadequacies and required improvements.
Develop Concepts for Revenue Streams	1.7.1.2.1	No	Develop concepts for new revenue streams, and diversification of revenue streams.
Focus or Broaden Customer Base	1.7.1.2.2	No	Focus or broaden the customer base via investigating new markets, as well as different products and services for the enterprise.

Table 3 Business Insight-to-Plan Process Elements

## 7.2 Product Proposal-to-Specification

This section defines the process elements and process flow for the Product Proposal-to-Specification stage of the PSR Definition Lifecycle.

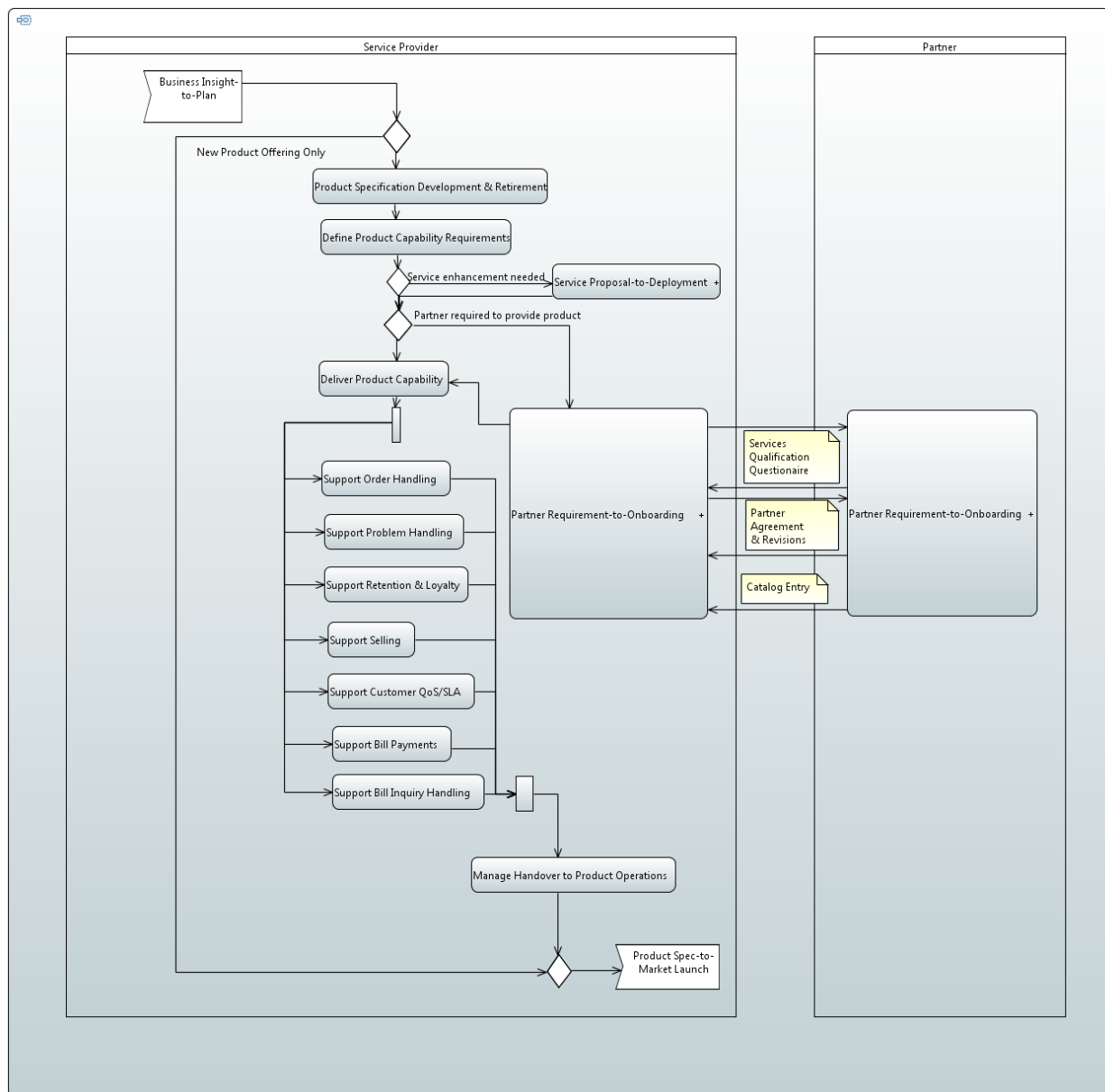
Based on incoming requirements and overall product strategy, Products are designed taking into account multiple considerations:

- How the product will "look": its commercial and brand aspects as well as its functionality/capability
- How customers will interface with the Service Provider to order, use, pay for and raise and solve problems with the product
- Which suppliers and partners will be involved or impacted by the ordering, delivery, billing or assurance of the product
- Justification and authorization for decisions in the above activities

The flow for product design includes:

- The management of the delivery and build of new or changed Product & Offer and delivery capabilities within the enterprise.
- "Product Capability" delivery has been included in scope and has been interpreted to include many activities representing "readiness" activities defined in the "Operations" side of eTOM.

It is important to note that the flows described below are defined from the perspective of the Service Provider. While the Service Provider is establishing/modifying their Product, Service and Resource definitions, the Partner is merely providing existing “product offerings” that are being incorporated into the Service Provider’s Product or Service definitions. Defining the Partner’s Products, Services and Resources will be achieved by the Partner acting in the role of Service Provider in these flows.



**Figure 3 – Product Proposal-to-Specification Process Flow**

The process flow in Figure 3 illustrates the development of new products and product offerings. The input to this process flow is a product concept that may originate from analysis of business/technical opportunities and requirements that drive an overall product strategy for Third Network Products, or the input may arise from a normal course of business in responding to business opportunities through the Lead Response-to-Contract process flow. In this second case, the Service Provider may be motivated to standardize a custom offer, or introduce a re-usable product or product offering based on market demand.

It is important to note that Product Offerings represent the customer-facing, commercial aspects of services being sold. Therefore, a large variety of Product Offering changes require no technical change to the underlying services, but are achieved through selective exposure of

product options, bundling of products and product offerings targeted at specific market segments, promotions, and pricing.

Based on the requirements associated with the product concept, new product specifications are developed that detail the proposal. At this point, it should be clear whether the new concept is supported by existing product specs, or whether new/revised product specifications are required to support the intended offering.

If new product definitions are required, the infrastructure impact of the new product must be assessed and described in terms of "Product Capability Requirements". If additional functionality is required from the services exposed to the product layer, Service Enhancements will be required. Similarly, if it is determined that the Service Provider cannot support the Product Capability requirements directly, a wholesale partner may be sought. This is frequently the case where the geographic reach of service offerings is extended outside the footprint of the Service Providers own access network. It is important to note that the use of a wholesale partner does not necessarily need to be directly exposed at the commercial layer. In some cases this transparency allows the customer to explicitly choose between Partners and have full knowledge of who is providing the last-mile access. However, this wholesale relationship may also be maintained at only the technical level and not explicitly exposed as products in the commercial layer. This is shown in the process flow for "Service Proposal-to-Deployment".

The interactions for establishing a supplier/partner relationship between Service Provider and Partners is detailed later in this document in "Partner Requirement-to-Onboarding" process flow.

Within the scope of this process flow, the Delivery of Product Capabilities and general aspects of "readiness" are shown. The areas relevant to a new product that would be coordinated by "Deliver Product Capabilities" would include potential changes to Order Handling, Problem Handling, Retention and Loyalty, Marketing, Sales, Customer SLAs, Billing Payments and Receivables as well as Billing Inquires. The final activity prior to handover to operations is the exposure of the product as appropriate new or updated product offerings in the Product Catalog (i.e. Product Offering Inventory).

After appropriate sets of Product Offerings have been exposed, the project can be handed over to Operations. This hand-over may involve trials and proof of concepts to ensure that the product is operating as expected from both technical and commercial perspectives.

When handover is successfully completed the new product will be launched following the process flow for "Product Spec-to-Market Launch".

Table 4 documents the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Support Selling	1.1.7.2	No	Administer and manage the operation of the various sales channels and to ensure that there is capability (for example, information, materials, systems and resources) to support the Selling processes.
Define Product Capability Requirements	1.2.2.1	No	Define and obtain agreement to the detailed infrastructure requirements to support the product portfolio and individual product plans.
Deliver Product Capability	1.2.2.4	No	Manage the coordinated delivery in line with the approved business case of all required product infrastructure capabilities for that business case across the enterprise.
Manage Handover to Product Operations	1.2.2.5	No	Manage the processes involved in handover of deployed product infrastructure to operational control.
Support Customer QoS/SLA	1.2.4.1	No	Support Customer QoS/SLA Management processes by proactively monitoring and assessing the performance of purchased product offerings as a group against agreed QoS/SLA parameters, and monitoring, managing and reporting on the capability of the Customer QoS/SLA Management processes.
Product Specification Development & Retirement	1.2.7.1	No	Develop and deliver new product specifications as well as enhancements and new features, ready for use by other processes, including Product Offering Development & Retirement.
Support Order Handling	1.3.1.2	No	Ensure that new and/or modified Order Handling related infrastructure is deployed effectively, and to ensure that Order Handling processes can operate effectively.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Support Problem Handling	1.3.1.3	No	Assist Problem Handling processes by proactively undertaking statistically driven preventative and scheduled purchased product offering maintenance activities and monitoring, managing and reporting on the capability of the Problem Handling processes.
Support Retention & Loyalty	1.3.1.4	No	Ensure that all information, materials, systems and resources are available so that the retention & Loyalty processes can be completed without delay, when a request is received from a customer.
Support Bill Payments & Receivables Management	1.3.1.7	No	Ensure that all information and systems are available so that the Bill Payments & Receivables Management processes can be completed without delay.
Support Bill Inquiry Handling	1.3.1.8	No	Ensure that all information, systems and resources are available so that the Bill Inquiry Handling processes can be completed without delay.

**Table 4 Product Proposal-to-Specification Process Elements**

The messages used in this process flow are documented within the scope of Partner Requirement-to-Onboarding and are documented in Table 7 Partner Requirement-to-Onboarding Messages.

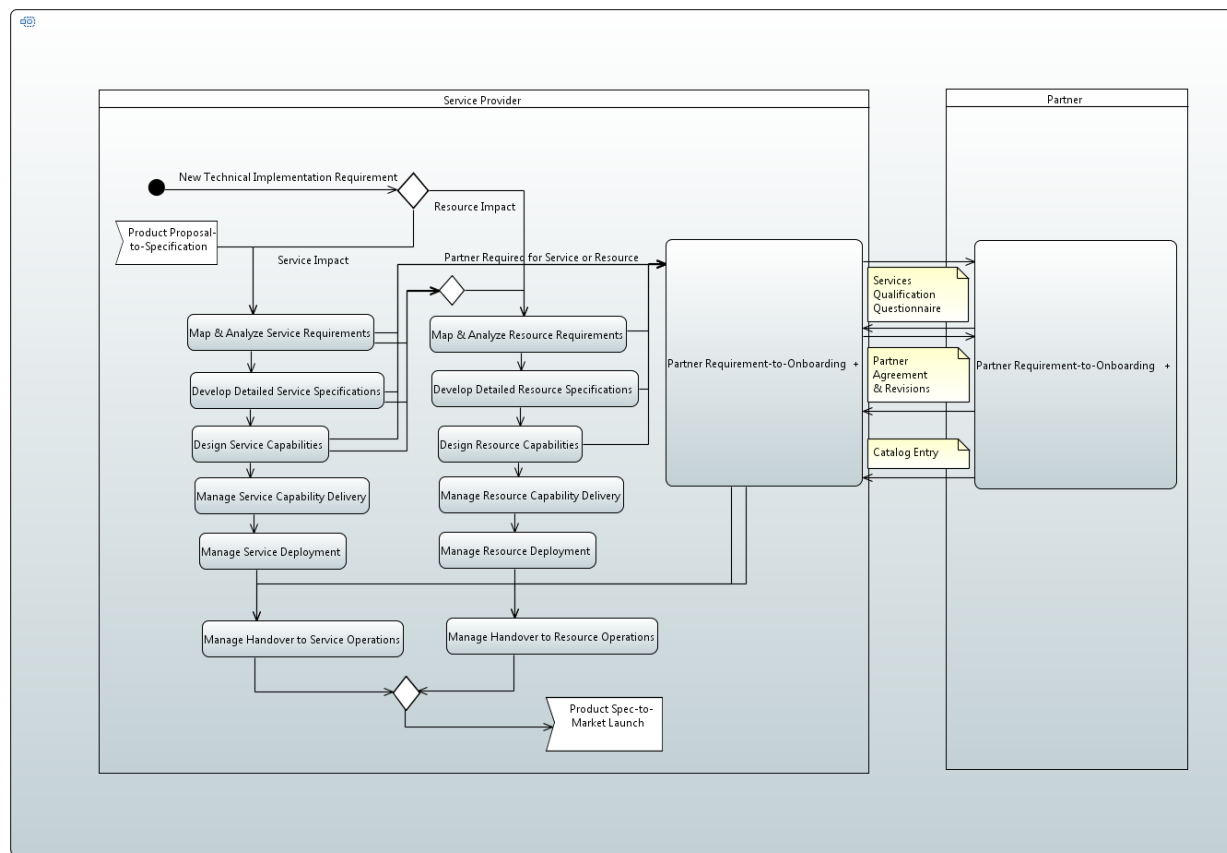
### 7.3 Service Proposal-to-Deployment

This section defines the process elements and process flow applicable to Service Proposal-to-Deployment stage within the context of the PSR Definition Lifecycle. Service Proposal-to-Deployment establishes the entity definitions and business logic that will be invoked by Fulfillment and Assurance processes in a Service Operations context. For fulfillment, Service and Resource Design represent the technical implementation of functionality exposed to the product layer through Service abstractions.

The design of Service and Resource specifications, their relationships and associated business logic is intertwined; therefore this process has been presented within a single flow. Despite the fact that Service and Resource Design is frequently iterative in nature, the process flow does not attempt to show the possible process flows that may result.

Service specifications represent a stable re-usable abstraction of the functionality that Service Providers provide to their Customers. This abstraction is expected to expose only the Service

details directly relevant to Customers ordering Products based upon the Service. This shields the internal implementation details, which may vary based upon available technology choices within the Service Provider network infrastructure, but which have no impact discernible by the Customer. The definition of new Service specifications or the modification of existing ones is triggered by the need to expose new functionality to Customers.



**Figure 4 – Service Proposal-to-Deployment Process Flow**

The process flow in Figure 4 illustrates the development of Service and Resource specifications, their relationships, and associated business logic.

The input to this process flow may be requirements for a new technical implementation of an existing Service or new technical capabilities within the network that will be exposed as a new Service. In these cases, the requirements may apply to service specifications, resource specifications, or both. Alternatively, the input requirement may be for a Service concept that originates from analysis of Product requirement activities.

The development of Service specifications must first assess incoming requirements to determine whether new Service specifications must be created, whether existing Service specifications must be modified, or both. The analysis results in the identification of high-level design logic and business or technical rules for selecting and configuring appropriate Resources; process decision, approval and measurement points; and dependencies on other Service capabilities from within the Service Provider's infrastructure. The Service capabilities may have further dependencies on capabilities represented by Resources.

During any of these activities, incremental Resource requirements may be identified, which are dealt with through a sequence of activities that deal with Resource specifications. The inputs to this sequence are the requirements originating from analysis of service requirements or direct requirements for a new technical implementation.

The development of Resource specifications starts with the assessment of the requirements to determine whether new Resource specifications must be created, or whether existing ones must be modified, or both. The analysis results in the identification of overall design logic and business or technical rules for Resource selection and configuration, and dependencies on Resource capabilities from within the Service Provider's infrastructure.

Although not explicitly shown in the process flow, it is possible that analysis, specification and design activities for resources may also identify additional service requirements.

As a result of analyzing Service or Resource requirements, developing specifications or design, it may be determined that a new capability from a partner is required. In this case it may be necessary to select an appropriate supplier and onboard a product offering from them. In the Service Provider's environment, the wholesale product offering may be exposed as a Service, a Service Component, or a Resource.

The interactions for establishing a supplier partner relationship between Service Provider and Partners is detailed later in this document in "Partner Requirement-to-Onboarding".

Once Resource capabilities have been specified and designed, they are tested and delivered according to the Service Provider's standard development processes. Following this, the delivered capabilities are deployed and accepted into the Service Provider's production environments, including where necessary, the network. This acceptance may involve trials and Proofs of Concept to ensure that the Resource is operating as expected from both technical and commercial perspectives. The final step in this process is the Handover to Resource Operations that enables the Resource specification to be used for Fulfillment and Assurance.

Similarly, the service is tested and delivered according to the Service Provider's standard development processes, then deployed and accepted into the Service Provider's production environments. The final step in this process is the Handover to Service Operations which enables the Service specification to be used for Fulfillment and Assurance.

Table 5 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Map & Analyze Service Requirements	1.4.2.1	No	Define the detailed service infrastructure requirements to support the product capabilities required by the enterprise.
Design Service Capabilities	1.4.2.4	No	Manage the design of the service infrastructure to meet the requirements in any approved investment proposals.
Manage Service Capability Delivery	1.4.2.6	No	Manage the provision, implementation and rollout of the new or enhanced service capability, and associated operational support processes.
Manage Handover to Service Operations	1.4.2.7	No	Manage the processes involved in handover of deployed service infrastructure to operational control.
Develop Detailed Service Specifications	1.4.3.4	No	Develop and document the detailed service-related technical and operational specifications, and customer manuals.
Manage Service Deployment	1.4.3.6	No	Ensure the co-coordinated deployment in line with the approved business case of all required service classes/components for that business case across the enterprise.
Map & Analyze Resource Requirements	1.5.2.1	No	Define the detailed resource infrastructure requirements to support the service capabilities required by the enterprise.
Design Resource Capabilities	1.5.2.4	No	Manage the design of the resource infrastructure to meet the requirements in any approved investment proposals.
Manage Resource Capability Delivery	1.5.2.6	No	Manage the provision, implementation, commissioning and rollout of the new or enhanced resource capability, and associated operational support processes.
Manage Handover to Resource Operations	1.5.2.7	No	Manage the processes involved in handover of deployed resource infrastructure to operational control.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Develop Detailed Resource Specifications	1.5.3.4	No	Develop and document the detailed resource-related technical, performance and operational specifications, and manuals.
Manage Resource Deployment	1.5.3.6	No	Ensure the co-coordinated deployment in line with the approved business proposal of all required resource classes/components for that business proposal across the enterprise.

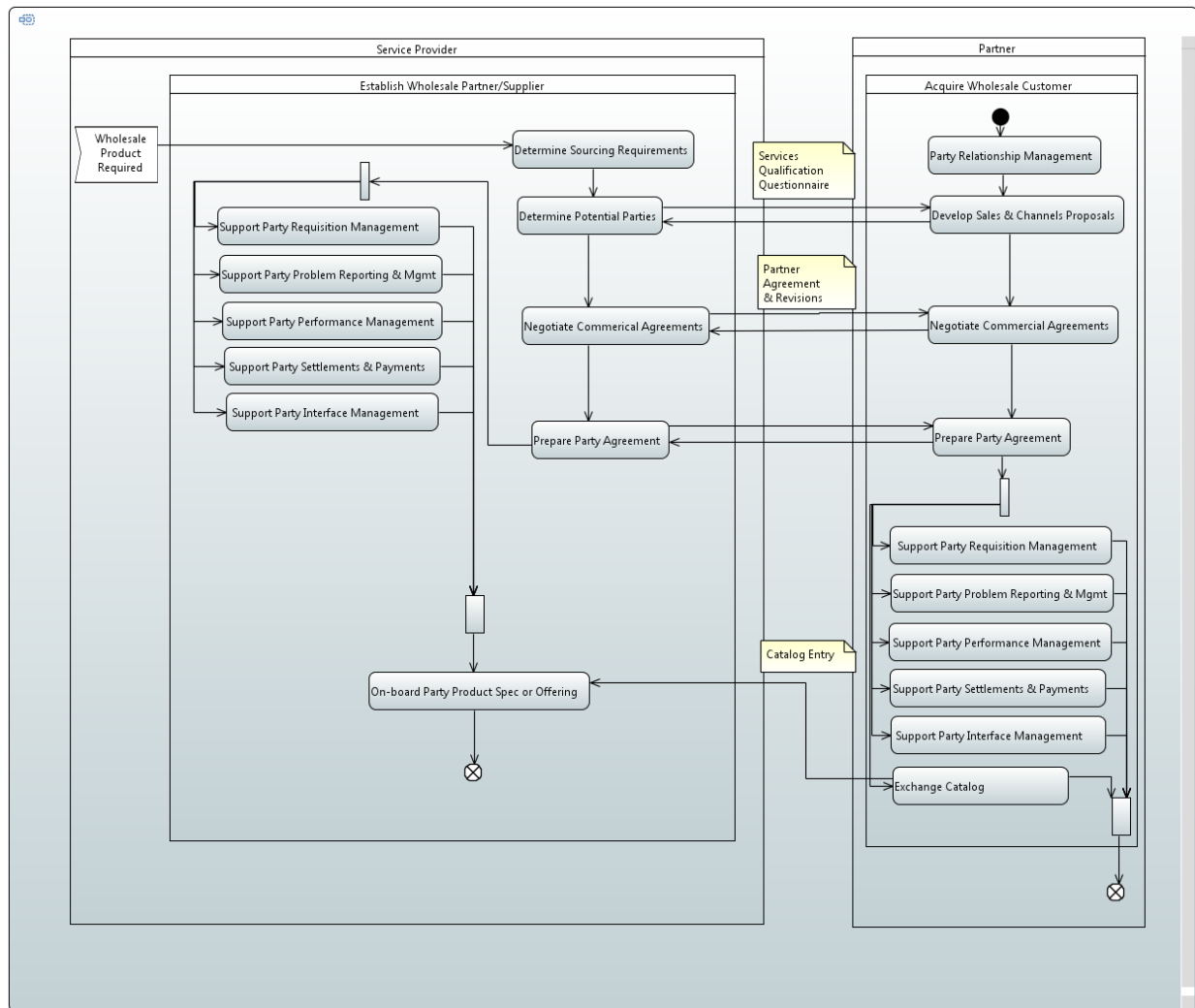
**Table 5 Service Proposal-to-Deployment Process Elements**

The messages used in this process flow are documented within the scope of “Partner Requirement-to-Onboarding” and are documented in Table 7 Partner Requirement-to-Onboarding Messages.

## 7.4 Partner Requirement-to-Onboarding

This section details the process by which a Service Provider establishes a relationship with a Partner and on-boards one or more of their product offerings. Within a Third Network environment, this could include establishing the ENNIs at which the Service Provider will connect to the partner’s service.

The product offering exposed by the partner to the service provider may be viewed as a Service, a Service Component, or a Resource from the service provider perspective.



**Figure 5 – Partner Requirement-to-Onboarding Process Flow**

The process flow in Figure 5 introduces the activities involved in establishing a new partner relationship and making partner's product offerings available for use in the Service Provider's environment.

As a result of analyzing Product, Service or Resource requirements, developing specifications or design, it may be determined that some components will not be provided directly by the Service Provider, but must be provided by a partner. For the Third Network, partners are commonly required to extend a Service Provider's geographic coverage, but partners might be engaged to provide a wide variety of components. Relevant sourcing requirements would be established expressing technical, performance and provisioning characteristics of acceptable components.

For Third Network components, potential partners would be identified by analyzing responses to MEF's Service Qualification Questionnaire. The questionnaires may be existing responses from existing partners or may be explicitly solicited from new potential partners. To identify potential partners, only the level of detail expressed in the sourcing requirements might be provided and/or examined from the Service Qualification Questionnaire.

Once a short list of potential suppliers is established one or more partners may be selected through commercial negotiation. The resultant partner agreement for new or existing partners must establish the interworking between the Service Provider and partner in areas such as Requisition management (i.e. order handling), Problem Reporting, Performance Management, Payment management, as well as overall procedures for interacting with the supplier. In addition, the agreement may specify performance guarantees and commercial penalties. Some of the details required to establish this interworking may be drawn from the Service Qualification Questionnaire.

Once such interworking is in place, relevant partner product offerings from the catalog provided by the partner can be on-boarded into the Service Provider's environment. The catalog information provided by the partner would include relevant details from the Service Qualification Questionnaire.

Table 6 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in *italic font*.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Develop Sales & Channel Proposals	1.1.5.2	No	Create and document proposals for sales processes and sales channels, and gain approval for them.
Determine the Sourcing Requirements	1.6.2.1	No	Manage the collection and finalization of the specific requirements to be achieved from the sourcing process.
Determine Potential Parties	1.6.2.2	No	Determine the appropriate short list of parties to meet the specific enterprise requirements.
Party Relationship Management	1.6.3.1	No	Support the lifecycles (development and retirement) of an enterprise's relationships with parties.
On-board Party Product Specification & Offering	1.6.4.1	No	Manages the on-boarding another party's product offering or a product specification upon which the offering is based.
Prepare Party Agreement	1.6.5.1	No	Prepare an agreement between the enterprise and a party or a template agreement that can be used as the basis for party-specific agreements.
Manage Party Agreement Commercial Negotiations	1.6.5.2	No	Manage the commercial negotiations between the enterprise negotiation team and the selected party or parties, or with competitors in a regulated market.
Support Party Requisition Management	1.6.6.1	No	The purpose of the Support Party Requisition Management processes is twofold - to manage requisition activity with parties who own and manage outsourced infrastructure, and to ensure that the Party Requisition Management processes can operate effectively.
Support Party Problem Reporting & Management	1.6.6.2	No	The purpose of the Support Party Problem Reporting & Management processes is twofold - to manage problem resolution activity with suppliers/partners who own and manage outsourced infrastructure, and to ensure that the Support Party Problem Reporting & Management processes can operate effectively.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Support Party Performance Management	1.6.6.3	No	The purpose of the Support Party Performance Management processes is twofold - to manage performance restoration activity with parties who own and manage outsourced infrastructure, and to ensure that the Party Performance Management processes can operate effectively. External parties are engaged by the service provider in infrastructure level performance-related activities when the service provider has outsourced the relevant infrastructure ownership and management to parties (i.e. outsourced network or IT bureau arrangements).
Support Party Settlements & Payments Management	1.6.6.4	No	The purpose of the Support Party Settlements & Payments Management processes is to ensure that there is capability (for example, information, materials, systems and resources) so that the Party Settlements & Payments Management processes can operate effectively. Examples are information on how to respond to current settlements and payment issues with suppliers and partners, materials needed to process payments and invoices with parties: systems needed to create payments, handle invoices or analyze party payment and settlement concerns, requests for provisioning of additional resources where it has been identified that current levels will impact on timely payment preparation, and complaint handling.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Support Party Interface Management	1.6.6.5	No	The purpose of the Support Party Interface Management processes is to ensure that there is capability (for example, information, materials, systems and resources) so that the Party Interface Management processes can operate effectively. Examples are information on how to handle unusual requests based on temporary situations, systems needed to accept and track supplier/partner contacts, requests for the provisioning of additional resources where it has been identified that current levels will impact on timely contact handling.
<i>Exchange Catalog</i>	N/A	Yes	Provide a set of catalog entries to a partner to facilitate their selection and ordering of product offerings.

**Table 6 Partner Requirement-to-On-boarding Process Elements**

Table 7 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Service Qualification Questionnaire	Service Provider	Partner	Request to identify and characterize the wholesale product offerings that are being offered.
Service Qualification Questionnaire Response	Partner	Service Provider	Standard description and characterization of product offerings that the Partner will offer to the Service Provider.
Partner Agreement (Initial version)	Service Provider	Partner	Initial draft of Partner agreement governing access to the Partners offerings.
Partner Agreement (Revision)	Partner	Service Provider	Revised draft of Partner agreement governing access to the Partners offerings.
Partner Agreement (Final Revision)	Service Provider	Partner	Finalized Partner Agreement endorsed by Service Provider.
Partner Agreement (Final Revision)	Partner	Service Provider	Finalized Partner Agreement endorsed by Partner.
Catalog Entry	Partner	Service Provider	The Catalog definitions of Partner Product Offering on-boarded by the Service Provider.

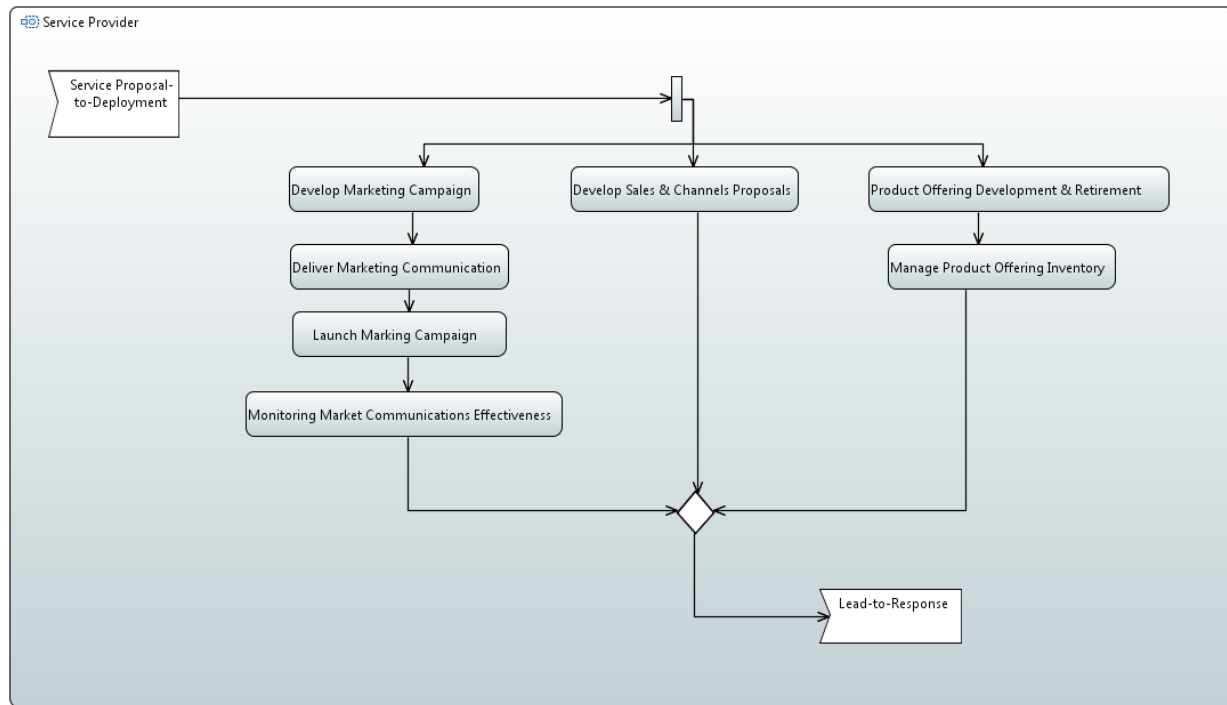
Table 7 Partner Requirement-to-On-boarding Messages

## 7.5 Product Spec-to-Market Launch

This section defines the process elements and process flow for the Product Spec-to-Market Launch stage of the PSR Definition Lifecycle.

The Product Spec-to-Market Launch stage includes:

- Managing the initial introduction of new and enhanced products into the market.
- Developing and managing communications to the market, prospective and existing customers



**Figure 6 – Product Spec-to-Market Launch Process Flow**

The process flow in Figure 6 illustrates the activities applicable to launching new commercial product offerings.

Configuration of a set of product offerings, associated Marketing, and Sales activities occur in parallel for Product Spec-to-Market Launch.

The configuration of product offerings establishes a set of offers to cover intended market segments, which may involve differentiating product offerings by price, constraining features, or other criteria.

The marketing activities include developing product and marketing campaign messaging, developing promotional material, and launching the marketing campaign. As part of the Product Spec-to-Market Launch, the Marketing campaign and messaging will be monitored on an on-going basis for effectiveness.

In addition, new sales channels and sales processes may be required to support the new product offerings.

Table 8 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in *italic font*.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Develop Sales & Channel Proposals	1.1.5.2	No	Create and document proposals for sales processes and sales channels, and gain approval for them.
Deliver Marketing Communication Collateral	1.1.14.4	No	Manage and co-ordinate the delivery of a marketing communication to the selected channels.
Monitor Marketing Communications Effectiveness	1.1.14.5	No	Establish metrics, monitor metrics, and analyze metrics to gauge the effectiveness of marketing communications.
Develop Marketing Campaign	1.1.15.3	No	Manage all activities and stakeholder engagement to develop and agree on a marketing campaign and the selection of appropriate channel or channels to support delivery of the campaign.
Launch Marketing Campaign	1.1.15.4	No	Manage and co-ordinate the delivery of the marketing campaign to the selected channel(s).
Manage Product Offering Inventory	1.2.4.2	No	Establish, manage and administer the enterprise's product offering inventory, as embodied in the Product Offering Inventory Database, and monitor and report on the usage and access to the product offering inventory, and the quality of the data maintained in it.

Table 8 Product Spec-to-Market Launch Process Elements

## 8. Product Service Resource Instance Lifecycle Management

This section defines the process models for the stages of PSR Instance Lifecycle management. For each process flow there are at least three entities (e.g., stakeholders or actors) involved in the flow:

1. Customer,
2. Service Provider,
3. Partner (one or more).

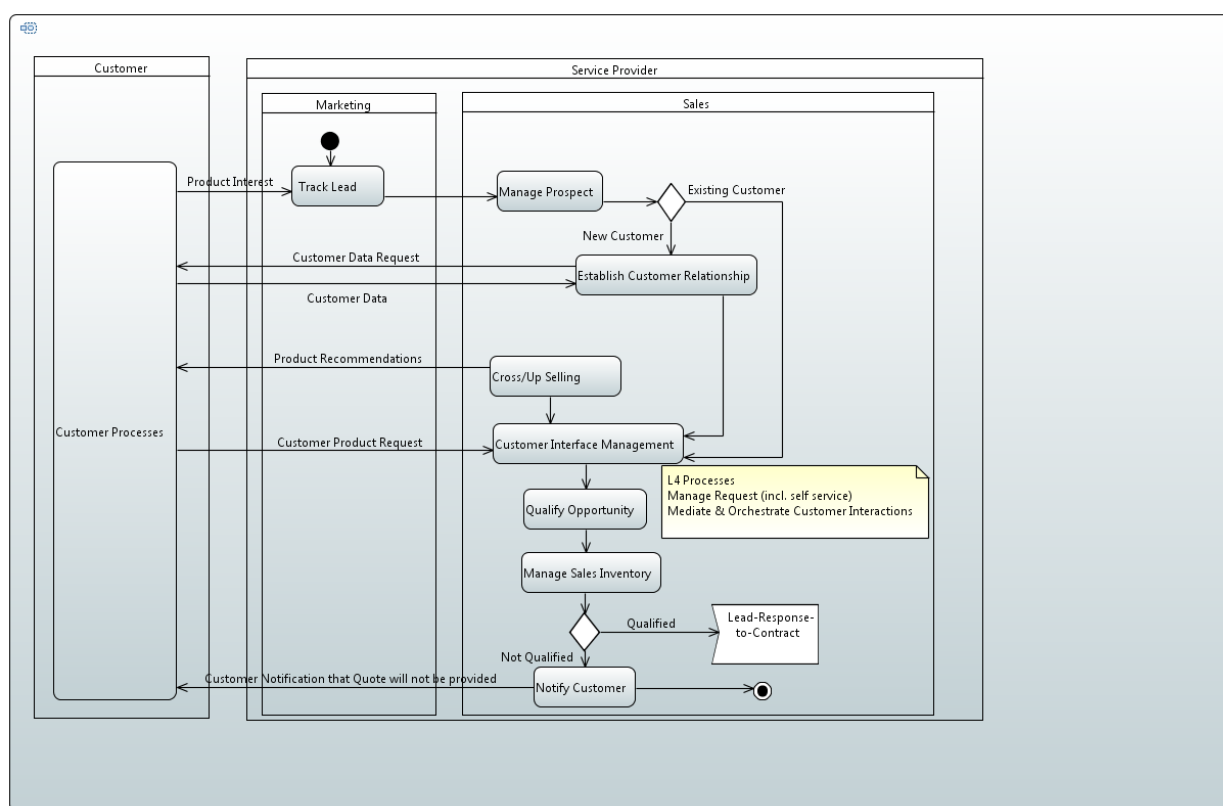
The process elements and interactions of these elements (process flows) are focused on the Service Provider where “Messages” are sent towards the Customer and Partner. It is important to recognize that the Partner Lane represents another Service Provider acting in the role of a partner providing a wholesale service. Therefore the processes within the Partner Lane are also directly applicable to Service Providers, and vice versa. On the other hand, the Customer Lane is presented as a black box since only the interfaces between the Service Provider and Customer are of interest in this case.

Furthermore it should be noted that a Partner itself may also rely on wholesale services provided by other Partners. This multi-tier relationship has not been explicitly shown, but can be viewed as the Partner interacting with another Partner from the perspective of the Service Provider Lane.

In general, the PSR Instance Lifecycle Management interacts with the business processes that affect operational aspects of a service instance within the Operations Support & Readiness, Fulfillment, and Assurance verticals of the TMF's Business Process Framework (eTOM).

## 8.1 Lead-to-Response

This section defines the process elements and process flow for the Lead-to-Response stage of the PSR Instance Lifecycle.



**Figure 7 – Lead-to-Response Process Flow**

The process flow in Figure 7 illustrates the activities applicable to managing sales opportunities arising through marketing Third Network based products to new and existing Customers, up-selling existing Customers and direct Customer requests.

As a result of a marketing campaign for Third Network based product offers, potential Customers may express interest in products being offered by the Service Provider. This may be expressed informally or through a formal Request for Proposal (RFP). These leads are collected and passed onto sales activities. Within the “Manage Prospects” activities, applicable products are identified and the prospects are assigned to an appropriate sales channel. Incoming leads and prospects are tracked by the “Manage Sales Inventory” process element.

If the prospect is not an existing Customer, the “Establish Customer Relationship” process element is applicable. In this process element the Customer details are validated, it is verified that this Customer is not already known to the Service Provider’s systems, a unique identifier is assigned, account credentials established and additional relevant Customer information is collected. It should be noted that further information may be gathered from the Customer in later activities within this or other flows.

Up-sell opportunities arise from ongoing interactions with the Customer described within the “Cross/Up Selling” process element. As a result of understanding the Customer specific requirements, recommendations for appropriate offerings may be made to the Customer that results in new incoming requests.

The incoming request originating from the marketing lead, from a direct Customer request, or from an up-sell is managed within “Customer Interface Management”, which then passes the request on to the “Qualify Opportunity” process element.

The “Qualify Opportunity” process element ensures that a decision to proceed with the opportunity is based on an appropriate assessment of risk, effort, ability to meet Customer expectations, strategic importance and profit potential. All sales prospects, sales, channel management and commissions are managed within a sales inventory. “Manage Sales Inventory” manages updates resulting from any of the activities within the flow illustrated here

If the opportunity is qualified, the opportunity is passed on to the Lead Response-to-Contract process flow shown in Figure 8, otherwise the Customer is notified that the Service Provider will not be providing a response to their request.

Table 9 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Manage Sales Inventory	1.1.7.4	No	Establish, manage and administer the enterprise's inventory of sales prospects, actual sales, channel management and sales commissions, as embodied in the Sales Inventory Database, and monitor and report on the usage and access to the sales inventory, and the quality of the data maintained in it.
Qualify Opportunity	1.1.9.1	No	Ensure that the opportunity is qualified in terms of any associated risk and the amount of effort required to achieve a sale.
Cross/Up Selling	1.1.9.3	No	Ensure that the value of the relationship between the customer and Service Provider is maximized by selling additional, or more of the existing, products.
Track Lead	1.1.11.2	No	Track Lead identifies a lead following on from marketing campaign advertising, or one that arises otherwise in the course of business and collected here.
Manage Prospect	1.1.11.3	No	Match assigned leads with the most appropriate products and ensure that these prospects are handled appropriately.
Establish Customer Relationship	1.3.4.2	No	Verify the customer identity and manage the customer identity across the Enterprise.
Notify Customer	1.3.5.5	No	Notify the customer when interesting events happen.
Customer Interface Management	1.3.5.9	No	Managing all interfaces between the enterprise and potential and existing customers.

Table 9 Lead-to-Response Process Elements

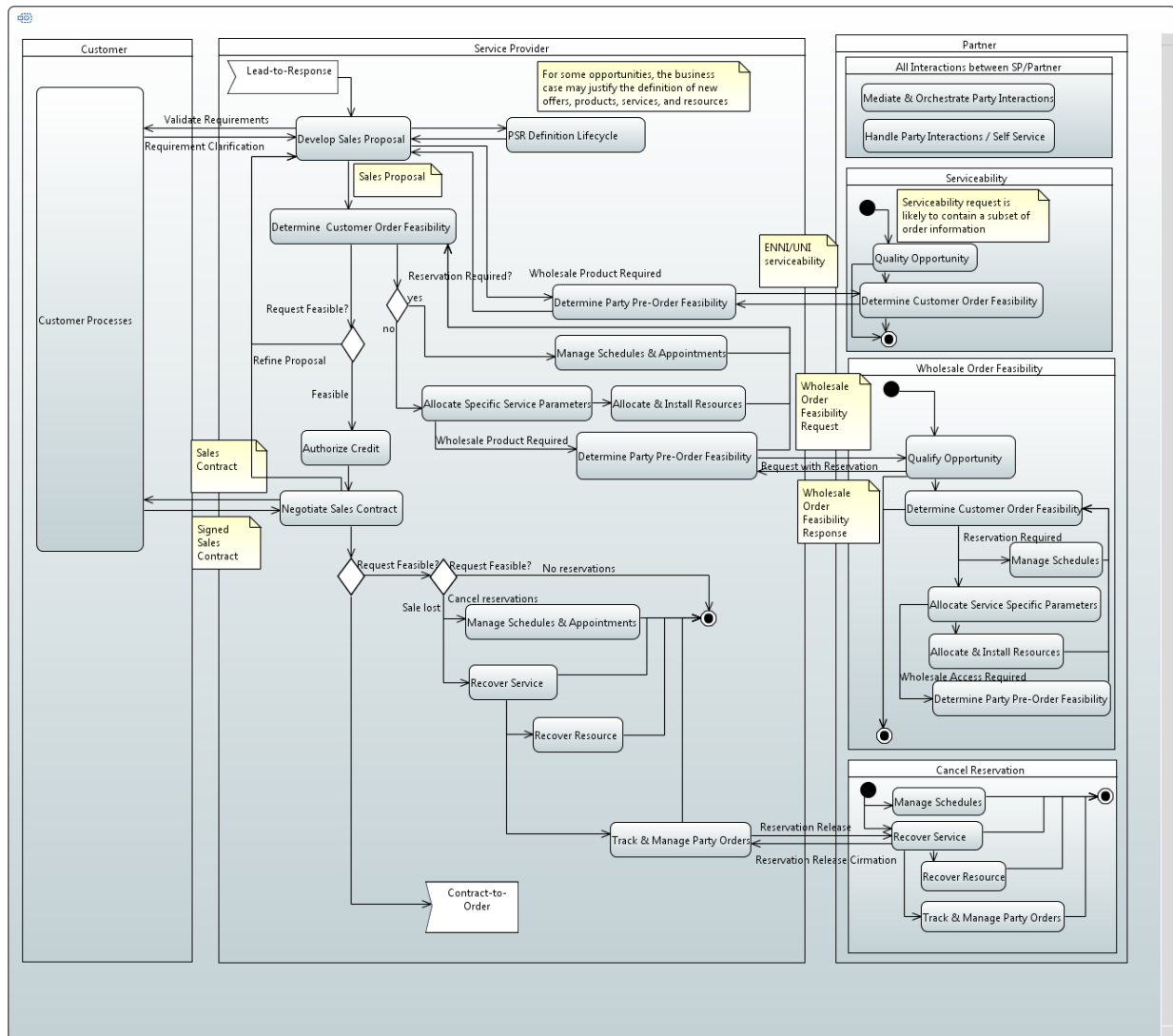
Table 10 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Product Interest	Customer	Service Provider	Customer indicates product interest to Service Provider through a formal request such as an RFP, or an informal request.
Customer Data Request	Service Provider	Customer	Service Provider requests customer details from Customer.
Customer Data	Customer	Service Provider	Customer provides information identifying themselves to the Service Provider.
Product Recommendations	Service Provider	Customer	Service Provider suggests a set of Product Offerings to the Customer.
Customer Product Request	Customer	Service Provider	Customer requests product offerings from the Service Provider.
Customer Notification that Quote will not be provided	Service Provider	Customer	Service Provider provides notification that sales proposal will not be provided to Customer.

Table 10 Lead-to-Response Messages

## 8.2 Lead Response-to-Contract

This section defines the process elements and process flow for the Lead Response-to-Contract stage of the PSR Instance Lifecycle.



**Figure 8 – Lead Response-to-Contract Process Flow**

The process flow in Figure 8 illustrates the activities applicable to developing sales contracts in response to qualified sales opportunities.

As an initial operation within the development of a sales proposal, the Service Provider may interact with the Customer to validate their requirements. As a result of feedback and questions from the Service Provider, a refined set of requirements may be provided by the Customer.

As part of the “Develop Sales Proposal” process element, the Service Provider may recognize that it does not have suitable product offerings, products or services to support the request. If the opportunity is sufficient, this may result in the development (or on-boarding) of new product offerings, products and services. These activities, which may vary greatly in complexity, effort and timeframe, are not detailed in this process flow, but would occur in the context of general PSR Definition Lifecycle flows.

A sales proposal may include providing product offerings to both on-net and off-net locations. For off-net locations, the availability of such product offers for a specific location or with specific parameters may be verified by “Determine Party Pre-Order Feasibility” process element which issues a Serviceability Request to the Partner. The Partner evaluates this request by performing some subset of determining the feasibility of an order with the specified location and parameters. These activities are represented by the “Qualify Opportunity” process element in which the Partner assesses risk and effort, as well as by the “Determine Customer Order Feasibility” process element in which the Partner determines whether the request can be met from a technical perspective. The result of this Serviceability assessment is returned to the Service Provider.

For on-net locations supported directly by the Service Provider, “Customer Order Feasibility” will be determined. This check may take many forms and involve CRM logic, internal serviceability data and possibly service design. In some cases, a Customer commitment may require resources to be reserved to ensure that the customer order will be fulfilled with a high degree of certainty. In such cases, installation appointments may be scheduled, service identifiers allocated, resources allocated and products offered by Partners reserved using a wholesale order feasibility request with reservations.

Such a request incoming to the Partner requires that the Partner reserve resources as a result of “Determining Customer Order Feasibility”. This sequence is the same as that identified in the Service Provider process, and may result in a request cascading to yet another partner (although this is not explicitly shown in the diagram).

When the reservations are complete, the Partner responds to the Service Provider with a Wholesale Order Feasibility response which includes confirmation that the reservation has been made. In an ATIS Access Service Request context, the response would take the form of the “Firm Order Confirmation”.

Within the Service Provider flow, if the Sales proposal is determined not to be feasible, the sales proposal may be refined until a feasible proposal is achieved. At this point, “Authorize Credit” performs a credit check of the Customer prior to negotiation of the Sales Contract.

The “Negotiate Sales Contract” process element might require further refinement of the Sales Proposal. Once an acceptable Sales Contract is established the Customer will sign the contract and the overall flow will progress to the stage of capturing the customer order.

If a Sales contract cannot be successfully negotiated, and if reservations have been made, these reservations are cancelled. This includes cancelling work force management appointments, recovering service and resource instances and requesting that the Partner release any reserved resources. The Partner follows a similar process for releasing reservations and responds to the Service Provider when this is complete.

Table 11 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Qualify Opportunity	1.1.9.1	No	Ensure that the opportunity is qualified in terms of any associated risk and the amount of effort required to achieve a sale.
Negotiate Sales/Contract	1.1.9.2	No	Close the sale with terms that are understood by the customer, and are mutually agreeable to both the customer and the Service Provider.
Develop Sales Proposal	1.1.9.4	No	Develop a sales proposal to respond to the customer's requirements.
Determine Customer Order Feasibility	1.3.3.1	No	Check the availability and/or the feasibility of providing and supporting standard and customized product offerings where specified to a customer.
Authorize Credit	1.3.3.2	No	Assess a customer's credit worthiness in support of managing customer risk and company exposure to bad debt.
Allocate Specific Service Parameters to Services	1.4.5.2	No	Issue service identifiers for new services.
Recover Service	1.4.5.9	No	Recover specific services that are no longer required by customers.
Manage Schedules & Appointments	1.5.5.1	No	Manages the appointment schedule of assignable staff.
Allocate & Install Resources	1.5.6.1	No	Allocate specific resources required to support a specific service.
Recover Resource	1.5.6.8	No	Recover specific resources that are no longer required.
Determine Party Pre-Order Feasibility	1.6.8.2	No	Determine the ability of suppliers/partners to deliver the specific resources, services or products, within the specified requirements.
Track & Manage Party Orders	1.6.8.3	No	Ensure a party's orders are being processed and delivered efficiently and effectively.
Handle Party Interaction (Including Self Service)	1.6.9.4	No	Handle all interactions (inbound and outbound) made by potential and existing Parties.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Mediate & Orchestrate Party Interactions	1.6.9.6	No	Ensure that transaction message structure and interactions conform to agreed or externally defined standards used by the enterprise and its Parties.

**Table 11 Lead Response-to-Contract Process Elements**

Currently a symmetric process definition from eTOM has not been identified by which an Partner would respond to “Determine Party Pre-Order Feasibility”. In the diagrams above, “Determine Customer Order Feasibility” serves this purpose, even though a Serviceability Request is not necessarily order based.

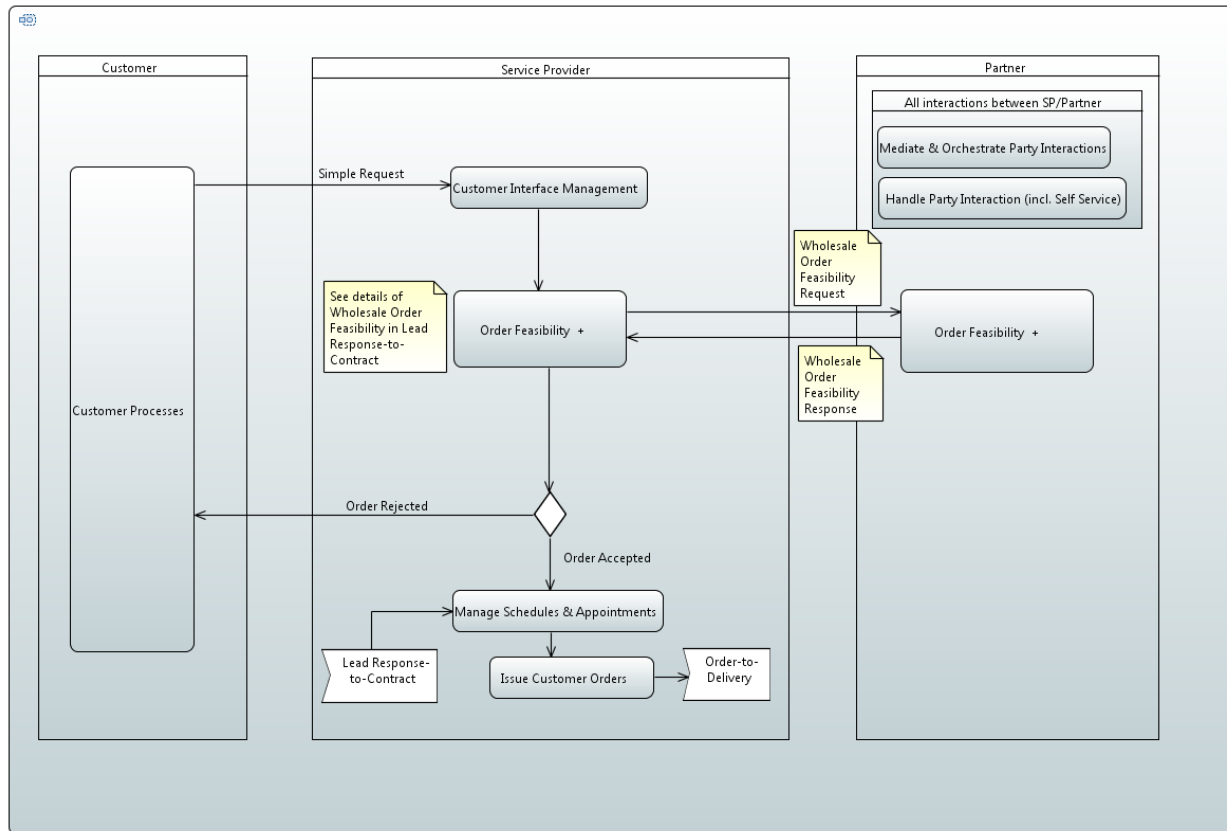
Table 12 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Validate Requirements	Service Provider	Customer	Service Provider communicates its understanding of requirements to Customer.
Requirement Clarification	Customer	Service Provider	Customer provides refined set of requirements to Service Provider.
Sales Contract	Service Provider	Customer	Service Provider proposes Sales Contract to Customer.
Signed Sales Contract	Customer	Service Provider	Customer accepts terms of Sales Contract from Service Provider.
Request ENNI/UNI Serviceability	Service Provider	Partner	Service Provider requests whether a service can be provided at a location by Partner.
Reply ENNI/UNI Serviceability	Partner	Service Provider	Partner indicates whether a service can be provided at a location by Service Provider.
Wholesale Order Feasibility Request	Service Provider	Partner	Service Provider requests whether whole sale product can be provided (and resources reserved) by Partner.
Wholesale Order Feasibility Response (SR Request Confirmation)	Partner	Service Provider	Partner indicates whether whole sale product can be provided for Service Provider.
Reservation Release	Service Provider	Partner	Service Provider indicates that resources reserved for an S/P Request should be released by Partner.
Reservation Release Confirmation	Partner	Service Provider	Partner confirms release of reserved resources associated with a S/P request Service Provider.

Table 12 Lead Response-to-Contract Messages

### 8.3 Contract-to-Order

This section defines the process elements and process flow for the Contract-to-Order stage of the PSR Instance Lifecycle that may represent orders for a new product, modification of an existing product, or deletion of an existing product.



**Figure 9 – Contract-to-Order Process Flow**

Figure 9 illustrates the activities applicable to capturing customer orders either from direct Customer requests or from sales contracts that have been generated through the Lead Response-to-Contract process. This flow reflects the interactions that occur with the Customer and Partners.

A Customer may directly initiate contact with the Service Provider to purchase new product offers or change their existing product offers. The “Customer Interface Management” process element is responsible for managing all incoming requests from the Customer. The request is expressed in terms of product offerings for which the feasibility of delivering can be determined by using the same process sub-flow identified within the Lead Response-to-Contract process. This may involve interactions with the Partner if wholesale E-Access based services are required.

If the order is determined to be feasible, scheduling of the order is performed (usually within CRM) and a customer order is issued. If the order is not feasible it is rejected and the Customer notified.

Once the customer order is issued the overall process advances to Order Fulfillment.

If it is determined that the Order is not feasible, the customer is notified and the process is complete.

Table 13 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Issue Customer Orders	1.3.3.5	No	Issue correct and complete customer orders.
Customer Interface Management	1.3.5.9	No	Managing all interfaces between the enterprise and potential and existing customers.
Manage Schedules & Appointments	1.5.5.1	No	Manages the appointment schedule of assignable staff.
Handle Party Interaction (Including Self Service)	1.6.9.4	No	Handle all interactions (inbound and outbound) made by potential and existing Parties.
Mediate & Orchestrate Party Interactions	1.6.9.6	No	Ensure that transaction message structure and interactions conform to agreed or externally defined standards used by the enterprise and its Parties.

**Table 13 Contract-to-Order Process Elements**

Table 14 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Simple Request	Customer	Service Provider	Customer requests Product Offerings or changes to product from Service Provider.
Order Rejected	Service Provider	Customer	Service Provider notifies Customer that Order cannot be accepted.
Wholesale Order Feasibility Request	Service Provider	Partner	Service Provider requests whether wholesale product can be provided (and resources reserved) by Partner.
Wholesale Order Feasibility Response (SR Request Confirmation)	Partner	Service Provider	Partner indicates whether wholesale product can be provided for Service Provider.

Table 14 Contract-to-Order Messages

## 8.4 Order-to-Delivery

This section defines the process elements and process flow for the Order-to-Delivery stage of the PSR Instance Lifecycle.

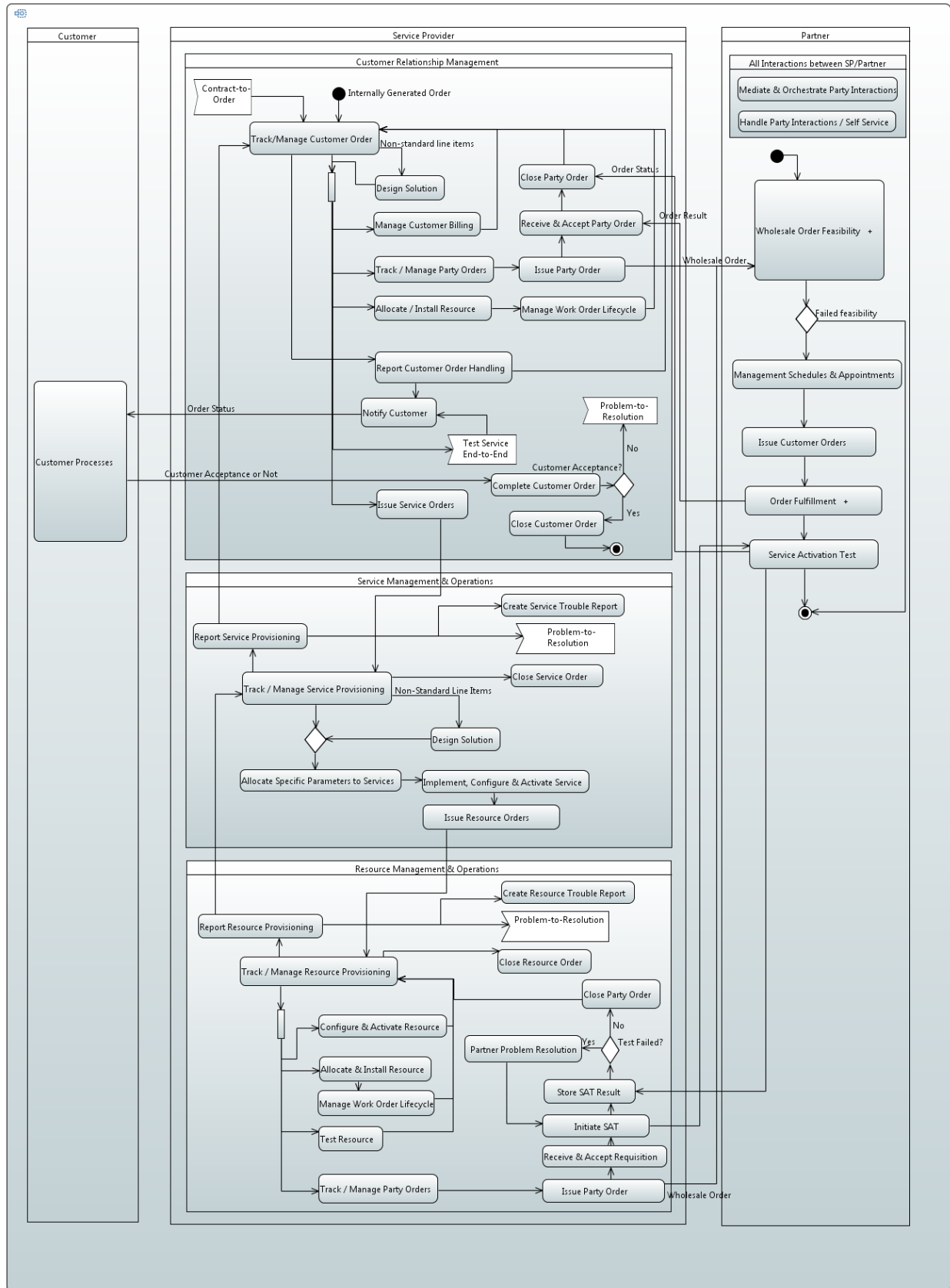


Figure 10 – Order-to-Delivery Process Flow

The process flow in Figure 10 illustrates the activities applicable to Order-to-Delivery. This flow reflects the coordination of activities that occur at the commercial, service and resource levels. Customer orders, based on product definitions and parameters, drive activities with direct commercial impact such as setting up billing, shipping of CPE equipment and installation. Service orders derived from the customer order drive the provisioning of services within the Service Provider. Services orders are based on the Service Provider's service definitions, which are closely aligned with MEF service concepts and parameters. Service orders in turn result in Resource Orders will drive the configuration of the network to support the required services.

In Figure 10, incoming customer orders are coordinated by the "Track & Manage Customer Orders" process element. This process element manages the overall lifecycle of the customer order and coordinates multiple processes that:

- drive the setup of appropriate billing configuration "Manage Customer Billing"
- initiate orders to Partners for wholesale products included in the Service Provider's product catalog "Track & Manage Party Orders, Issue Party Order, Receive & Accept Party Order, Close Party Order"
- identify CPE equipment "Allocate & Install Resource"
- initiate appropriate work force management operations for CPE installation "Manage Work Order Lifecycle"
- initiate service orders to drive Service Provider provisioning operations "Issue Service Orders"
- initiate end-to-end testing "Test Service End-to-End"

After a successful end-to-end testing, customer will be notified. If she is satisfied with test results, she will accept the delivery allowing the order to be completed and closed. Figure 11 provides more detailed description of testing.

In addition to the coordination of these activities, the "Design Solutions" process element represents the case in which non-standard order items requiring a unique customer solution are included in the customer order.

Closely related to the "Track & Manage Customer Orders" process element is the process element "Report Customer Order Handling" which represents the activities around tracking customer order status and notifying other processes. This process element will trigger appropriate Customer Order status information to be sent to the customer "Notify Customer", and trigger problem reporting "Create Customer Problem Report" and fault management. This status notification is used to coordinate customer acceptance testing, with the results enabling the closure of the customer order, or appropriate fault resolution.

The processing of Service Orders is coordinated through the "Track & Manage Service Provisioning". Service Orders processing involves the allocation of service identifiers and parameters "Allocation Specific Parameters to Services", the detailing of required configuration

“Implement, Configure & Allocate Service”, the generation of Resource Orders, and finally the closure of the Service order “Close Service Order”.

Associated with the “Track & Manage Service Orders” process element is the process element “Report Service Order Handling” which represents the activities around tracking service order status and notifying other processes. This process will trigger problem reporting “Create Service Trouble Report” and fault management, and also provide updates to the “Track & Manage Customer Orders” process element.

The processing of Resource Orders is coordinated through the “Track & Manage Resource Provisioning” process element. Resource Order processing involves activating resources in the network “Configure & Activate Resource”, identifying equipment “Allocate & Install Resource”, initiating appropriate work force management operations for installation “Manage Work Order Lifecycle”, and closing the resource order “Close Resource Order”.

In addition, if the implementation design identifies third party service or resource components such as an OVC that has not been exposed at the commercial level, this may require the “Track & Manage Resource Provisioning” process element to initiate orders to Partners for wholesale products (Track & Manage Party Orders, Issue Party Order, Receive & Accept Party Order, Close Party Order).

Associated with the “Track & Manage Resource Orders” process element is the process element “Report Resource Order Handling” which represents the activities around tracking resource order status and notifying other processes. This process will trigger problem reporting (Create Resource Trouble Report) and fault management, and also provide updates to the “Track & Manage Service Orders” process element.

In this process flow, the Partner may be the recipient of wholesale orders originating from the Service Provider either as a result of wholesale product offering presented directly as Service Provider product offerings, or orders generated as part of the design of the Service Provider’s internal service implementation. In both cases the flow and interactions between the Service Provider and the Partners are represented by the same process flows.

The Service Provider initiates an order (Issue Party Order) with a Wholesale Order to the Partner. Within the Partner, the Feasibility of the request is verified, and order acceptance is communicated via the Whole Order Result (Firm Order Confirmation). If the order is feasible, scheduling is performed (Manage Schedules & Appointments), the Order is captured and then fulfilled using a process corresponding to the flow shown within the Service Provider lane. Order status is reported to the Service Provider, which will ultimately trigger the closure of the wholesale order.

Table 15 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Track & Manage Customer Order Handling	1.3.3.3	No	Ensure customer provisioning activities are assigned, managed and tracked efficiently to meet the agreed committed availability date.
Complete Customer Order	1.3.3.4	No	Manage customer information and interactions after customer contracts or associated service orders have been finalized and during the order completion phase.
Issue Customer Orders	1.3.3.5	No	Issue correct and complete customer orders.
Report Customer Order Handling	1.3.3.6	No	Monitor the status of customer orders, provide notifications of any changes and provide management reports.
Close Customer Order	1.3.3.7	No	Close a customer order when the customer provisioning activities have been completed. Monitor the status of all open customer orders, and recognize that a customer order is ready to be closed when the status is changed to Completed.
Notify Customer	1.3.5.5	No	Notify the customer when interesting events happen.
Create Customer Problem Report	1.3.7.5	No	This process creates a new Customer Problem Report.
Manage Customer Billing	1.3.10.1	No	Ensure effective management of the customer's billing account as it relates to the products purchased and consumed throughout the appropriate billing cycle.
Design Solution	1.4.5.1	No	Develop an end-end specific service design which complies with a particular customer's requirement.
Allocate Specific Parameters to Services	1.4.5.2	No	Issue service identifiers for new services.
Track & Manage Service Provisioning	1.4.5.3	No	Ensure service provisioning activities are assigned, managed and tracked efficiently.
Implement, Configure & Activate Service	1.4.5.4	No	Implement, configure and activate the specific services allocated against an issued service order.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Test Service End-to-End	1.4.5.5	No	Test specific services to ensure all components are operating within normal parameters, and that the service is working to agreed performance levels.
Issue Service Orders	1.4.5.6	No	Issue correct and complete service orders.
Report Service Provisioning	1.4.5.7	No	Monitor the status of service orders, provide notifications of any changes and provide management reports.
Close Service Order	1.4.5.8	No	Close a service order when the service provisioning activities have been completed.
Create Service Trouble Report	1.4.6.1	No	Create a new service trouble report.
Manage Schedules & Appointments	1.5.5.1	No	Manages the appointment schedule of assignable staff.
Manage Work Order Lifecycle	1.5.5.5	No	A Work Order is an aggregation of jobs that are to be completed to achieve some business goal: to provide a customer service, to fix a problem, etc. Work Order Lifecycle Management processes are responsible for processing and monitoring the execution of a work order through its entire lifecycle, from issuance to closing.
Allocate & Install Resource	1.5.6.1	No	Allocate specific resources required to support a specific service.
Configure & Activate Resource	1.5.6.2	No	Configure and activate the specific resources allocated against an issued resource order.
Test Resource	1.5.6.3	No	Test specific resources to ensure they are operating within normal parameters.
Track & Manage Resource Provisioning	1.5.6.4	No	Ensure resource provisioning activities are assigned, managed and tracked efficiently.
Report Resource Provisioning	1.5.6.5	No	Monitor the status of resource orders, provide notifications of any changes and provide management reports.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Close Resource Order	1.5.6.6	No	This process monitors the status of the order and changes the status to closed when it is completed.
Issue Resource Orders	1.5.6.7	No	Issue correct and complete resource orders.
Create Resource Trouble Report	1.5.8.7	No	Create a new resource trouble report.
Track & Manage Party Orders	1.6.8.3	No	Ensure a party's orders are being processed and delivered efficiently and effectively.
Receive & Accept Party Order	1.6.8.4	No	Records delivery of a party order and arranges for any acceptance testing or commissioning required.
Issue Party Order	1.6.8.5	No	Generate a correctly formatted and specified party order and issue this to the selected party.
Close Party Order	1.6.8.7	No	Close a party order when it has been successfully completed.
Handle Party Interaction (Including Self Service)	1.6.9.4	No	Handle all interactions (inbound and outbound) made by potential and existing Parties.
Mediate & Orchestrate Party Interactions	1.6.9.6	No	Ensure that transaction message structure and interactions conform to agreed or externally defined standards used by the enterprise and its Parties.

Table 15 Order-to-Delivery Process Elements

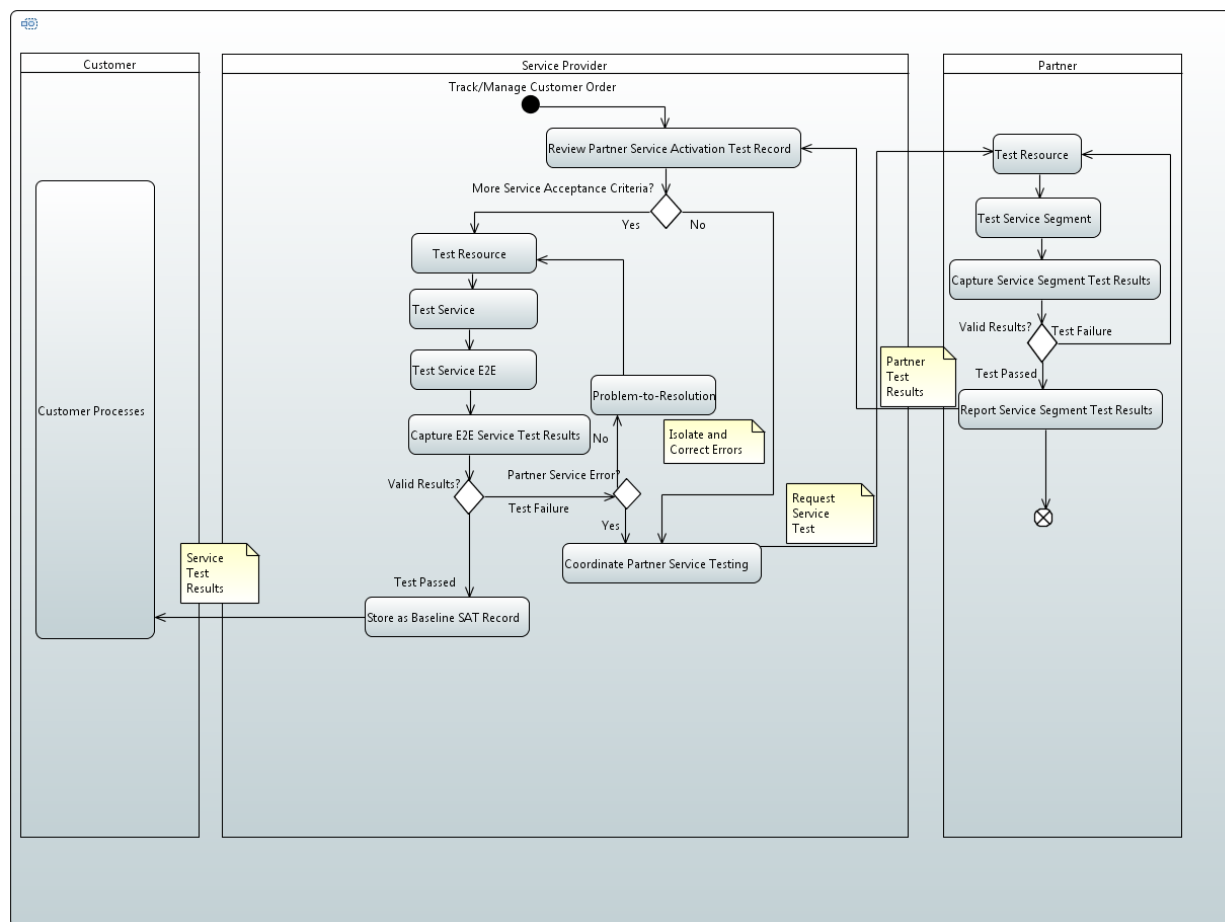
Table 16 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Order Status and Service Test Results	Service Provider	Customer	Service Provider reports status of customer order to Customer. This may include end-to-end service SAT results.
Customer Acceptance	Customer	Service Provider	Customer confirms to Service Provider that the service meets their acceptance criteria.
Wholesale Order (Firm Order)	Service Provider	Partner	Service Provider requests product from Partner.
Wholesale Order Result (Firm Order Confirmation)	Partner	Service Provider	Partner indicates whether wholesale product can be provided for Service Provider.
Order Status	Partner	Service Provider	Partner reports status of customer order to Service Provider.

Table 16 Order-to-Delivery Messages

## 8.5 Test Service End-to-End

This section defines the process elements and process flow for the Test Service End-to-End stage of the PSR Instance Lifecycle. Note that this is a detailed view of the process element identified within the Order-to-Delivery process flow. Figure 11 illustrates this process flow.



**Figure 11 – Test Service End-to-End Process Flow**

The process flow illustrates the interconnection points between the Customer, Service Provider and Partner with respect to testing the Third Network Service before the service is turned over to the Customer. In addition, the Service Provider and Partner lanes illustrate the process flow of Service Activation Testing (SAT) activities within each of their organizations.

As an example, for Carrier Ethernet the process generally occurs with a Customer ordering an Ethernet Service from the Service Provider that requires the Service Provider to order an E-Access service from a Partner. As such, several different Ethernet segments (EVC and OVC) must be tested to validate the end-to-end Customer service. When the Service Provider orders the E-Access service, they likely request a Service Activation Test Record from the Partner showing the validation test results of the ordered Access Service. This might be a baseline SAT Record for the Access EPL or Access EVPL service the Service Provider is receiving from the Partner. If the Partner's SAT Record meets the Service Acceptance Criteria (SAC), the Service Provider also performs testing on their segment, or the EVC/OVC within their footprint, both at the resource and service level. If the Service Provider has access to the Partner's UNI for SAT testing purposes, the Service Provider can finally test the UNI-to-UNI, or end-to-end service for generating a SAT Record. This SAT Record can be stored as a service baseline SAT Record or birth certification test report for historical comparison purposes. In the event that end-to-end

testing uncovers faults, troubleshooting can occur within the Service Providers Ethernet segment, or coordination with the Partner can occur if the issue is within the E-Access service. Once the testing has passed, the customer order can be marked completed and the end-to-end service can be turned over to the Customer.

Table 17 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
<i>Review Partner Service Activation Test Record</i>	N/A	Yes	Review Ethernet Access Provider Service Activation Test Record to confirm adequate testing and performance of SP purchased E-Access service.
Test Service End-to-End	1.4.5.5	No	Test specific services to ensure all components are operating within normal parameters, and that the service is working to agreed performance levels.
<i>Test Service Segment</i>	N/A	Yes	Specific to Third Network service definitions, these processes test specific services against test procedures defined in MEF 48 [5]. This process focuses on testing the OVC (E-Access service).
Capture Service Test Results	1.4.5.5.3	No	Capture and store the test results for historical and downstream testing comparison purposes. This is done for the end-to-end Customer Ethernet service.
Test Resource	1.5.6.3	No	Test specific resources to ensure they are operating within normal parameters.
<i>Capture Service Segment Test Results</i>	N/A	Yes	Capture and store the test results for historical and downstream testing comparison purposes. This is done for the Ethernet Access Services service segment.
<i>Report Service Segment Test Results</i>	N/A	Yes	Report the Ethernet Access Service SAT results.
<i>Store as Baseline Service Activation Test Record</i>	N/A	Yes	Store SAT results as a baseline for historical comparison purposes (e.g., birth certificate).
<i>Coordinate Partner Service Testing</i>	N/A	Yes	Initiate and execute Partner Service testing. SP may perform all or part of this testing or may request Partner to perform all or part of this testing.

Table 17 Test Service End-to-End Process Elements

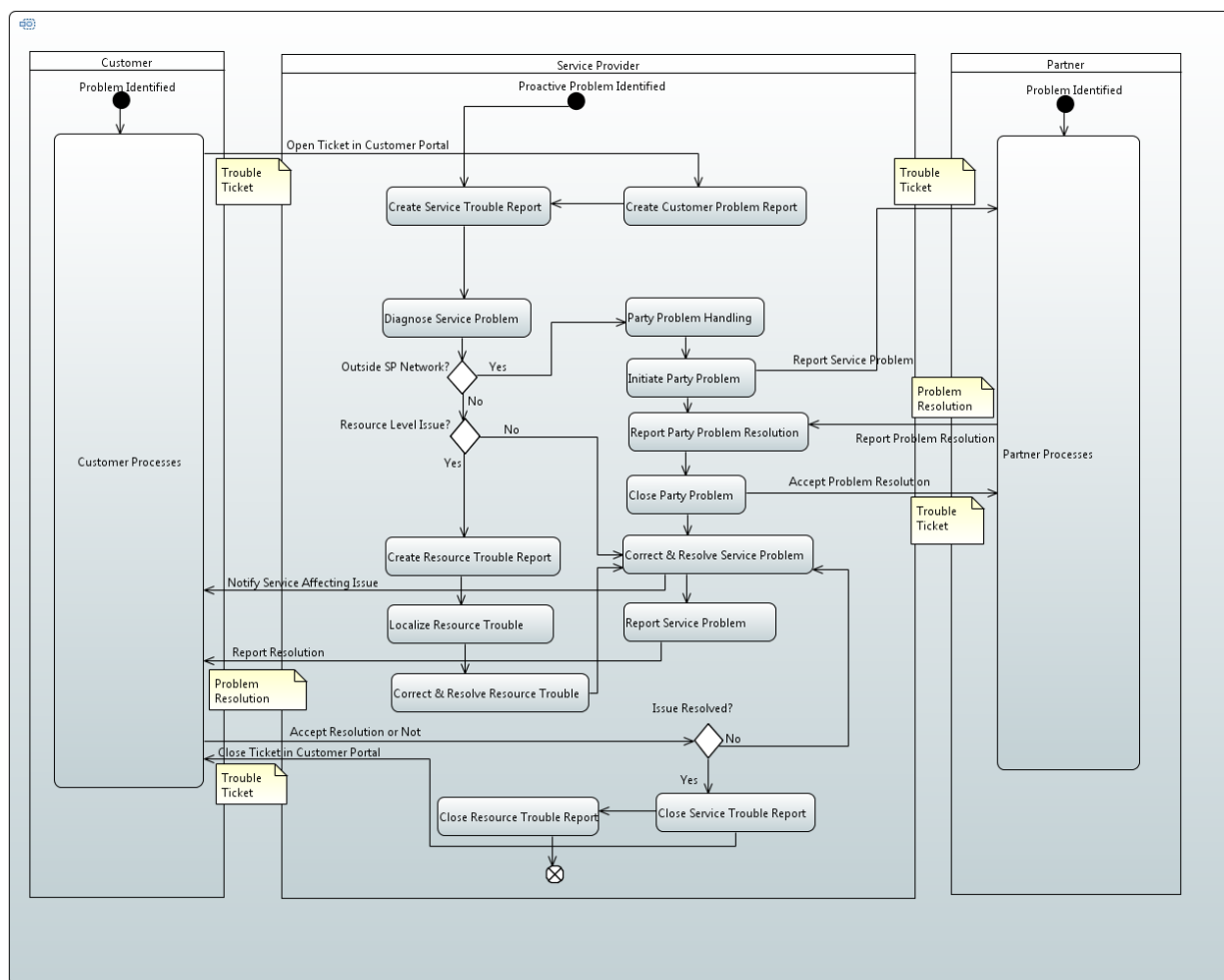
Table 18 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Service Test Results	Service Provider	Customer	Service Provider notifies Customer of the end-to-end Ethernet service SAT results.
Partner Service Test Results	Partner	Service Provider	Partner reports Service test results to the Service Provider.
Request Service Test	Service Provider	Partner	Service Provider coordinates testing of the Service with its Partner.

### Table 18 Test Service End-to-End Messages

## 8.6 Problem-to-Resolution

This section defines the process elements and process flow for the Problem-to-Resolution stage of the PSR Instance Lifecycle. Figure 12 illustrates the process flow for the Problem-to-Resolution stage.



**Figure 12 – Problem-to-Resolution Process Flow**

The process flow illustrates the interconnection points between the Customer, Service Provider and Partner with respect to Problem-to-Resolution activities including Fault Management for Service OAM. In addition, the Service Provider lane illustrates the process flow of Problem-to-Resolution activities within their organization.

The process flow shown in the diagram generally starts in one of two ways:

1. Customer identifies an issue with their service and opens a problem in their customer portal,
- or
2. Service Provider proactively identifies an issue with the service.

Once the problem has entered the Service Provider's problem handling system, the process flow takes two parallel tracks where the issue is handled at the service and resource facing perspective (e.g., internal to the Service Provider) and handled at customer facing perspective (e.g., externally to the Service Provider).

Another perspective is the interactions with the Partner to troubleshoot and resolve issues with the service the Service Provider has ordered from the Partner. If an issue is isolated to the Partner Service, the Service Provider reports the problem to the Partner via the interconnection point as shown in the process flow diagram. It's up to the Partner to troubleshoot and resolve the problem and then report the resolution and correction back to the Service Provider. The Service Provider has the opportunity to accept the Partner problem resolution and close the problem report.

Similar to this interaction is the interaction between the Customer and the Service Provider when the Customer opens a problem report in their customer portal. The Service Provider isolates and corrects the problem at the service and potentially resource levels within their network (and the Partner's network as just discussed) and notifies the Customer of the problem resolution. The Customer has the opportunity to accept the Service Provider problem resolution and notify the Service Provider. Once the Customer has accepted the problem resolution, the Service Provider closes the open problem in the Customer's customer portal. Another scenario exists where the Service Provider proactively identifies a service affecting issue and notifies the Customer of the problem. Once the problem has been resolved, the Service Provider notifies the Customer of the problem resolution.

Table 19 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Create Customer Problem Report	1.3.7.5	No	This process creates a new Customer Problem Report.
Create Service Trouble Report	1.4.6.1	No	Create a new service trouble report.
Diagnose Service Problem	1.4.6.2	Yes	Identify the root cause of the specific service problem, including those service problems related to security events.
Correct & Resolve Service Problem	1.4.6.3	No	Restore the service to a normal operational state as efficiently as possible.
Report Service Problem	1.4.6.5	No	Monitor the status of service trouble reports, provide notifications of any changes and provide management reports. This includes service trouble caused by security events.
Close Service Trouble Report	1.4.6.6	No	Close a service trouble report when the service problem has been resolved.
Localize Resource Trouble	1.5.8.2	No	Perform analysis to identify the root cause of the specific resource trouble including those resource troubles related to security events.
Correct & Resolve Resource Trouble	1.5.8.3	No	Restore or replace resources that have failed as efficiently as possible.
Close Resource Trouble Report	1.5.8.6	No	Close a resource trouble report when the resource problem has been resolved.
Create Resource Trouble Report	1.5.8.7	No	Create a new resource trouble report.
Initiate Party Problem	1.6.10.1	No	Report specific problems to the party.
Report Party Problem Resolution	1.6.10.4	No	Monitor the status of party problems, provide notifications of any changes, and provide management reports.
Close Party Problem	1.6.10.5	No	Close a party problem report when the problem has been resolved.

Table 19 Problem-to-Resolution Process Elements

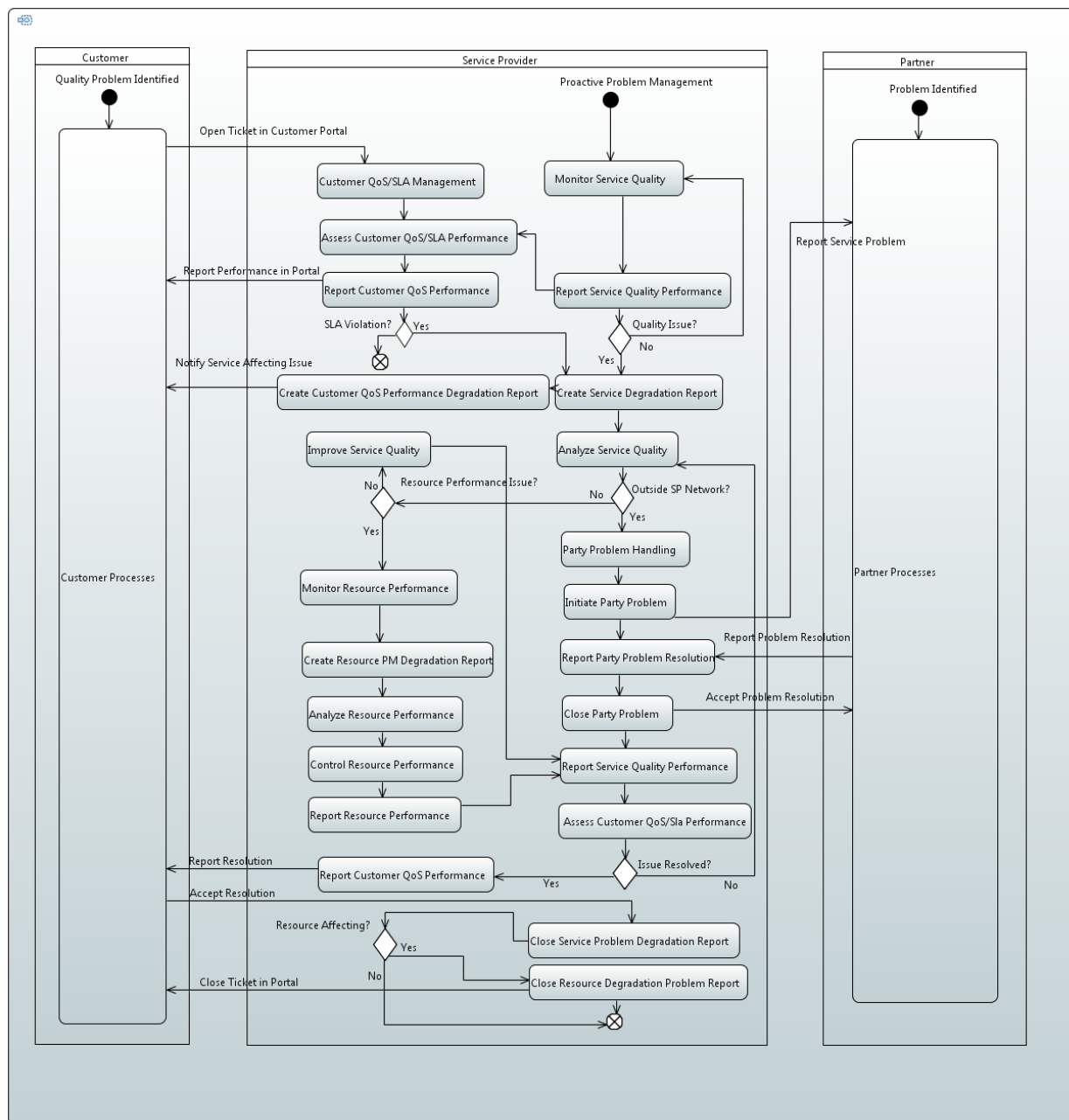
Table 20 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Open Ticket in Customer Portal	Customer	Service Provider	Customer opens problem ticket in customer portal.
Notify service affecting issue	Service Provider	Customer	Service Provider notifies Customer, perhaps via the Customer Portal, or via email, of a service affecting condition the SP or AP has detected.
Report resolution	Service Provider	Customer	SP reports the problem resolution to the Customer.
Accept resolution	Customer	Service Provider	Customer accepts the SP problem resolution and likely performs some level of their own testing to validate the issue resolution.
Close Ticket in Customer Portal	Service Provider	Customer	Once Customer accepts the resolution, SP closes the open problem ticket in the Customer Portal.
Report Service Problem	Service Provider	Partner	Service Provider notifies its Partner of a service-level problem with the Service.
Report Problem Resolution	Partner	Service Provider	Partner reports the problem resolution to the Service Provider.
Accept Problem Resolution	Service Provider	Partner	Service Provider accepts the Partner problem resolution and likely performs some level of their own testing to validate the issue resolution.

Table 20 Problem-to-Resolution Messages

## 8.7 SLS Violation-to-Resolution

This section defines the process elements and process flow for the SLS Violation-to-Resolution stage of the PSR Instance Lifecycle. Figure 13 illustrates the process flow for the SLS Violation-to-Resolution stage.



**Figure 13 – SLS Violation-to-Resolution Process Flow**

The process flow illustrates the interconnection points between the Customer, Service Provider and Partner with respect to SLS Violation-to-Resolution activities including Performance Monitoring for Service OAM.

In addition, the Service Provider lane illustrates the process flow of SLS Violation-to-Resolution activities within their organization. The process flow shown in the diagram generally starts in one of two ways:

- 1) Customer identifies a service quality issue with their service and opens the issue in their customer portal,

or

- 2) Service Provider proactively identifies a quality issue with the service (e.g., service degradation occurring).

Once the issue has entered the Service Provider's problem handling system, the process flow takes two parallel tracks where the issue is handled at the service and resource facing perspective (e.g., internal to the Service Provider) and handled at customer facing perspective (e.g., externally to the Service Provider).

Another perspective is the interactions with the Partner to troubleshoot and resolve issues with the service the Service Provider has ordered from the Partner. If an issue is isolated to the Partner Service, the Service Provider reports the problem to the Partner via the interconnection point as shown in the process flow diagram. It's up to the Partner to troubleshoot and resolve the problem and then report the resolution and correction back to the Service Provider. The Service Provider has the opportunity to accept the Partner problem resolution and close the problem report.

Similar to this interaction is the interaction between the Customer and the Service Provider when the Customer opens a problem report in their customer portal. The Service Provider isolates and corrects the problem at the service and potentially resource levels within their network (and the Partner's network as just discussed) and notifies the Customer of the problem resolution. The Customer has the opportunity to accept the Service Provider problem resolution and notify the Service Provider. Once the Customer has accepted the problem resolution, the Service Provider closes the open Problem in the Customer's customer portal. Another scenario exists where the Service Provider proactively identifies a service quality affecting issue and notifies the Customer of the problem. Once the problem has been resolved, the Service Provider notifies the Customer of the problem resolution. Performance reporting is another requirement for the Customer to enable SLA compliance verification of the service as delivered by the Service Provider. This is shown in the diagram as a continual process of reporting performance in the customer performance in a near-real time manner.

Table 21 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in *italic font*.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Assess Customer QoS/SLA Performance	1.3.8.1	No	Manage the overall assessment of the customer QoS/SLA performance.
Report Customer QoS Performance	1.3.8.3	No	Report on the customer's QoS/SLA performance.
Create Customer QoS Performance Degradation Report	1.3.8.4	No	Create a new customer QoS performance degradation report.
Monitor Service Quality	1.4.7.1	Yes	Monitor received service quality information and undertake first-in detection.
Analyze Service Quality	1.4.7.2	Yes	Analyze and evaluate the service quality performance of specific services.
Improve Service Quality	1.4.7.3	No	Restore the service quality to a normal operational state as efficiently as possible.
Report Service Quality Performance	1.4.7.4	No	Monitor the status of service performance degradation reports, provide notifications of any changes and provide management reports.
Create Service Performance Degradation Report	1.4.7.5	No	Create a new service performance degradation report.
Close Service Performance Degradation Report	1.4.7.7	No	Close a service performance degradation report when the service performance has been resolved.
Monitor Resource Performance	1.5.9.1	No	Monitor received resource performance information and undertake first-in detection.
Analyze Resource Performance	1.5.9.2	No	Analyze and evaluate the performance of specific resources.
Control Resource Performance	1.5.9.3	No	Apply controls to resources in order to optimize the resource performance.
Report Resource Performance	1.5.9.4	No	Monitor the status of resource performance degradation reports, provide notifications of any changes and provide management reports.
Create Resource Performance Management Degradation Report	1.5.9.5	No	Create a new resource performance degradation report.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Close Resource Performance Degradation Report	1.5.9.7	No	Close a resource performance degradation report when the resource performance has been resolved.
Initiate Party Problem	1.6.10.1	No	Report specific problems to the party.
Report Party Problem Resolution	1.6.10.4	No	Monitor the status of Partner problem reports, provide notifications of any changes and provide management reports.
Close Party Problem	1.6.10.5	No	Close a Partner problem report when the Partner problem has been resolved.

Table 21 SLS Violation-to-Resolution Process Elements

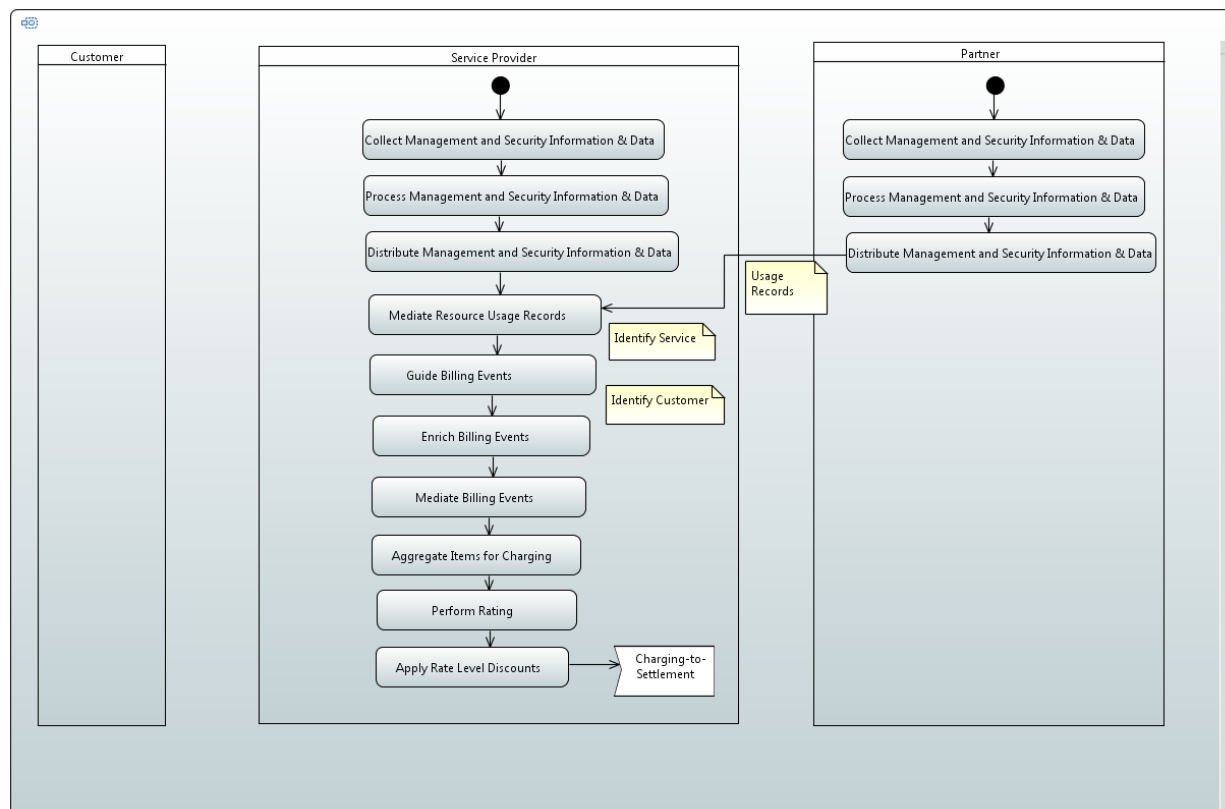
Table 22 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Open Ticket in Customer Portal	Customer	Service Provider	Customer opens quality problem ticket in customer portal.
Report Performance in Customer Portal	Service Provider	Customer	Service Provider populates Customer Portal with near-real time service level Performance data.
Notify service affecting issue	Service Provider	Customer	Service Provider notifies Customer, perhaps via the Customer Portal, or via email, of a service affecting condition the Service Provider or its Partner has detected.
Report resolution	Service Provider	Customer	Service Provider reports the quality problem resolution to the Customer.
Accept resolution	Customer	Service Provider	Customer accepts the SP quality problem resolution and likely performs some level of their own testing to validate the issue resolution.
Close Ticket in Customer Portal	Service Provider	Customer	Once Customer accepts the resolution, SP closes the open quality problem ticket in the Customer Portal.
Report Service Problem	Service Provider	Partner	SP notifies its Partner of a service-level quality problem with the Partner Service.
Report Problem Resolution	Partner	Service Provider	Partner reports the quality problem resolution to the SP.
Accept Problem Resolution	Service Provider	Partner	SP accepts the Partner quality problem resolution and likely performs some level of their own testing to validate the issue resolution.

Table 22 SLS Violation-to-Resolution Messages

## 8.8 Usage-to-Charging

This section defines the process elements and process flow for the Usage-to-Charging stage of the PSR Instance Lifecycle. Note that the activities around setting up a billing account for a Customer and associating pricing to the Customer's products are established during Service Fulfillment, specifically in the "Manage Customer Billing" process element referenced in Figure 10.



**Figure 14 – Usage-to-Charging Process Flow**

Figure 14 illustrates the activities involved in usage collection, billing event management and charging.

The collection of data and events relevant to resource and service usage information is performed by activities within the “Collect Management and Security Information & Data” process element. Usage data and events are then aggregated, formatted, and filtered by the “Process Management and Security Information & Data” process element, which identifies data and events relevant to billing and charging. This data and events are then distributed to appropriate downstream processes by the “Distribute Management and Security Information & Data” process element.

Usage data is filtered to remove duplication, validated and correlated with services within the “Mediate Resource Usage Records” process element. This process may receive usage information from the Partner in addition to usage records received directly from within the Service Provider.

The events represented by usage and network events are then associated with customer and product information within the “Guide Billing Events” process element. The resultant billing events are then enriched with pricing information from product and customer data in the “Enrich Billing Events” process element. This is followed by “Mediate Billing Events” which performs any reformatting of data necessary prior to rating operations.

Processing within “Aggregate Items for Charging” allows usage to be aggregated (if necessary) and the aggregated items used as a basis for rating or discounts. “Perform Rating” calculates the value of each product, with discounts applied by “Apply Rate Level Discounts”.

This overall sequence of operations provides the information set upon which Billing will operate.

Table 23 introduces the process elements used in the Charging process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in *italic font*.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Enrich Billing Events	1.3.12.1	No	Enrich billing event records with additional data.
Guide Billing Events	1.3.12.2	No	Ensures that the event records used in the billing processes are related to the correct customer billing account and subscribed products.
Mediate Billing Events	1.3.12.3	No	Edits and reformats data for recipient applications.
Perform Rating	1.3.13.1	No	Calculating the value of the service/product, before, during or after the rendering of the service.
Apply Rate Level Discounts	1.3.13.2	No	Applies discounts to product prices.
Aggregate Items for Charging	1.3.13.3	No	Manages the accumulation of items that may be used in the selection of a value or in calculation of a rate/discount.
Collect Management and Security Information & Data	1.5.7.1	No	Collection of management and security information and data records from resource and service instances and other enterprise processes.
Process Management and Security Information & Data	1.5.7.2	No	Process the management and security information and/or data into a form suitable for the intended recipient processes, resource instances or service instances.
Distribute Management and Security Information & Data	1.5.7.3	No	Distribute processed management and security information and/or data to resource instances, service instances or other processes within the enterprise for further analysis and/or reporting.
Mediate Resource Usage Records	1.5.10.1	No	Validate, normalize, convert and correlate usage records collected from the network.

Table 23 Usage-to-Charging Process Elements

Table 24 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Usage Records	Partner	Service Provider	Partner sends relevant Usage Records to the Service Provider.

Table 24 Usage-to-Charging Messages

## 8.9 Charging-to-Settlement

This section defines the process elements and process flow for the Charging-to-Settlement stage of the PSR Instance Lifecycle.

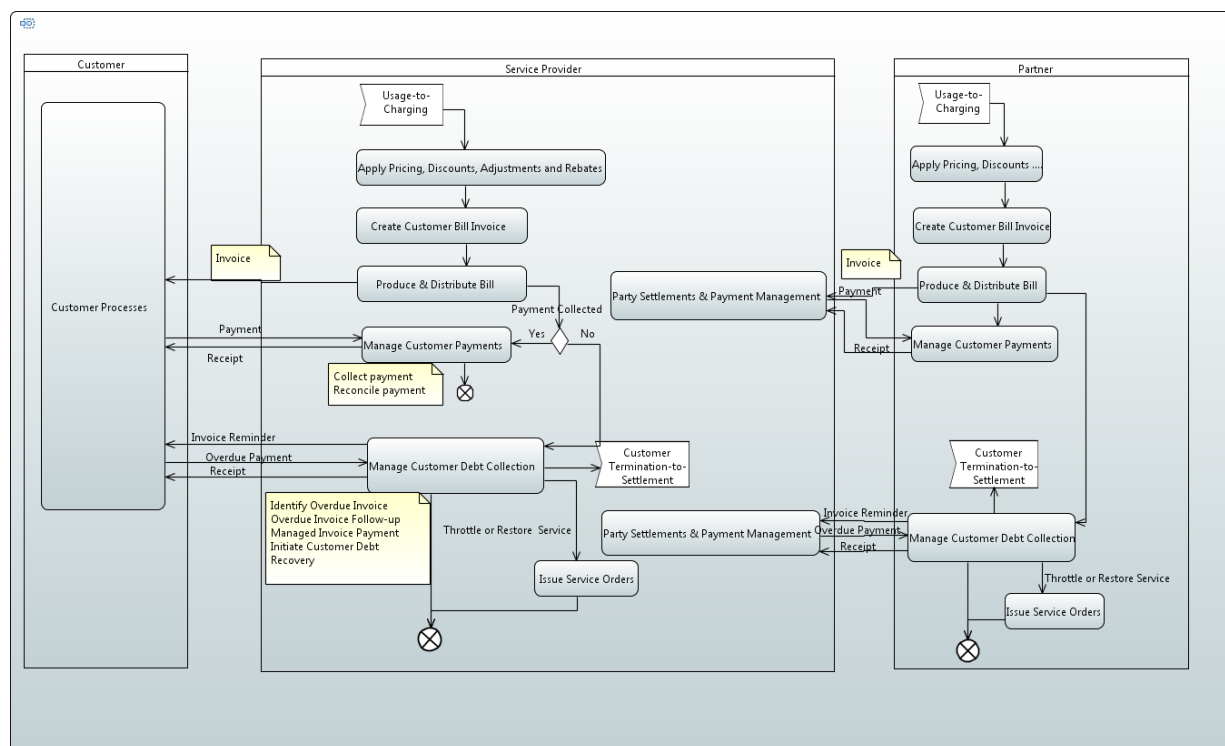


Figure 15 – Charging-to-Settlement Process Flow

Figure 15 illustrates the activities involved in generating Customer bills and payment collection.

At an appropriate time, as determined by the contract between the Service Provider and the Customer, the Service Provider shall determine all the relevant items for inclusion in the Customer bill within the “Apply Pricing, Discounting, “Adjustments & Rebates” process element. These are used to generate the Customer invoice within the “Create Customer Bill Invoice” process element. The invoice is then converted into the relevant customer-friendly format (hard-copy, email, etc.) and provided to the Customer by the processes within the “Produce and Distribute Bill” process element.

Payments made by the Customer are collected, recorded, applied to the Customer account and acknowledged by the processes within the “Manage Customer Payments” process element.

Customer late-, partial- or non-payment are identified and appropriate decisions made on how to handle this within the “Manage Customer Debt Collection” process element. These decisions might include the issuing of reminder notifications to the Customer, agreeing and establishing a repayment schedule, throttling the services used by the customer (e.g., by reducing the agreed bandwidths or QoS parameters), or initiating more formal debt recovery activities. Should a decision to throttle the Customer service be made, then this is managed and executed by the processes within the “Issue Service Orders” process element; a subsequent Customer payment may result in a decision to fully or partially restore the service, when again the same “Issue Service Orders” process element is used to manage and execute this.

As an ultimate decision to handle late- or non-payment by the Customer, the relationship may be terminated, following the processes defined in the “Customer Termination-to-Settlement” section below

When the Service Provider receives a bill from a Partner (that is, when the Service Provider is a Customer of the Partner), the Service Provider will assess the correctness of the received bill using the processes defined in the “Receive and Assess Invoice” process element. Any issues, questions or clarifications resulting from this are resolved with the Partner in the “Negotiate and Approve Invoice” process element. Should the Service Provider agree to pay the bill, then this is accomplished by the processes within the “Issue Settlement Notice & Payment” process element.

Table 25 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

process element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Apply Pricing, Discounting, Adjustments & Rebates	1.3.9.1	No	Ensure that the bill invoice is reflective of all the commercially agreed billable events and any bill invoice adjustments agreed between a Service Provider and the customer.
Create Customer Bill Invoice	1.3.9.2	No	Production of a timely and accurate invoice in accordance with the specific billing cycles and reflective of the final charges for services, together with any adjustments, delivered to the customer by the Service Provider and respective other parties.
Produce and Distribute Bill	1.3.9.3	No	Physical production and distribution of bills to customers in accordance with the specified billing cycle.
Manage Customer Payments	1.3.10.2	No	Collect payments made by the customer and reconcile the payments to the invoices.
Manage Customer Debt Collection	1.3.10.3	No	Collect past due payments from the customer.
Issue Service Orders	1.4.5.6	No	Issue correct and complete service orders.
Party Revenue Management	1.6.12	No	Wholesale and Partner Settlement entails the full end-2-end process considering the operational execution (under business model specific processes), controlling the Wholesale and Partner Billing Settlement & Collections process, Identifying potential Fraud, as well as tracking outstanding payments and resultant actions (from Collections). Manage party billing events, charge parties for products, manage bills/invoices, manage payments, sharing revenue, manage account balances, and handle bill/invoice inquiries.

Table 25 Charging-to-Settlement Process Elements

Table 26 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

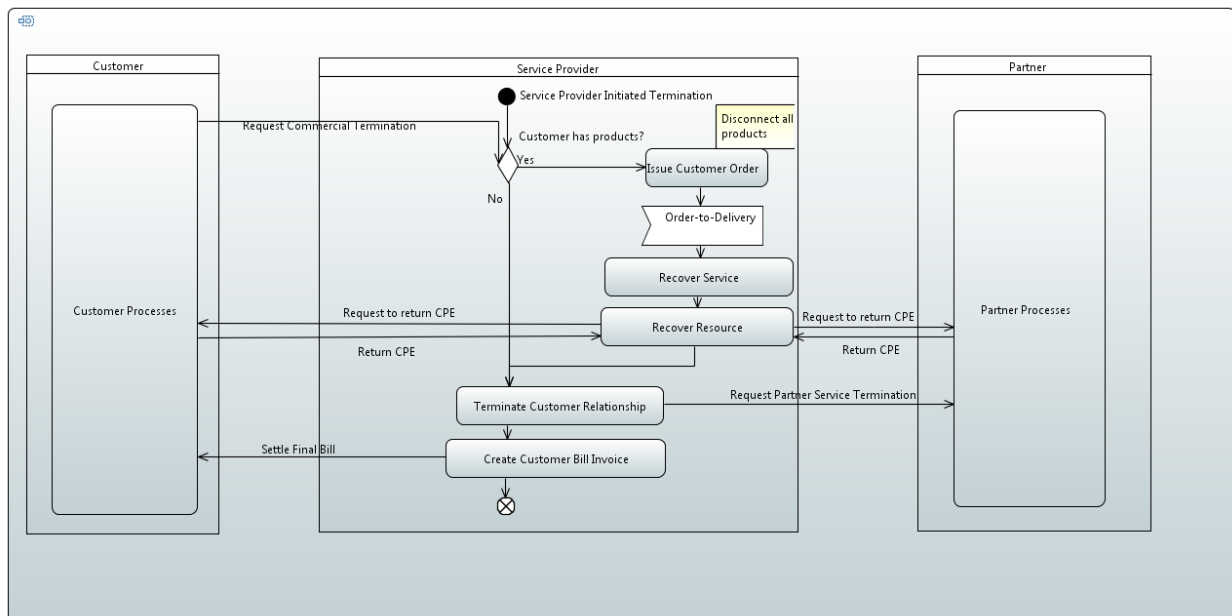
Message	Originator	Receiver	High Level Description
Invoice	Service Provider	Customer	The statement of monies due to the Service Provider for the supplied services.
Payment	Customer	Service Provider	The transfer of funds from the Customer to the Service Provider to settle the issued Invoice.
Receipt	Service Provider	Customer	Confirmation of receipt by the Service Provider of the Payment made by the Customer.
Invoice Reminder	Service Provider	Customer	A reminder from the Service Provider to the Customer of the monies due for the supplied services.
Overdue Payment	Customer	Service Provider	The transfer of funds after the expected date from the Customer to the Service Provider to settle the issued Invoice.
Invoice	Partner	Service Provider	The statement of monies due to the Partner for the supplied services.
Payment	Service Provider	Partner	The transfer of funds from the Service Provider to the Partner to settle the issued Invoice.
Receipt	Partner	Service Provider	Confirmation of receipt by the Partner of the Payment made by the Service Provider.
Invoice Reminder	Partner	Service Provider	A reminder from the Partner to the Service Provider of the monies due for the supplied services.
Overdue Payment	Service Provider	Partner	The transfer of funds after the expected date from the Service Provider to the Partner to settle the issued Invoice.

**Table 26 Charging-to-Settlement Messages**

## 8.10 Customer Termination-to-Settlement

This section defines the process elements and process flow for the Customer Termination-to-Settlement stage of the PSR Instance Lifecycle. Figure 16 illustrates the process flow in which

customer services are canceled, equipment returned, financial settlement made and the relationship between the Service Provider and the customer terminated.



**Figure 16 – Customer Termination-to-Settlement Process Flow**

Figure 16 illustrates the collaboration between the Service Provider and Partner business entities through a set of messages over an interface. The same relationship is shown between the Customer and the Service Provider. Both the Customer and Partner process lanes are shown empty to indicate they are treated as black boxes. The only interest is with the Service Provider's interface to each of these actors.

The Customer initiates the process flow by submitting a request to the Service Provider to cancel their service subscriptions. This request might be initiated through an on-line system or over the phone. Alternatively, the Service Provider might initiate the termination, perhaps, for example, due to lack of payment. Since the customer sees the Service Provider services as Products, the termination request results in a customer order that is processed by the Order-to-Delivery process flow.

The process elements are shown in the Service Provider lane to illustrate the activities that occur within the Service Provider's business enterprise. Each process element is described in Table 27. Since this scenario assumes a Service is part of the overall end-to-end service provided to the Customer, the Service Provider must initiate a Service termination request with the Partner. The Service Provider recovers the service resulting in a deallocation of the service instance and associated parameters. When the Service Provider needs to recover the resources or network element from the Customer Premises, there is another interaction with both the Customer and Partner. The Service Provider may request the Customers in their geographical footprint to return the devices to a local customer service center. The Service Provider may request the Partner to collect the SP-owned devices via a similar method, or a method the Partner has defined. Finally, the Service Provider settles the final bill with the Customer through the interface between those two actors, perhaps via an automated billing system.

Table 27 introduces the process elements used in the process flow and identifies those that are defined in [1] by listing the TMF eTOM Process Identifier. If a process element has not been defined within eTOM, the level is listed as N/A and the process element name in the process flow is shown in italic font.

Process Element	TMF eTOM Identifier	Third Network Extension?	High Level Description
Issue Customer Orders	1.3.3.5	No	Issue correct and complete customer orders.
Terminate Customer Relationship	1.3.4.4	No	Manage termination as appropriate.
Create Customer Bill Invoice	1.3.9.2	No	Production of a timely and accurate invoice in accordance with the specific billing cycles and reflective of the final charges for services, together with any adjustments, delivered to the customer by the Service Provider and respective other parties.
Recover Service	1.4.5.9	No	Recover specific services that are no longer required by customers.
Recover Resource	1.5.6.8	No	Recover specific resources that are no longer required.

**Table 27 Customer Termination-to-Settlement Process Elements**

Table 28 introduces the messages used in the process flow and identifies the originator and receiver of the message along with the behavior of the message sequence.

Message	Originator	Receiver	High Level Description
Request Commercial Termination	Customer	Service Provider	Customer submits request to cancel their service.
Request to return CPE	Service Provider	Customer	Service Provider submits request to customer to return CPE.
Return CPE	Customer	Service Provider	Customer returns service provider owned CPE to Service Provider.
Request Partner Service Termination	Service Provider	Partner	Service Provider submits request to cancel Service with its Partner.
Request to return CPE	Service Provider	Partner	Service Provider submits request to its Partner to return CPE.
Return CPE	Partner	Service Provider	Partner returns service provider owned CPE to Service Provider.
Settle Final Bill	Service Provider	Customer	Service Provider sends out final bill for service.

Table 28 Customer Termination-to-Settlement Messages

## 9. References

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- [2] MEF 6.2, EVC Ethernet Services Definitions Phase 3, August 2014.
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- [4] MEF 33, Ethernet Access Services Definition, January 2012.
- [5] MEF 48, Third Network Service Activation Testing (SAT), October 2014.
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- [11] MEF 7.3, Carrier Ethernet Services Management Information Model, October 2016.
- [12] Object Management Group (OMG), Unified Modeling Language (UML), Version 2.5, March 2015.
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- [14] MEF 51, OVC Services Definitions, August 2015.

