



Framework Best Practice

Business Process Framework (eTOM)

Application Note: Process Flow Examples

**Business Process Framework
GB921 Addendum F
Release 12.5.0
July 2013**

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Direct inquiries to the TM Forum office:

240 Headquarters Plaza,
East Tower – 10th Floor,
Morristown, NJ 07960 USA
Tel No. +1 973 944 5100
Fax No. +1 973 944 5110
TM Forum Web Page: www.tmforum.org

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Table 1 - Use of Level 3 Process Elements in Scenarios and Perspectives

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Executive Summary

This document provides additional insight into the Business Process Framework (eTOM) and its application, through the definition of some example business scenarios, or applications, in which the Business Process Framework is applied, and then process flows and related information that demonstrate how the Framework processes interact in these situations.

In this release, content has been added based on industry experience in linking the Business Process Framework with ITIL. The content in previous releases has also reflected linkage with ITIL, but there derived from "Quick Start Packs" that were published separately. The Quick Start Pack GB957 for Assurance (Trouble2Resolve) and that for Quick Start Pack GB959 for Fulfillment (Lead2Cash) were "mined" in this way for the process flows included.

Note that the Quick Start packs are intended to provide packaged solutions for members and the industry by delivering a "commercial off the shelf" (COTS) capability focused around specific market drivers. The intended focal points for the Quick Start packs are the major business activities for an enterprise and their means of support. This requires each pack to be scoped around one or more specific use cases which are a priority for many enterprises. This will translate into a business view of activities and flows that represent how an enterprise or set of enterprises interworking in a value chain, handles the scenarios. While it is recognized that there may be variation in detail for how companies may handle each scenario, the objective is to agree a common baseline, from which tailored amendments can be made. As these Quick Start packs evolve, they will address the whole of the Framework area, but at this point, the published examples are mainly focused on the Business Process Framework since this sets the initial business context. Despite this, it is seen that there can be benefit in packaging the content specifically within the Business process Framework area, to make this more accessible and visible to that community.

This document is an Application Note, aiming to document approaches based on industry experience that can be used by a company and adapted to its business needs.

Note that, as an Application Note, this material should not be read as normative – i.e. as representing a single standardised approach – but rather as a representative view that provides a useful base for others to build on. Other approaches are also possible. It is the goal of work like this to assist convergence for the industry, but not to impose a single approach, where there are other variations and alternatives that make sense.

1. Introduction

This document provides additional insight into the Business Process Framework (eTOM) and its application, through the definition of some example business scenarios, or applications, in which the Business Process Framework is applied, and then process flows and related information that demonstrate how the Framework processes interact in these situations.

In this release, content has been added based on industry experience in linking the Business Process Framework with ITIL. The content in previous releases has also reflected linkage with ITIL, but there derived from "Quick Start Packs" that were published separately. The Quick Start Pack GB957 for Assurance (Trouble2Resolve) and that for Quick Start Pack GB959 for Fulfillment (Lead2Cash) were "mined" in this way for the process flows included. The new material in this release (see Section 12) focuses on further insights around Assurance.

Note that the Quick Start packs are intended to provide packaged solutions for members and the industry by delivering a "commercial off the shelf" (COTS) capability focused around specific market drivers. The intended focal points for the Quick Start packs are the major business activities for an enterprise and their means of support. This requires each pack to be scoped around one or more specific use cases which are a priority for many enterprises. This will translate into a business view of activities and flows that represent how an enterprise or set of enterprises interworking in a value chain, handles the scenarios. While it is recognized that there may be variation in detail for how companies may handle each scenario, the objective is to agree a common baseline, from which tailored amendments can be made. As these Quick Start packs evolve, they will address the whole of the Framework area, but at this point, the published examples are mainly focused on the Business Process Framework since this sets the initial business context. Despite this, it is seen that there can be benefit in packaging the content specifically within the Business process Framework area, to make this more accessible and visible to that community. Note that the whole of the Quick Start Pack documents is not reproduced here. It is not the aim that this document absorbs all the Quick Start Pack scope, but just that this provides another window into the content, for users focused specifically on process flows. For fuller insight into the Quick Start Packs themselves, the original Quick Start Pack documentation should be consulted.

A number of example scenarios are described in this document. These can be considered as "Use Cases", if this terminology assists, with a business, rather than an implementation, perspective since the Business Process Framework and these scenarios seek to define the business requirements rather than a particular solution that addresses these requirements. Nevertheless, since these scenarios are examples, certain assumptions have been made about the nature of the business problem concerned, and it should be stressed that these assumptions do not imply that the Business Process Framework can only be applied in the context described. Instead, these are intended to provide insight for the cases considered, but many other scenarios and examples can be addressed, and it is hoped that as the work on the Business Process Framework progresses, a growing library can be assembled on these.

It should be emphasized that the example scenarios shown here are not to be viewed as normative – these scenarios are examples to illustrate how to apply the Business Process Framework. The value of information is confirmed when it is put to use. The Business Process Framework has many possible applications, but the most obvious way to use a framework of Process Elements is to use it to guide the design of actual Process Flows that deliver value for the Enterprise.

To appreciate this, it is important here to differentiate between Process Flows and Process Elements, especially from the point of view of how they relate to standardizing processes.

The **Process Elements** in the Business Process Framework are intended as an exhaustive list, i.e. an enterprise can use the Business Process Framework process elements when categorizing business activities within process implementations. Should an exception arise where some activity is identified as not being supported by (i.e. able to fit within) any existing process element, then a new process element would be created and added to the Business Process Framework in order to maintain its role as a comprehensive process framework.

The **Process Flows** represent the way that the business activities (in the form of the process elements) can work together to satisfy a particular need. An exhaustive list of process flows will never be completed because needs are continually changing, but this is not an issue as the individual scenarios, and the process flows developed around them, provide insight that contributes to an enhanced understanding of how the Business Process Framework can be used. What is important for an enterprise that is trying to improve its efficiency by re-using its process and IT capabilities, is that it must ensure that process flows are built using business activities that are categorized using the Business Process Framework process elements.

This document is an Application Note, aiming to document approaches based on industry experience that can be used by a company and adapted to its business needs.

Note that, as an Application Note, this material should not be read as normative – i.e. as representing a single standardised approach – but rather as a representative view that provides a useful base for others to build on. Other approaches are also possible. It is the goal of work like this to assist convergence for the industry, but not to impose a single approach, where there are other variations and alternatives that make sense.

Note that earlier process flows are now positioned in an Appendix “Historical Process Flows” since these relate to older versions of the Business Process Framework, but are still useful for reference.

2. Fulfillment: Overview

2.1. High Level Scope

In terms of the Business Process Framework (eTOM) Level 1, the scope of this Quick Start Pack is the Fulfillment vertical (from Operations), as shown in Figure 1.

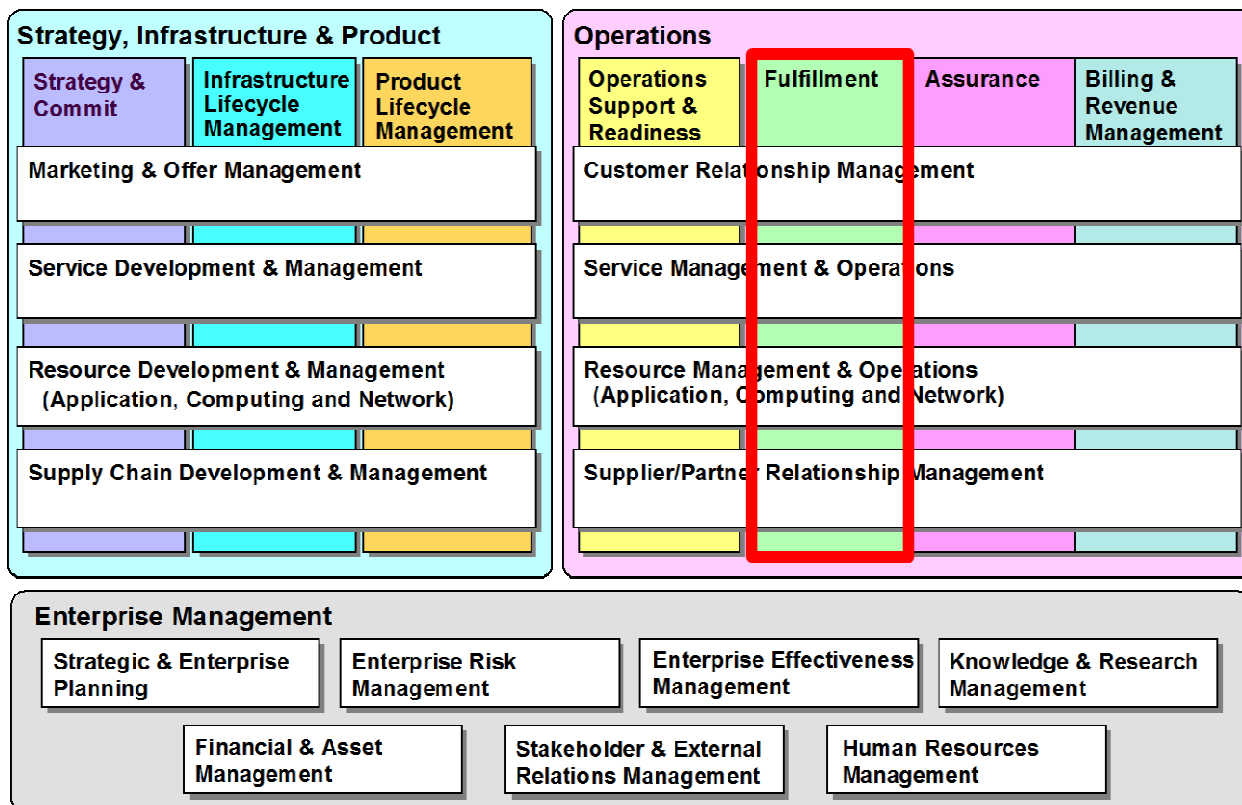


Figure 1 – Level 1 eTOM scope of this Quick Start Pack (enclosed)

2.2. Level 2 Scope

In terms of the Business Process Framework (eTOM) Level 2, the scope of this Quick Start Pack is a subset of the Level 2 processes in the Fulfillment vertical (from Operations), as shown in Figure 2:

- Selling, Marketing Fulfillment Response, and Order Handling within Customer Relationship Management
- Service Configuration & Activation within Service Management & Operations
- Resource Provisioning within Resource Management & Operations
- Supplier/Partner Requisition Management and Supplier/Partner Interface Management within Supplier/Partner Relationship Management

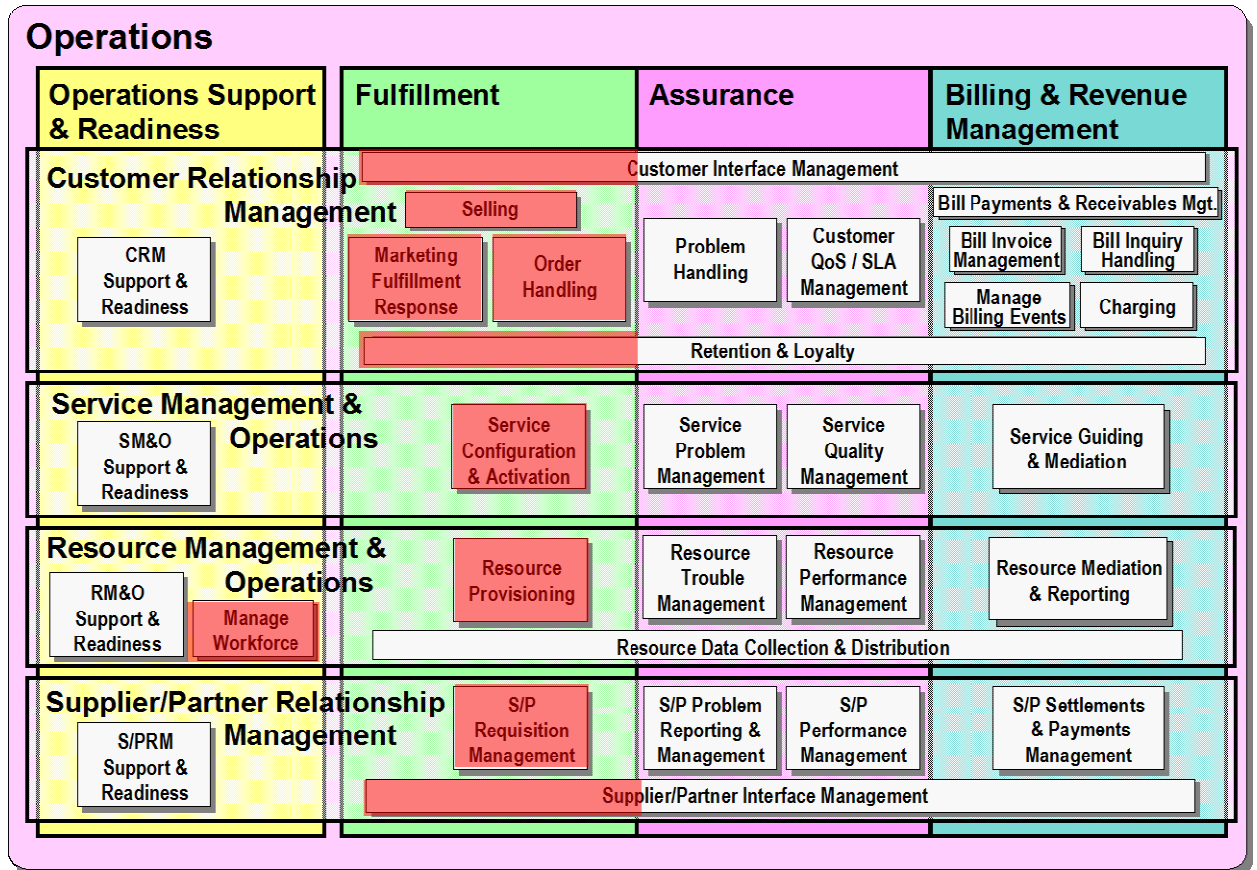


Figure 2 – Level 2 eTOM scope in Operations of this Quick Start Pack (shaded)

2.3. Scope in Terms of GB921-E End-to-End Process Flows

This section discusses QSP scope in terms of the widely known GB921-E collection of end-to-end level 3 process flows.

2.3.1. Level 3 Scope: Request to Answer

The Request to Answer scenario is shown below in the form of a Level 3 process flow. Level 3 process elements included in this Quick Start Pack are highlighted. All of the Level 3 process elements are in scope except Manage Contact and Issue & Distribute Marketing Collaterals.

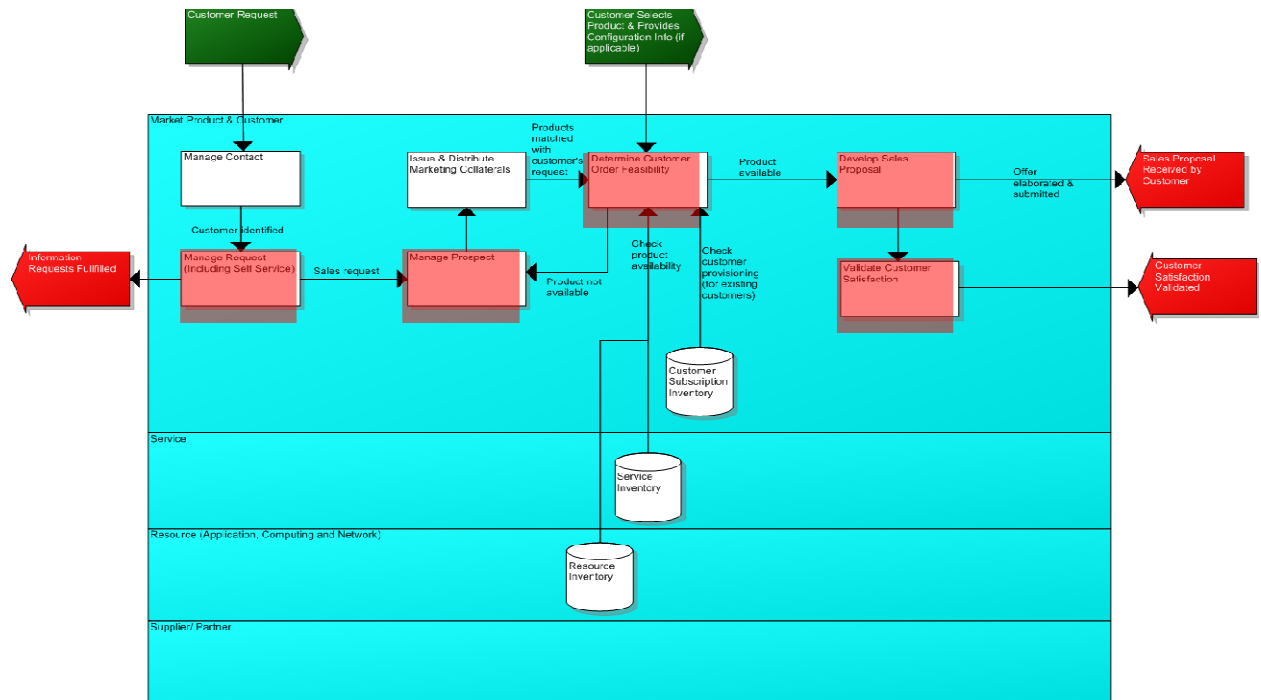


Figure 3 – Level 3 process elements in Request to Answer (shaded)

GB921-E defines this scenario with the following guidelines:

- This process comprises of activities relevant to managing customer requests across all communication channels (customer interfaces).
- Specific information requests or product requests from the customer are qualified and addressed.
- This could lead to the preparation of a pre-sales offer if the customer shows interest in a particular product.

2.3.2. Level 3 Scope: Order to Payment

The Order to Payment scenario is shown below in the form of a Level 3 process flow. Level 3 process elements included in this Quick Start Pack are highlighted. All of the Level 3 process elements are in scope except Manage Contact and Create Customer Bill Invoice.

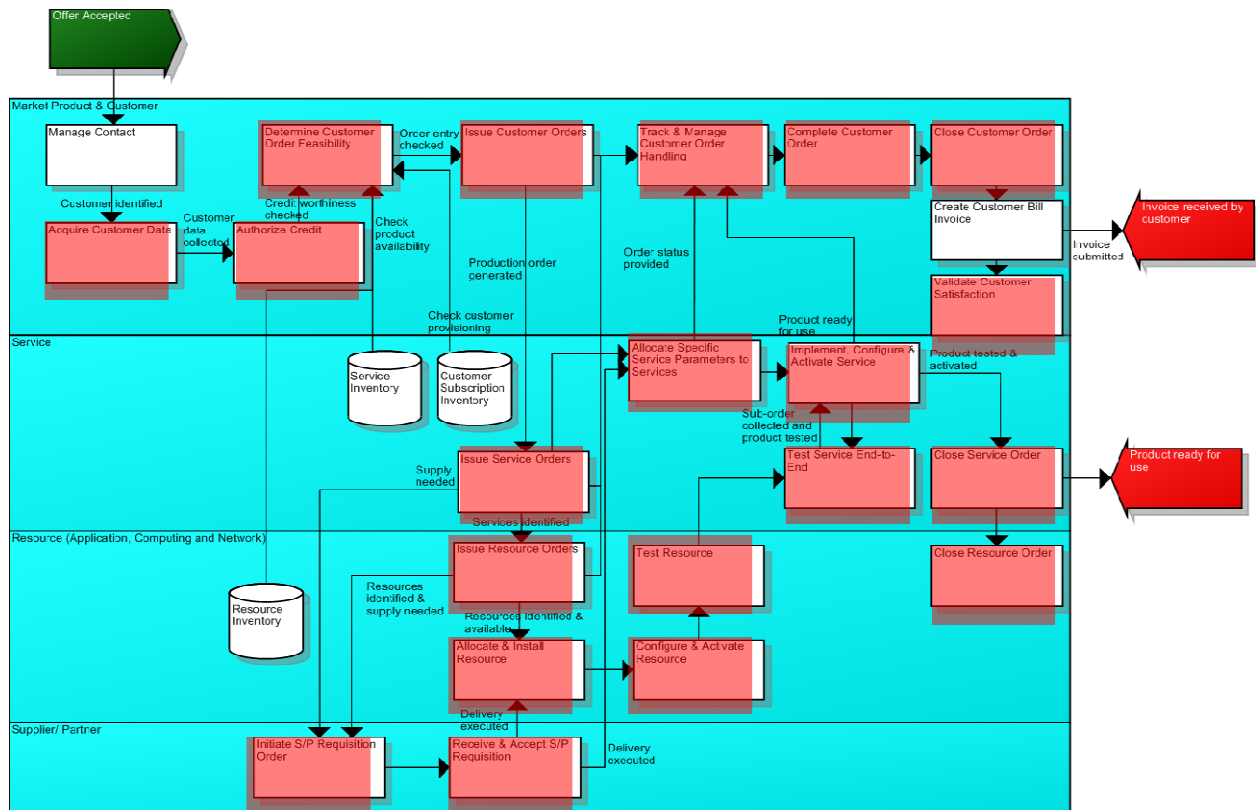


Figure 4 – Level 3 process elements in Order to Payment (shaded)

GB921-E defines this scenario with the following guidelines:

- This process deals with all activities which convert the customer request or an accepted offer into a 'Ready for use' product.
- This process involves capturing customer order information, triggering the relevant provisioning process and handing over the order to the Service layer.
- Once the product is successfully provisioned, the customer order is closed and the customer satisfaction is validated.

2.3.3. Level 3 Scope: Request to Change

The Request to Change scenario is shown below in the form of a Level 3 process flow. Level 3 process elements included in this Quick Start Pack are highlighted. All of the Level 3 process elements are in scope except Manage Contact and Create Customer Bill Invoice.

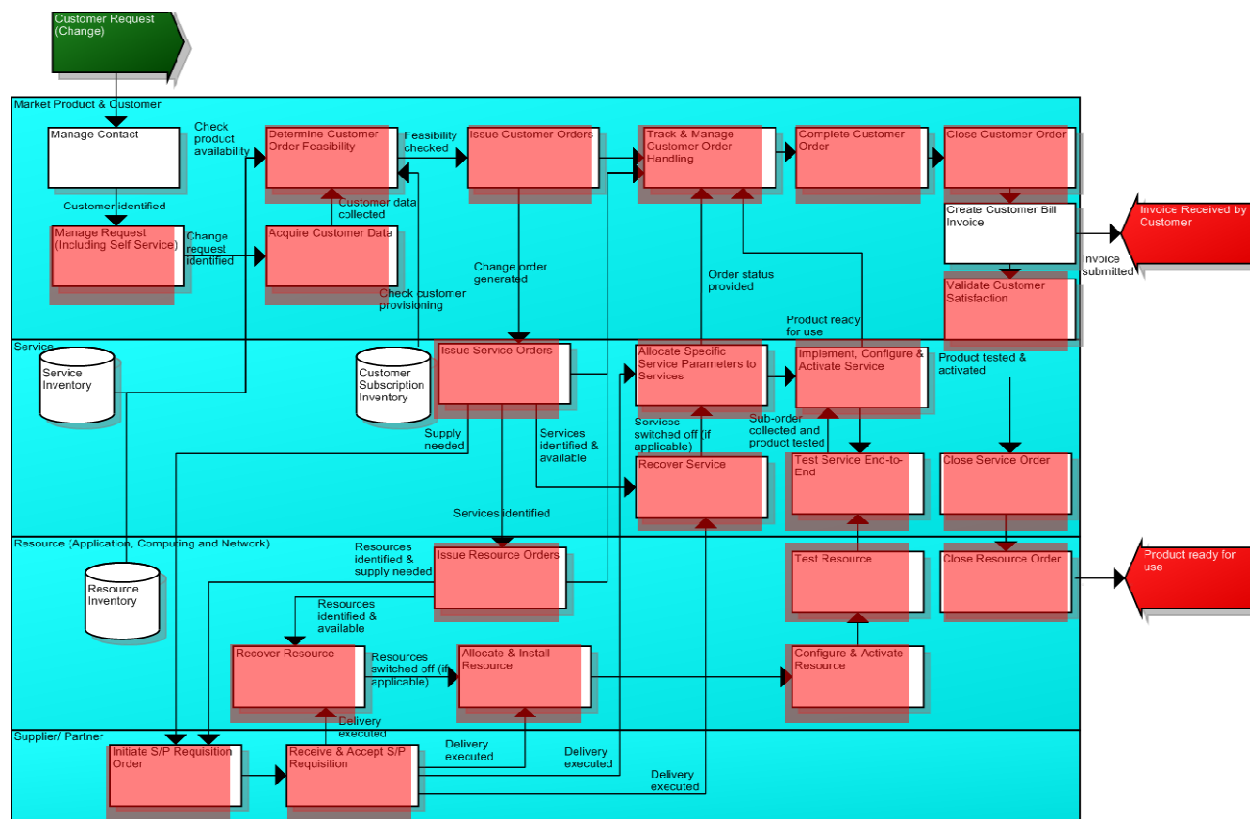


Figure 5 – Level 3 process elements in Request to Change (shaded)

GB921-E defines this scenario with the following guidelines:

- This process deals with all activities which convert the customer's change request into a 'Ready for use' product.
- This process involves capturing customer order information, triggering the relevant provisioning process and handing over the order to the Service layer.
- Once the product is successfully provisioned, the customer order is closed and the customer satisfaction is validated.

2.3.4. Level 3 Scope: Termination to Confirmation

The Termination to Confirmation scenario is shown below in the form of a Level 3 process flow. Level 3 process elements included in this Quick Start Pack are highlighted. All of the Level 3 process elements are in scope except Manage Contact, Establish & Terminate Customer Relationship, and Create Customer Bill Invoice.

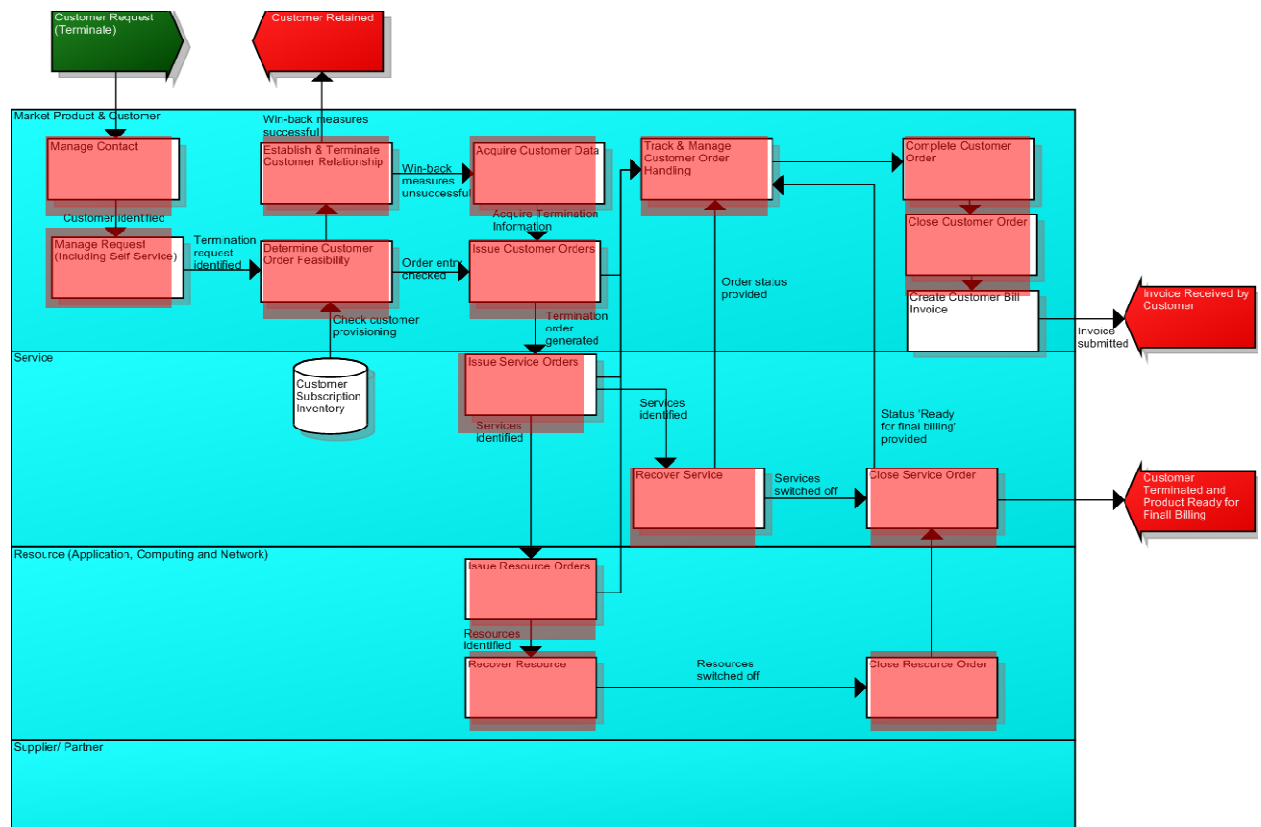


Figure 6 – Level 3 process elements in Termination to Confirmation (shaded)

GB921-E defines this scenario with the following guidelines:

- This process deals with all activities related to the execution of customer’s termination request.
- This process involves retention activities, capturing customer order information, triggering the relevant provisioning process and handing over the order to the Service layer.
- Once the product is successfully terminated, the customer order is closed and the customer satisfaction is validated.

2.3.5. Level 3 Scope: Production Order to Acceptance

The Production Order to Acceptance scenario is shown below in the form of a Level 3 process flow. Level 3 process elements included in this Quick Start Pack are highlighted. All of the Level 3 process elements are in scope.

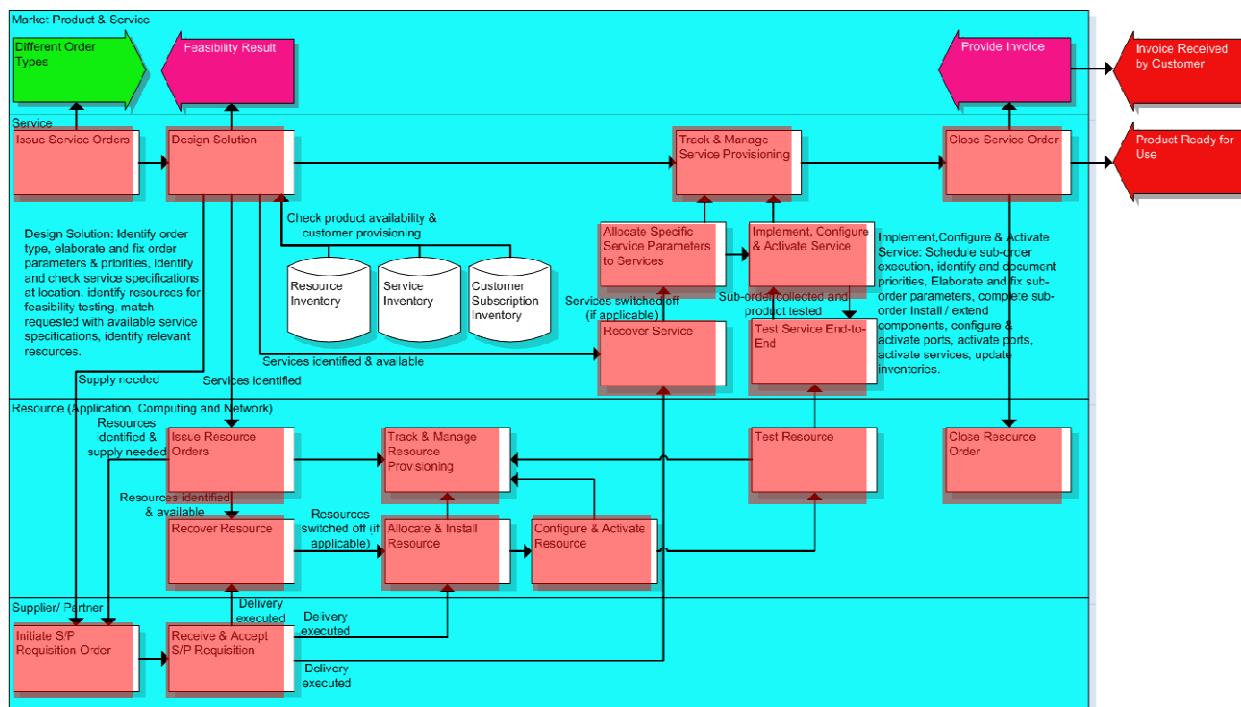


Figure 7 – Level 3 process elements in Production Order to Acceptance (shaded)

GB921-E defines this scenario with the following guidelines:

- This scenario manages the provisioning and termination process, starting from the feasibility check and ending with the activation of services and resources.
- The order processing includes the verification of service specifications, the availability check for the services and resources, and the identification of critical and uncritical resources.
- The reservation or cancellation of critical resources then takes place, followed by the completion of the suborder with relevant parameters.
- In the end, an overall acceptance test is executed.

3. Fulfillment: Level 3 End-to-End Process Flows

The related GB959 Quick Start Pack document uses five end-to-end scenarios and three additional perspectives to develop a set of Level 4 process flows that can be used to implement business processes that integrate ITIL activities with elements from the Business Process Framework, and that provide B2B and C2B business scenarios and business interactions.

As part of this, it describes level 3 process flows that are relevant to Fulfillment business scenarios. In the Fulfillment vertical, a large collection of process elements have already been defined at eTOM level 3, based on various business models and implementations. In this case, the existing level 3 process descriptions have been used to derive process flows. This Level 3 material is reproduced here.

Note that the focus in the material following is on the flows themselves and further context and detail can be found in the GB959 Quick Start Pack.

The five Level 3 scenarios are derived from the well-known eTOM application note “GB921-E: End-to-End Business Flows”:

- Request to Answer
- Order to Payment
- Request to Change
- Termination to Confirmation
- Production Order to Acceptance

3.1. Level 3 Process Flow for Internally Generated Requests

Figure 8 shows the eTOM level 3 fulfillment process flow for orders originating from a customer through a CSR or self-care portal (as opposed to orders originating from a partner).

As shown in Figure 8, the eTOM level 3 fulfillment process for internally generated requests encompasses a wide range of process elements from lead management through billing initiation:

- If the process is initiated by a lead, it begins with Track Leads; otherwise it begins with Manage Request.
- From this point the request can go in one of several directions. An appointment request will go to Manage Schedule & appointments, while requests for address or pricing information will go to other level 3 request handling processes (not shown in this diagram). Pre-order and order requests go to Manage Prospect, which is the first of a series of Selling process elements ending with Acquire Customer Data.
- At this point the flow incorporates a series of steps from Order Handling, beginning with Authorize Credit and ending with Complete Customer Order. Track & Manage Customer Order Handling is responsible for most of the interaction with other layers, potentially calling on any combination of Issue Service Orders, Issue Resource Orders, and Manage Work Order Lifecycle for order components that can be processed internally, and going to Initiate Supplier/Partner Requisition Order for components that must be obtained externally. A pattern can be seen in which Track & Manage acts as the “brains” at each level, calling on subtending Issue processes and responding to higher Track & Manage processes.
- Finally, for successful orders the Validate Customer Satisfaction step closes the loop with the customer and begins post-order processing.

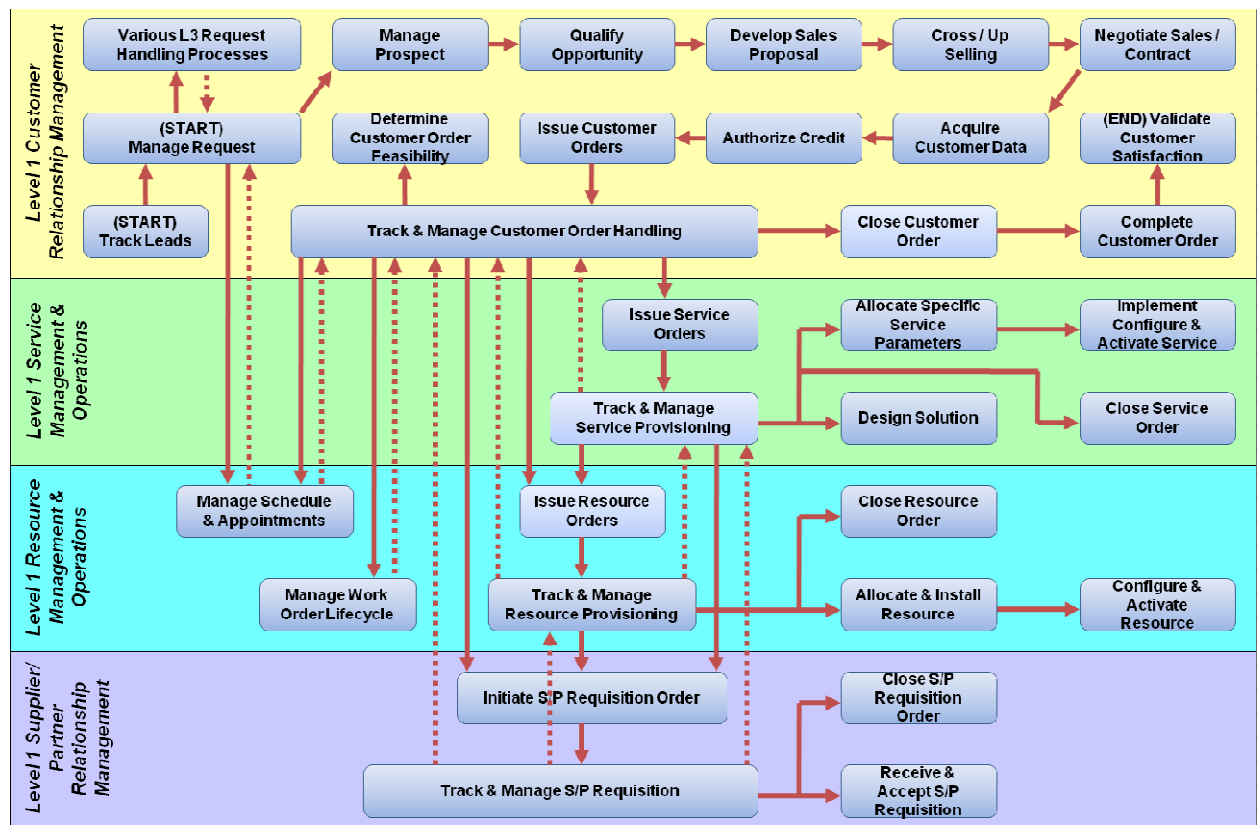


Figure 8 – Level 3 End-to-End Flow – Internally Generated Requests

Note that many process elements can be skipped. For example, if an order is received from an existing customer, the Manage Prospects step would be unnecessary. Entire sections of a flow can also be bypassed; for example, if the order is a type of preauthorized activity, the intervening steps up to Issue Order could be omitted. The branch logic for these situations would be difficult to represent in a level 3 process flow, but is shown in the level 4 process flow for Selling.

3.2. Level 3 Process Flow for Externally Generated Requests

Figure 9 shows the eTOM level 3 fulfillment process flow for orders originating from a partner. This is similar to the process described in the previous section, with a few significant differences:

- The process begins and ends with Manage Supplier/Partner Requests, which receives and responds to external requests.
- There is no need for lead processing, up-selling, etc., so the process is more streamlined.

Note that although not shown in the diagram, it is possible that some order components might be sourced from yet another partner, using the S/PRM processes shown in the previous figure.

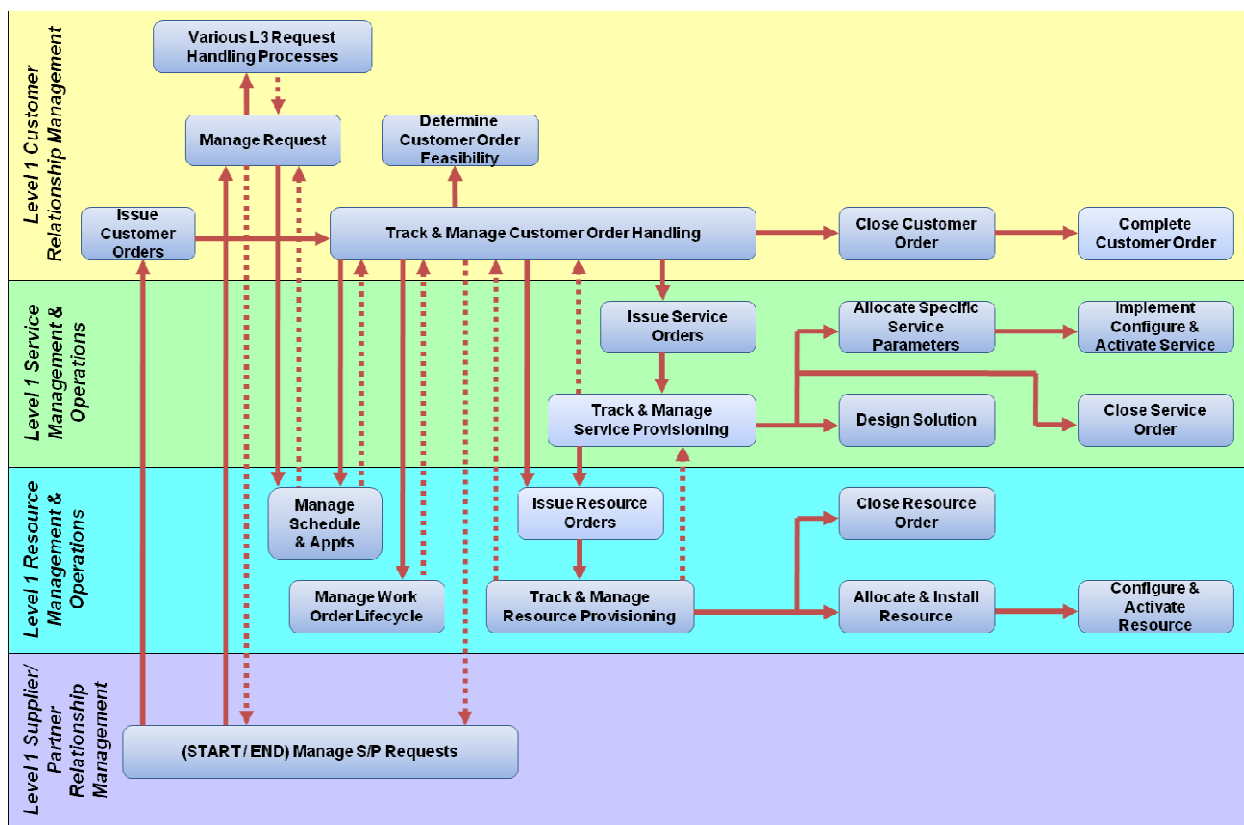


Figure 9 – Level 3 End-to-End Flow – Externally Generated Requests

3.3. Level 3 Process Flow between Partners

Figure 10 shows the eTOM level 3 fulfillment process flow linking two partners, each of whom is acting as both buyer and supplier. This view uses the same major process elements as in the preceding diagrams, but highlights how two (or more) organizations could interact with each other as both buyer and supplier:

- The focus of this diagram is only on order processing as opposed to the multiple types of activity shown in the two preceding diagrams.
- As before, the paired Issue and Track & Manage processes decompose the order and handle resulting components at each layer.
- Orders can be sent to suppliers from the Customer, Service or Resource layers, but in each case they go through Track & Manage Supplier/Partner Requisition to Issue Customer Orders on the partner side, meaning that they are handled by the supplier as customer orders regardless of the way in which they are classified by the buyer.

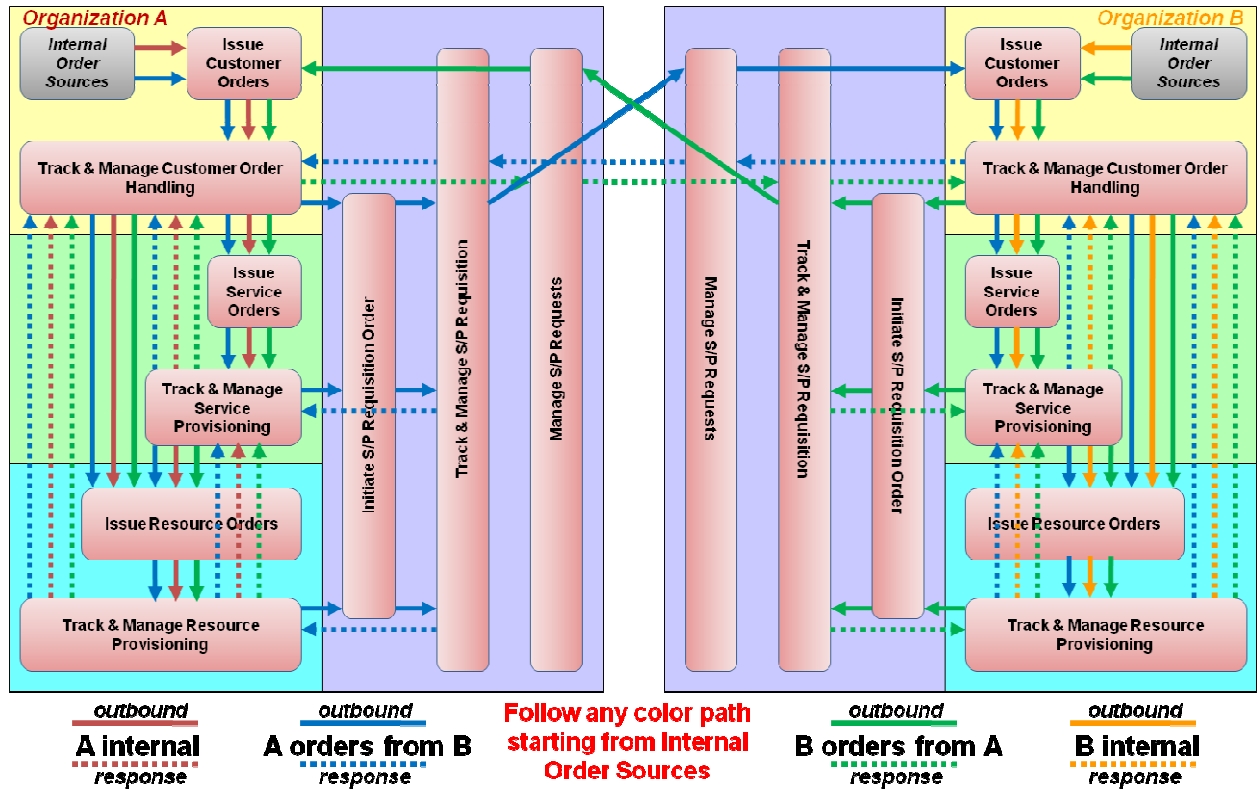


Figure 10 – Level 3 End-to-End Flow – Reciprocal Buyer-Supplier Interactions

3.4. Level 4 Process Flows

The GB959 Quick Start Pack develops the analysis further into Level 4 process flows, that are not reproduced here as they are too voluminous and it is more effective to read the Quick Start Pack itself.

The GB959 Quick Start Pack describes level 4 process flows that are relevant to Fulfillment business scenarios. As with the Level 3 material shown here, existing process descriptions have been used to derive process flows. The Quick Start Pack contains BPMN process diagrams that illustrate the detailed operation of in-scope Level 3 processes in the context of a Level 2 process, by representing them as vertical “phases” or groupings along the top of each diagram, with selected Level 4 process elements represented by BPMN activities. These diagrams also highlight the points at which ITIL activities are integrated and at which B2B interactions occur.

Further context and detail can be found in the GB959 Quick Start Pack. This also contains details on a variety of business scenarios in which these flows are applied.

4. Assurance: Overview

4.1. Scope

In terms of the Business Process Framework (the Business Process Framework), the scope of this Quick Start Pack is the set of level 2 processes in the Assurance vertical that are related to Problem / Trouble Management (as opposed to Quality or Performance Management), as shown in Figure 11:

- Problem Handling within Customer Relationship Management
- Service Problem Management within Service Management & Operations
- Resource Trouble Management within Resource Management & Operations

In terms of the IT Infrastructure Library (ITIL¹), the scope of this Quick Start Pack encompasses activities within Event Management, Incident Management, and Problem Management.

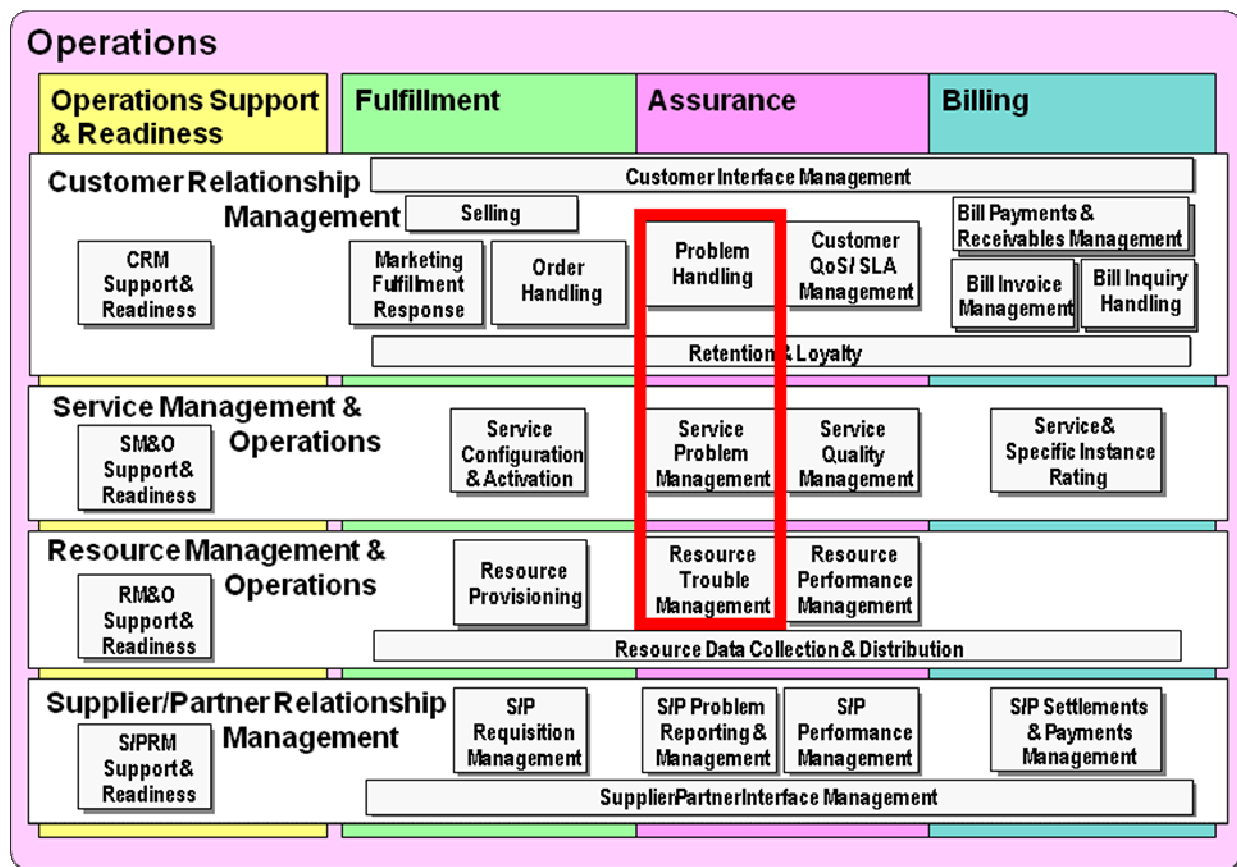


Figure 11 - Scope in the Business Process Framework terms of this Quick Start Pack (red enclosure)

¹ ITIL® is a Registered Trade Mark of the Office of Government Commerce in the United Kingdom and other countries.

4.2. Focus

The focus of this Quick Start Pack is the detailed specification and delivery of a set of processes, defined in Business Process Management Notation (BPMN), that utilize all currently defined Business Process Framework level 4 process elements within project scope to integrate ITIL activities in the context of process flows.

These level 4 process flows, and the context within which they are defined, are described in the Quick Start Pack and are also included as attachments in the form of XML Process Definition Language (XPDL) files. XPDL file format allows the processes to be imported into most BPMN design and runtime environments for customization, further definition, and execution.

Future versions of this Quick Start Pack will address detailed mappings from these processes to Information Framework (SID) entities, Application Framework (TAM) capabilities, and Business Services.

5. Problem Handling Process Elements

Problem Handling, shown in Figure 12, is a level 2 process at the intersection of the Customer Relationship Management level 1 process with the Assurance vertical. It comprises six level 3 processes that represent all customer-related and product-related activities related to the problem/trouble aspects of Assurance. Five of its derived level 3 process elements have been further decomposed into level 4 process elements (as indicated by the “+” sign on their icons).

Brief description from GB921-D: “Responsible for receiving trouble reports from customers, resolving them to the customer’s satisfaction and providing meaningful status on repair and/or restoration activity to the customer.”

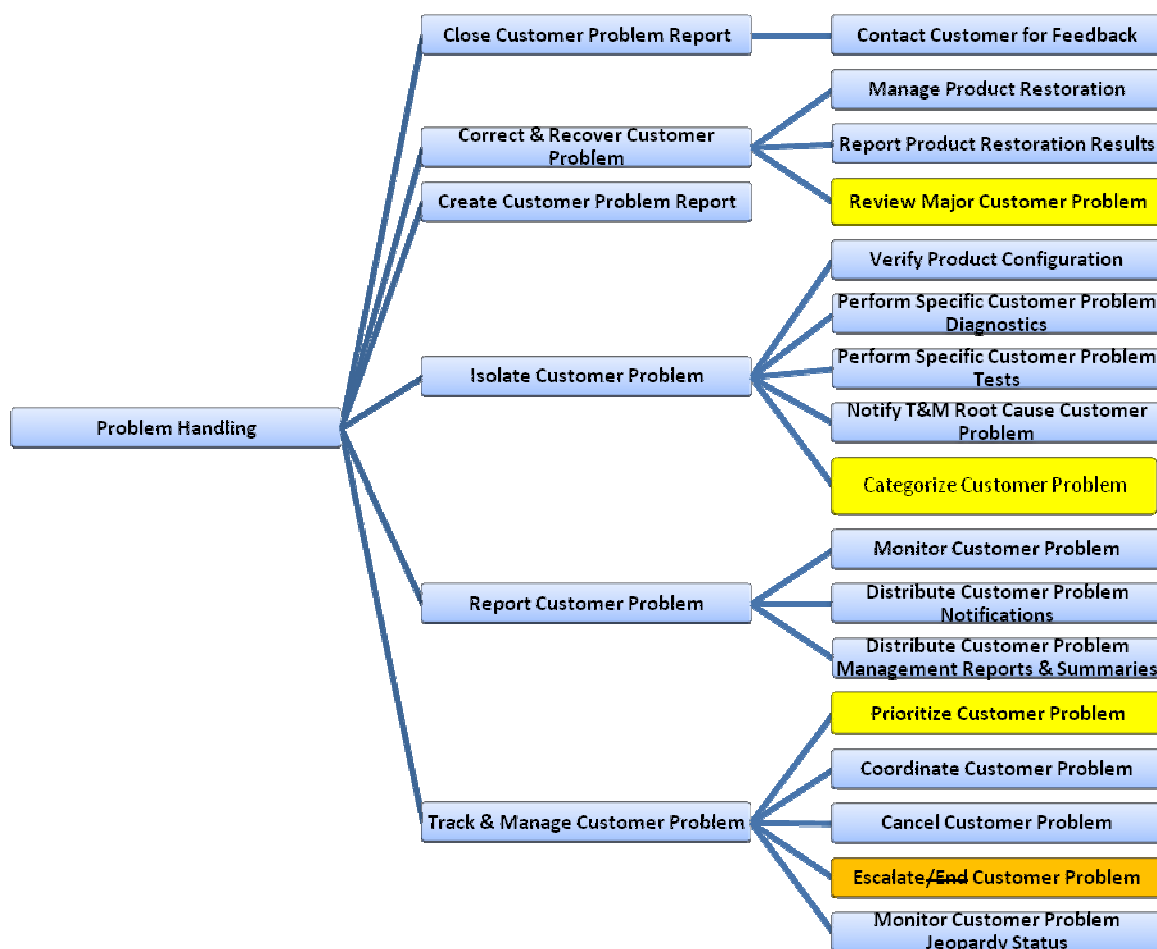


Figure 12 - Problem Handling and its level 3 and level 4 children

6. Service Problem Management Process Elements

Service Problem Management, shown in Figure 13, is a level 2 process at the intersection of the Service Management & Operations level 1 process with the Assurance vertical. It includes seven level 3 processes that represent all service-related activities related to the problem/trouble aspects of Assurance. Six of its derived level 3 process elements have been further decomposed into level 4 process elements.

Brief description from GB921-D: “Respond immediately to customer-affecting service problems or failures in order to minimize their effects on customers, and to invoke the restoration of the service, or provide an alternate service as soon as possible.”

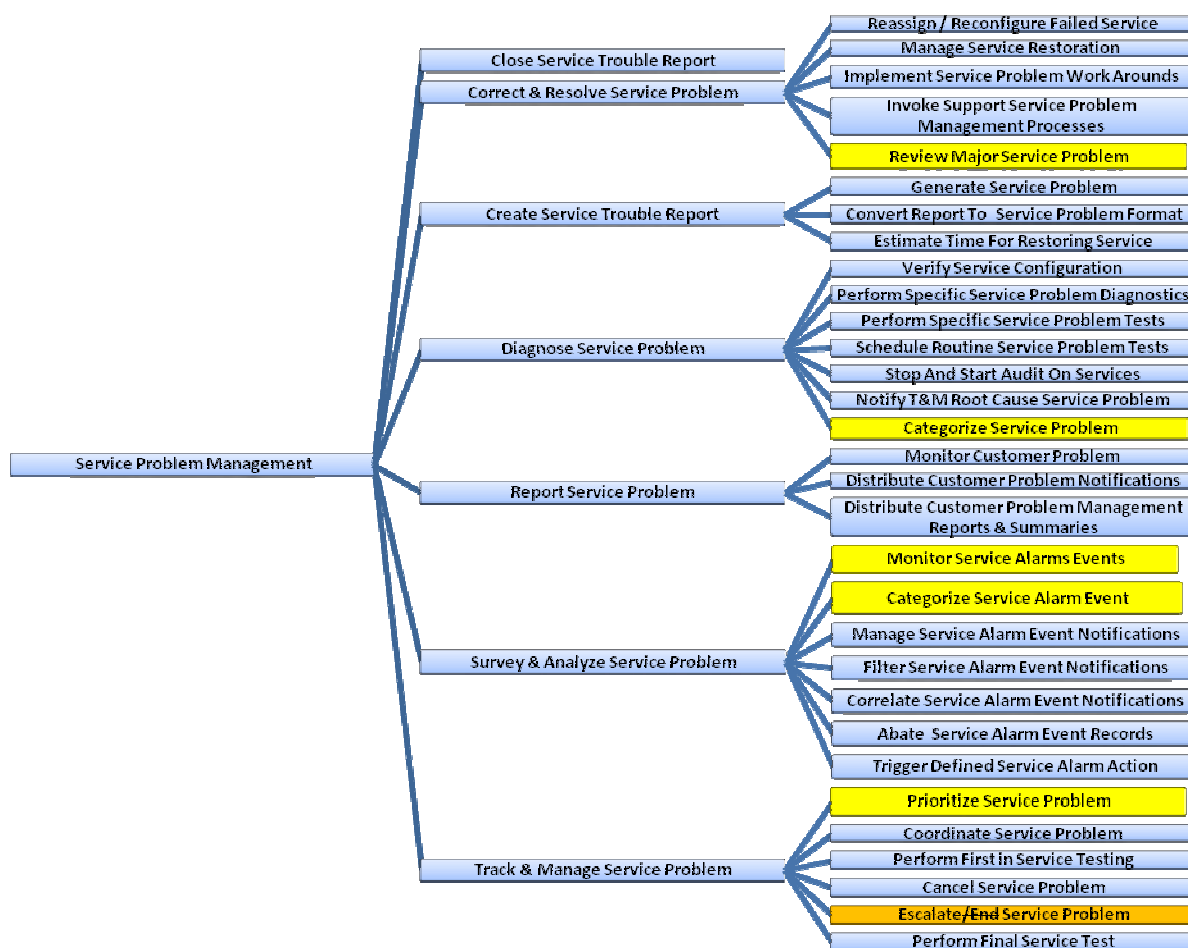


Figure 13 - Service Problem Management and its level 4 and level 4 children

7. Resource Trouble Management Process Elements

Service Problem Management, shown in Figure 14, is a level 2 process at the intersection of the Resource Management & Operations level 1 process with the Assurance vertical. It includes seven level 3 processes that represent all resource-related activities related to the trouble aspects of Assurance. Six of its derived level 3 process elements have been further decomposed into level 4 process elements.

Brief description from GB921-D: “Responsible for the management of troubles with specific resources.”

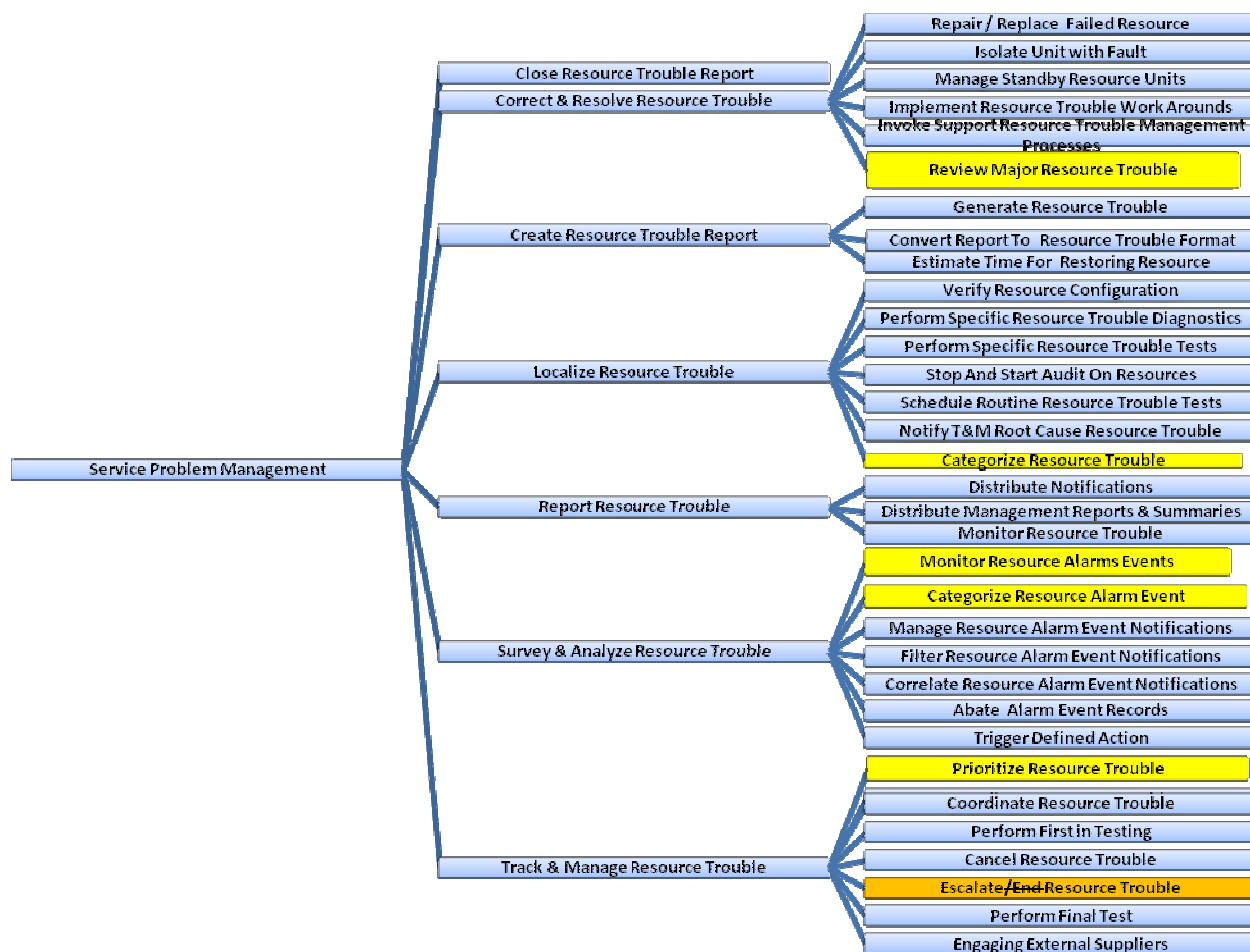


Figure 14 - Resource Trouble Management and its level 3 and level 4 children

8. Scenarios and Perspectives for Level 4 Flow Development

This document uses three end-to-end scenarios and two additional perspectives to develop a set of level 4 process flows that can be used within the scenarios to implement business processes that integrate ITIL activities with elements from the Business Process Framework:

- The level 3 Problem to Solution, Complaint to Solution, and Trouble Ticket to Solution scenarios from the well-known application note “GB921-E: End-to-End Business Flows”.
- A level 3 end-to-end perspective that unites the domain-specific views of Problem Management, Service Problem Management, Resource Trouble Management, and Supplier/Partner Problem Reporting & Management
- An ITIL integration perspective that uses a defined methodology to identify and incorporate ITIL activities in level 4 process flows.

Use of the level 3 scenarios and perspectives provides a broader and deeper understanding of the various contexts within which the level 4 process flows delivered with this Quick Start Pack can be used. This understanding can be an important guide in the customization, extension and integration that are required for implementation of process flows at level 4 and below. An example of the analysis applied for implementation can be seen in the comparison of scenarios and perspectives in Table 1.

8.1. Level 3 Problem to Solution Scenario

The Problem to Solution scenario is shown in Figure 15 in the form of a level 3 process flow.

Note that level 3 process elements included in this Quick Start Pack are highlighted in light red.

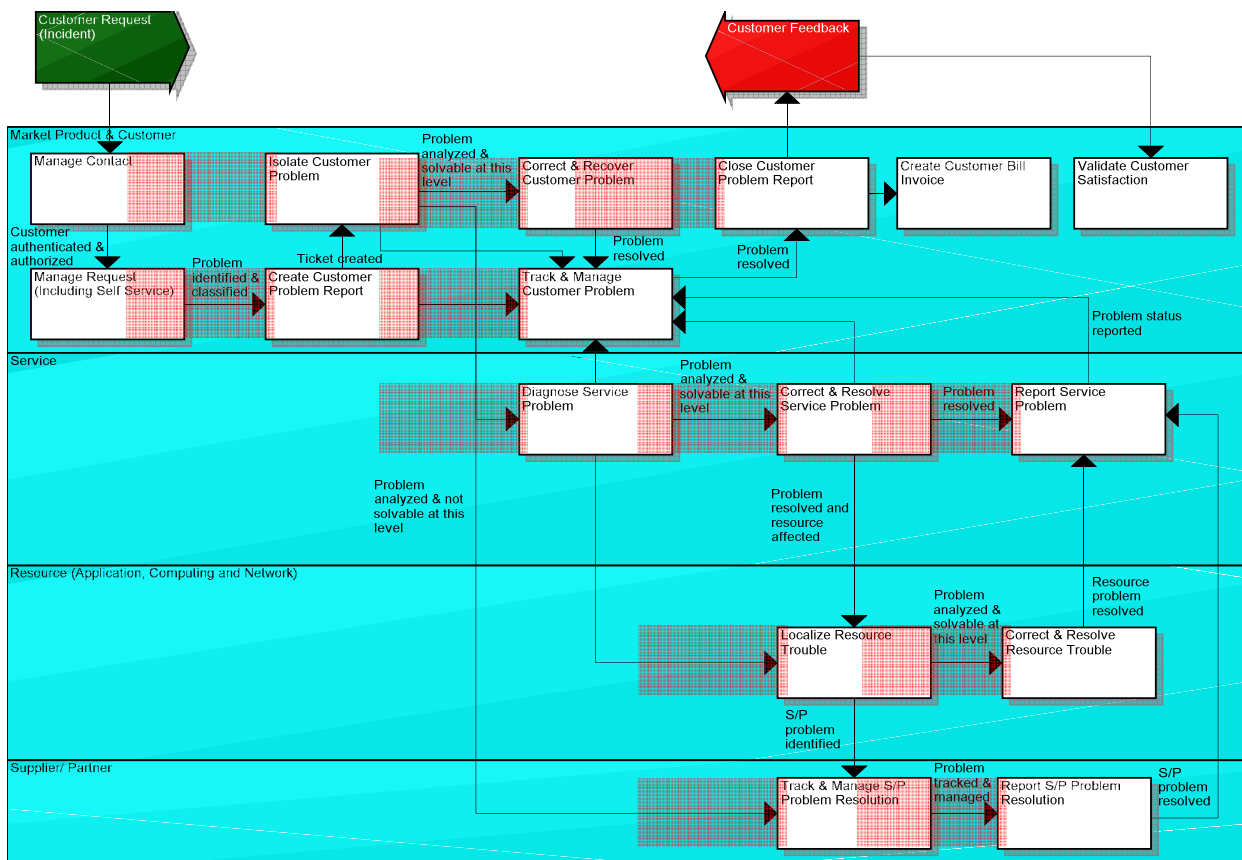


Figure 15 - Problem to Solution Scenario (GB921-E)

GB921-E defines this scenario with the following guidelines:

- This process deals with a technical complaint (problem) initiated by the customer, analyzes it to identify the source of the issue, initiates resolution, monitors progress and closes the trouble ticket.
- The basis for a problem is an unplanned interruption to a product / service or reduction in the quality of a product/service. (In comparison, the process “complaint-to-solution” deals with customer inquiries in which the customer is not pleased with a product or handling speed of an inquiry etc.)

8.2. Level 3 Complaint to Solution Scenario

The Complaint to Solution scenario is shown in Figure 16 in the form of a level 3 process flow.

Note that level 3 process elements included in this Quick Start Pack are highlighted in light red.

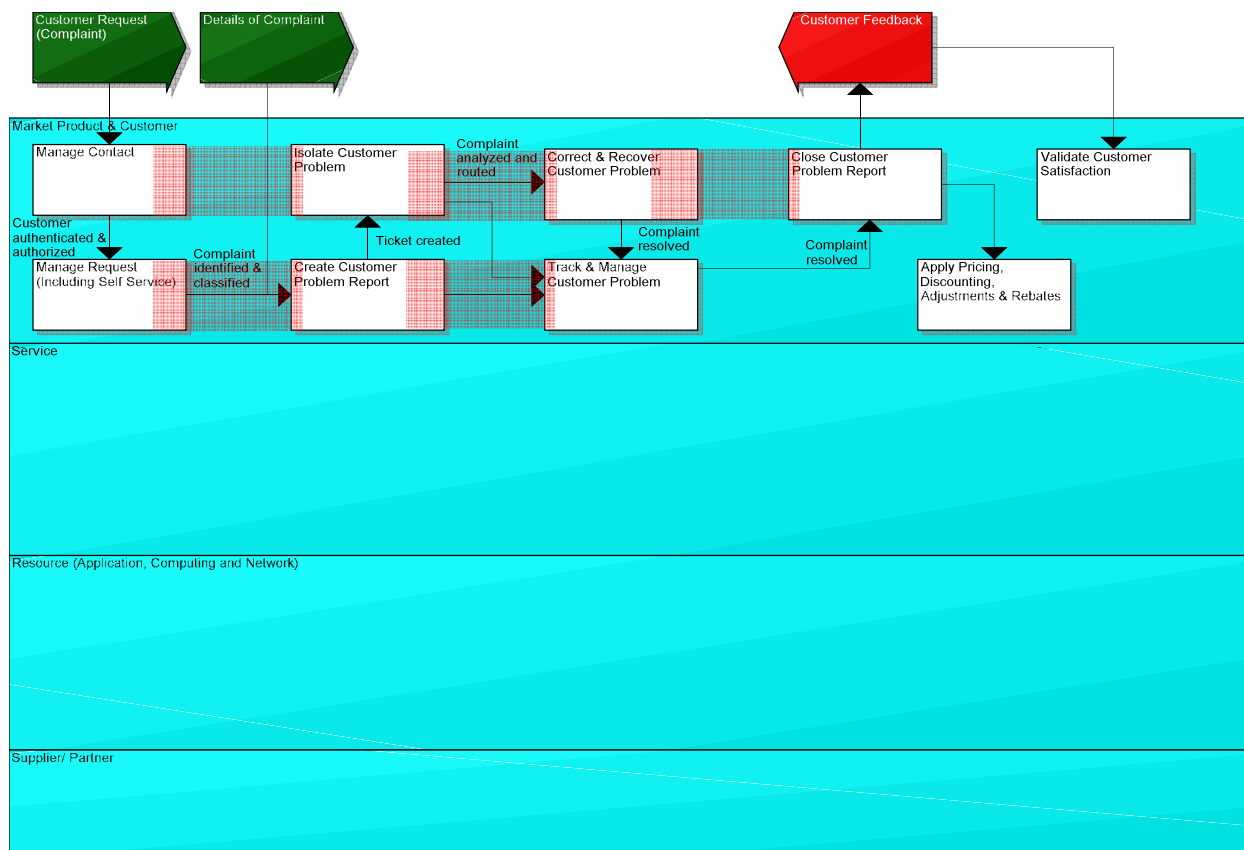


Figure 16 - Complaint to Solution Scenario (GB921-E)

GB921-E defines this scenario with the following guidelines:

- This process deals with a complaint (problem) initiated by the customer, analyzes it to identify the source of the issue, initiates resolution, monitors progress and closes the trouble ticket.
- A complaint is a customer inquiry in which the customer is not pleased with a product or the handling speed of an inquiry etc.

8.3. Level 3 Trouble Ticket to Solution Scenario

The Trouble Ticket to Solution scenario is shown in Figure 17 in the form of a level 3 process flow.

Note that level 3 process elements included in this Quick Start Pack are highlighted in light red.

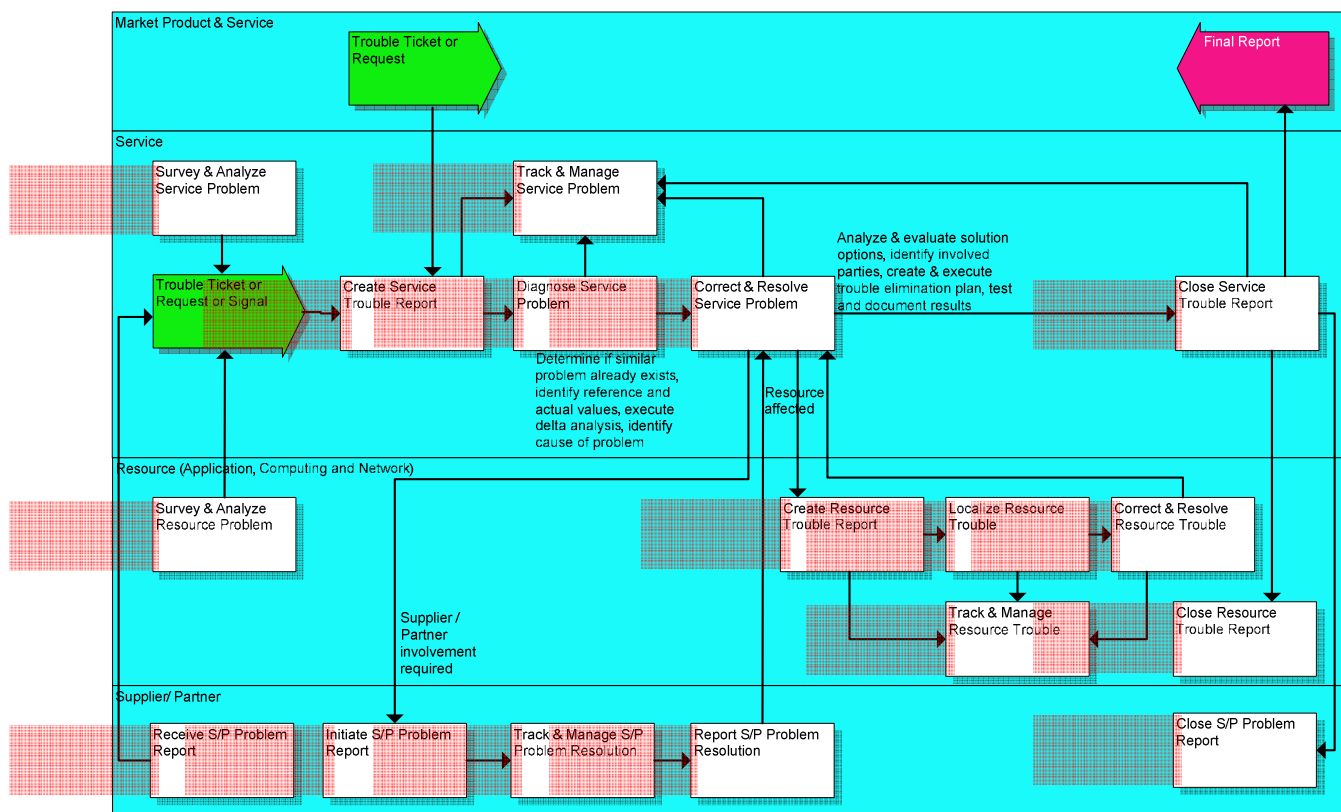


Figure 17 - Trouble Ticket to Solution Scenario (GB921-E)

GB921-E defines this scenario with the following guidelines:

- This process is either triggered internally through a service or resource alarm, or externally, through a trouble ticket generated based on a complaint of a customer.
- The process covers the qualification, classification and the elimination of the service or resource trouble.
- The analysis of trouble includes the verification of trouble ticket or request, and a delta analysis based on reference and actual values.
- Once the root cause is identified, the trouble eliminated and the acceptance test completed, the trouble ticket is closed.

8.4. Level 3 End-to-End Perspective

The level 3 end-to-end perspective is described in detail in the Huawei contribution to Team Action Week July 2011.

Figure 18 shows one diagram from the contribution, which highlights several key features of this level 3 perspective.

Note that event acquisition (shown as Network Surveillance) can initiate any of the level 3 flows except Problem Handling (which is initiated by customer interaction). Also note that each level 3 process flow, in contrast to the more prescriptive organization of the GB921-E

process flows, is organized as a sequence of process elements “managed” by the “Track & Manage xxx” process specific to its domain.

The Huawei contribution contains many additional concept flows, which were the basis for the BPMN flows delivered with this Quick Start Pack. All concept flows are included in subsequent sections of this document.

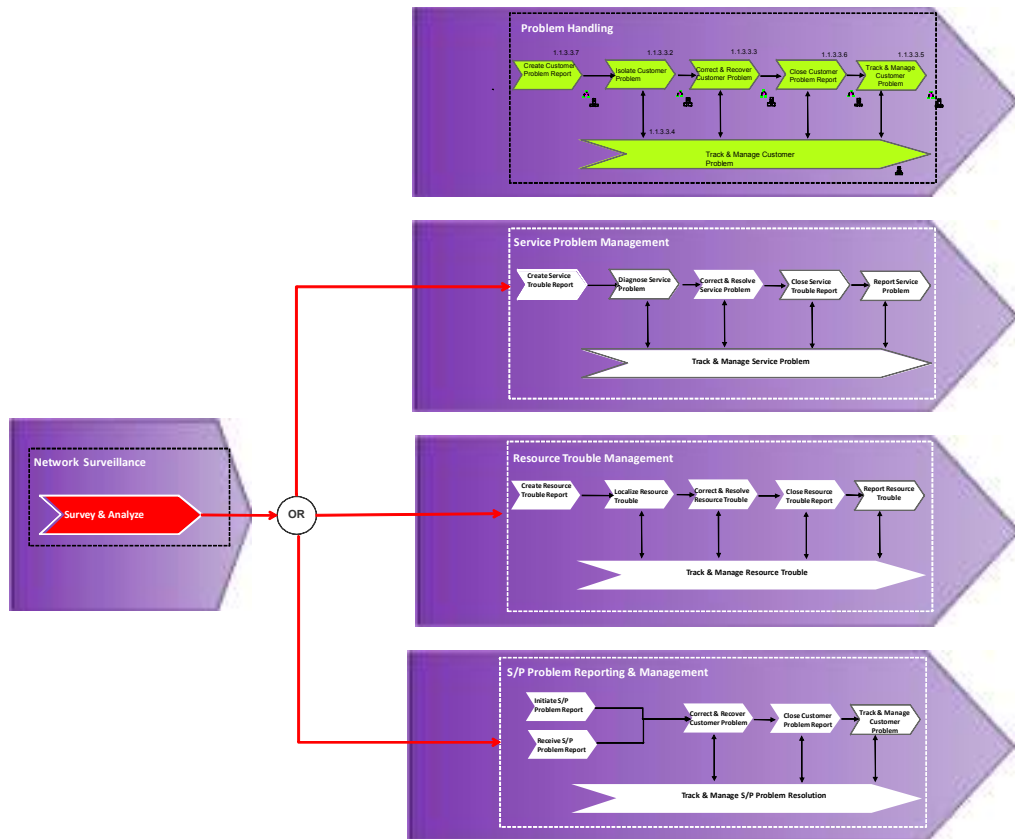


Figure 18 - Level 3 End-to-End Perspective (Huawei Contribution, TAW July 2011)

8.5. Comparison of Level 3 Scenarios and Perspectives

Table 1 compares the preceding scenarios and perspectives, showing the domain emphasis and element usage of the different scenarios. Other scenarios may have quite different usage patterns, and implementers are advised to make similar evaluations for their specific scenarios.

Table 1 - Use of Level 3 Process Elements in Scenarios and Perspectives

| Level 2 Process Group | Level 3 Process Element | Item to Solution | Maintain to Solution | Resolve Ticket to Solution | 3 End-to-End |
|-----------------------|-------------------------|------------------|----------------------|----------------------------|--------------|
|-----------------------|-------------------------|------------------|----------------------|----------------------------|--------------|

| Level 2 Process Group | Level 3 Process Element | Open to Solution | Maintain to Solution | Close Ticket to Solution | 3 End-to-End |
|-----------------------------|------------------------------------|------------------|----------------------|--------------------------|--------------|
| Problem Handling | Close Customer Problem Report | X | X | | X |
| | Correct & Recover Customer Problem | X | X | | X |
| | Create Customer Problem Report | X | X | | X |
| | Isolate Customer Problem | X | X | | X |
| | Report Customer Problem | | | | X |
| | Track & Manage Customer Problem | X | X | | X |
| Service Problem Management | Close Service Trouble Report | | | X | X |
| | Correct & Resolve Service Problem | X | | X | X |
| | Create Service Trouble Report | | | X | X |
| | Diagnose Service Problem | X | | X | X |
| | Report Service Problem | X | | | X |
| | Survey & Analyze Service Problem | | | X | X |
| | Track & Manage Service Problem | | | X | X |
| Resource Trouble Management | Close Resource Trouble Report | | | X | X |
| | Correct & Resolve Resource Trouble | X | | X | X |

| Level 2 Process Group | Level 3 Process Element | em to Solution | laint to Solution | ple Ticket to Solution | 3 End-to-End |
|-----------------------|-----------------------------------|----------------|-------------------|------------------------|--------------|
| | Create Resource Trouble Report | | | X | X |
| | Localize Resource Trouble | X | | X | X |
| | Report Resource Trouble | | | | X |
| | Survey & Analyze Resource Trouble | | | X | X |
| | Track & Manage Resource Trouble | | | X | X |

8.6. Level 4 Perspective with ITIL Integration

The level 4 perspective with ITIL integration is described in a methodology outlined the Huawei contribution referenced in the previous section, as well as the new application guide “GB921-L: Leveraging Level 4 Process Elements and Process Flows in Support of ITIL”.

The methodology involves identifying essential patterns in ITIL activities and the Business Process Framework processes, then using those patterns to guide the construction of level 4 process flows. The level 4 process flows include process elements derived from level 3 process elements and previously published, as well as additional process elements representing ITIL activities and access to ITIL data.

The remaining sections of the Quick Start Pack are organized under the level 2 processes in scope. For each level 3 process element within a level 2 process, this document includes:

- A conceptual level 4 process flow including process elements from the original level 4 decomposition as well as process elements identified from ITIL
- A BPMN level 4 process flow derived from the concept flow.

The following design guidelines were used in the development of the BPMN flows:

- Color coding follows the scheme of the original contribution and GB921-L:
 - Gray = Elaboration

- Green = Extension
- Red = Enhancement.
- In cases where external ITIL components such as CMS or KEDB are referenced in the concept flow, the BPMN flow contains a process element that accesses the ITIL component, but not the ITIL component itself.
- Incoming messages appearing midway in flows were not modeled in this release.
- Extended descriptions have not been included in BPMN flows in the current release. Work is underway in parallel to assign components of the extended descriptions to specific properties, which will be added to the BPMN flows in the next release.
- Only one actor and no swim lanes are used each BPMN flow in this section. However, a later section in this document will define multi-actors process flows at assurance level including swim lanes per actors involved.
- Default choices for ORs were assumed for the BPMN flows, but should be examined on an implementation-specific basis.
- Within the above guidelines, the BPMN flows adhere as closely as possible to the original concept flows.

9. Problem Handling Process Flows

This section contains level 4 process flows within the level 2 context of Problem Handling.

9.1. Close Customer Problem Report

Brief description from GB921-DX: “Ensure that a problem affecting the customer is solved”.

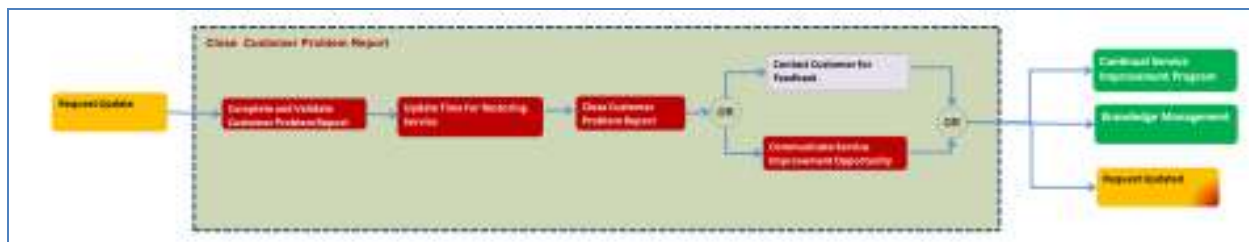


Figure 19 - Close Customer Problem Report L4 Concept Flow

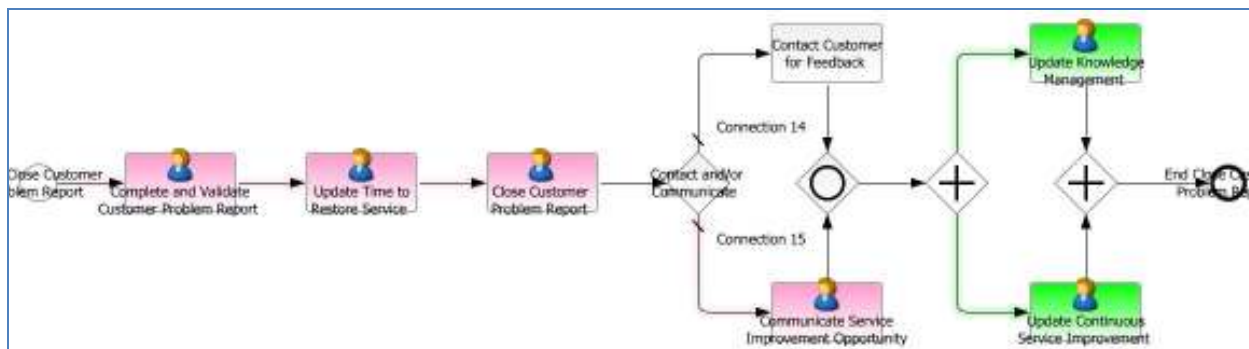


Figure 20 - Close Customer Problem Report L4 BPMN Flow

This process flow includes the original process element derived from level 3 and adds six new process elements to coordinate with ITIL activities. Once the customer problem report has been completed and validated, the service restoration time is updated, and the report is closed. It may still be necessary to contact the customer for feedback and at the same time to register the need for improvements in the service. Finally the ITIL knowledge management and continuous service improvement systems are updated.

9.2. Correct & Resolve Customer Problem

Brief description from GB921-DX: “Restore the service to a normal operational state as efficiently as possible.”

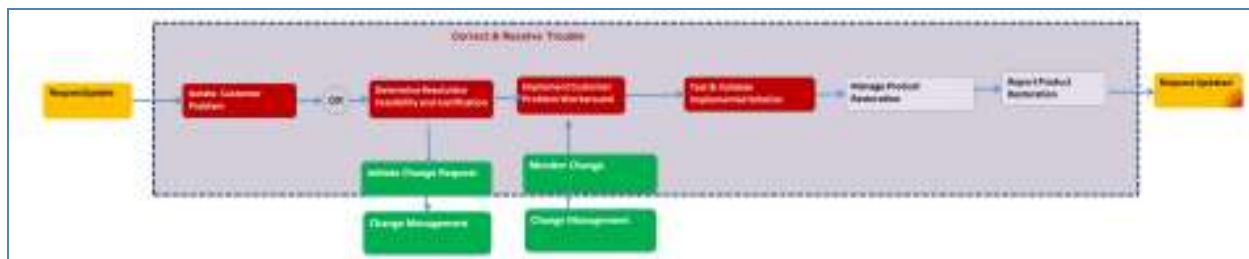


Figure 21 - Correct & Resolve Customer Problem L4 Concept Flow

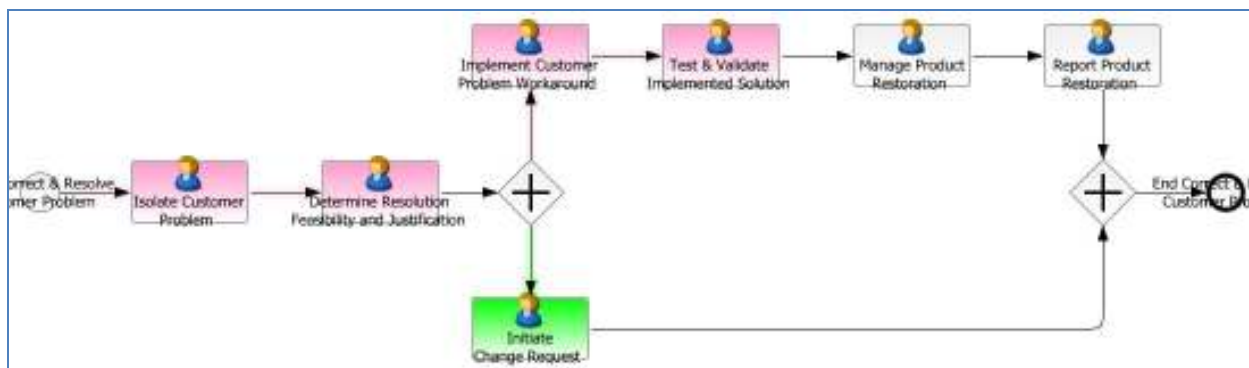


Figure 22 - Correct & Resolve Customer Problem L4 BPMN Flow

This process flow includes two original process elements derived from level 3 and adds five new process elements to coordinate with ITIL activities. The first step is to isolate the customer problem. Once that has been accomplished it should be possible to determine whether the problem can be resolved and what will be required. Next, an ITIL change request will need to be initiated. In parallel with that process, a series of steps will implement a workaround for the customer, test the solution, manage the restoration of product availability to the customer, and report on that effort.

9.3. Create Customer Problem Report

Brief description from GB921-DX: "This process creates a new Customer Problem Report."

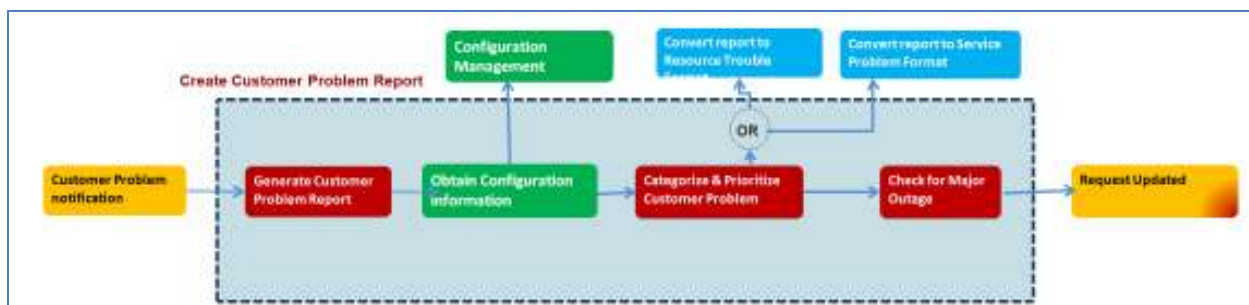


Figure 23 - Create Customer Problem Report L4 Concept Flow

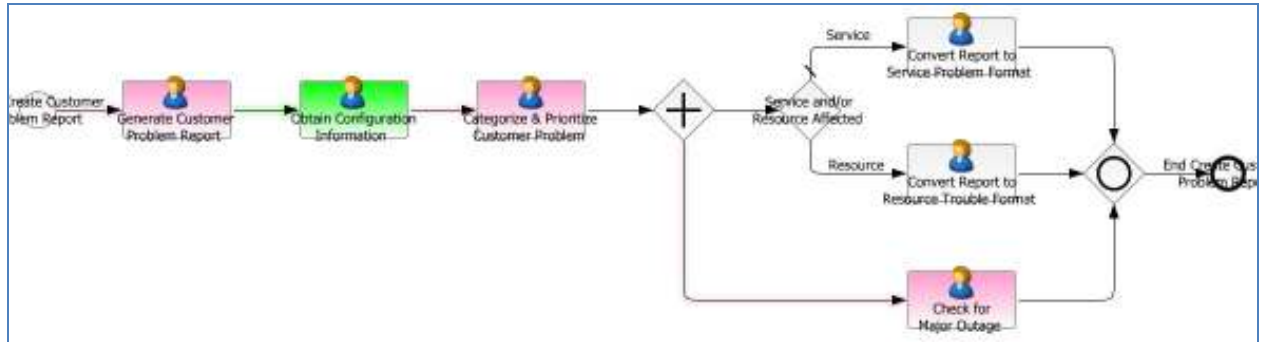


Figure 24 - Create Customer Problem Report L4 BPMN Flow

This process flow includes two original process elements derived from level 3 and adds four new process elements to coordinate with ITIL activities. The first step is to generate the customer problem report, followed by acquisition of configuration information from the ITIL CMS and the placement of the customer problem in a known category and priority. Next, an ITIL check is made to determine whether the problem is related to a major outage. In parallel with that process, the customer problem is reframed in terms of service problem and/or resource trouble in order to invoke processes in the Service and Resource domains.

9.4. Isolate Customer Problem

Brief description from GB921-DX: “Identify the root cause of the customer problem.”

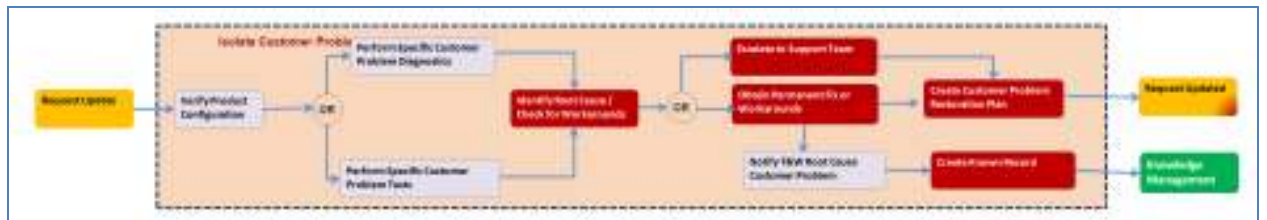


Figure 25 - Isolate Customer Problem L4 Concept Flow

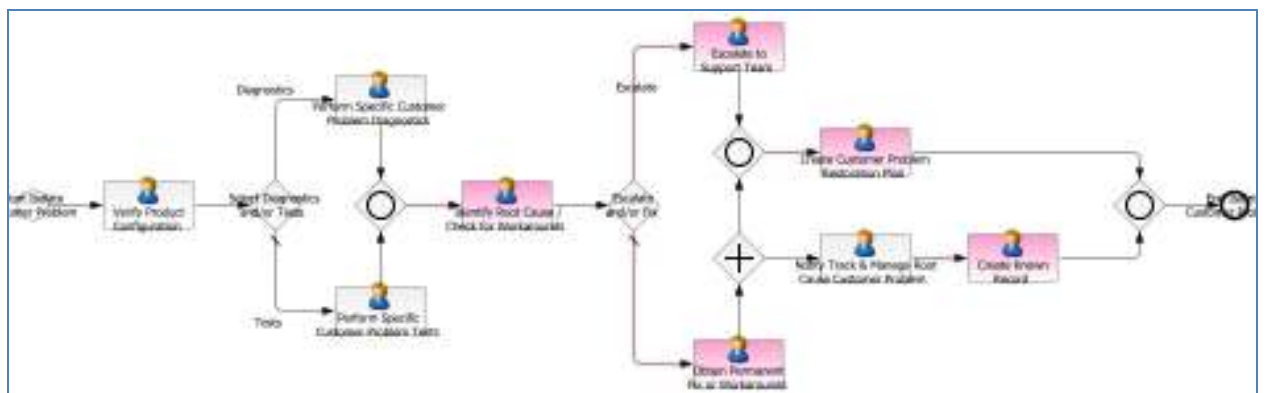


Figure 26 - Isolate Customer Problem L4 BPMN Flow

This process flow includes four original process elements derived from level 3 and adds five new process elements to coordinate with ITIL activities. The first step is to verify the

configuration of the customer’s product. Next, it may be necessary to run various tests and/or diagnostics. Once those have been completed, an ITIL activity identifies the root cause of the problem and available workarounds for it. Escalation may be required, which will use an ITIL activity to involve the appropriate support team. At the same time another ITIL activity checks for permanent fixes and workarounds, followed by notification of the process responsible for tracking and management of the customer problem, and by an ITIL activity to create a record in the known error database. In any case another ITIL activity will create a plan for restoration.

9.5. Report Customer Problem

Brief description from GB921-DX: “Monitor the status of customer problem reports, provide notifications of any changes and provide management reports.”

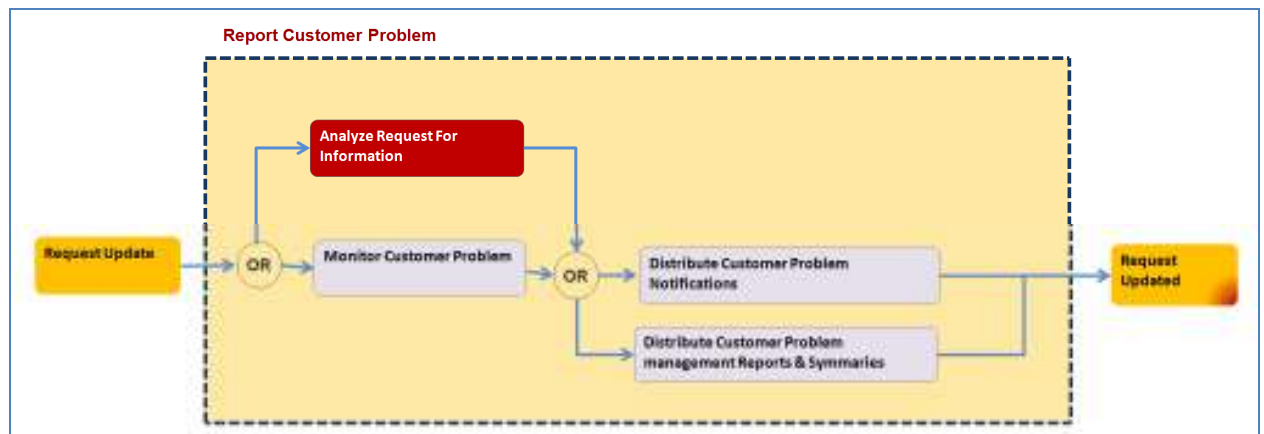


Figure 27 - Report Customer Problem L4 Concept Flow

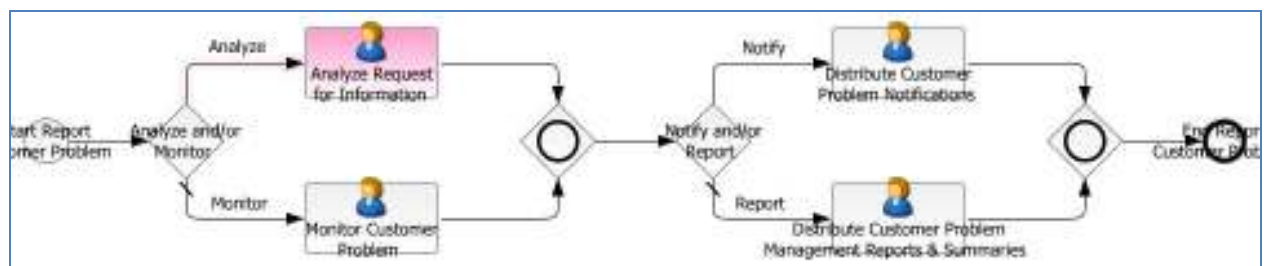


Figure 28 - Report Customer Problem L4 BPMN Flow

This process flow includes three original process elements derived from level 3 and adds one new process element to coordinate with ITIL activities. The first step is to determine whether analysis and/or additional problem monitoring is required. If analysis is required, an ITIL activity is invoked, and monitoring is also begun if necessary. Next a decision must be made as to required notifications and reports. Depending on that decision, two additional steps may distribute notification of the problem and distribute management reports and summaries.

9.6. Track & Manage Customer Problem

Brief description from GB921-DX: “Ensure that recovery activities are assigned, coordinated and tracked efficiently, and that escalation is invoked as required for any open customer problem reports in jeopardy.”

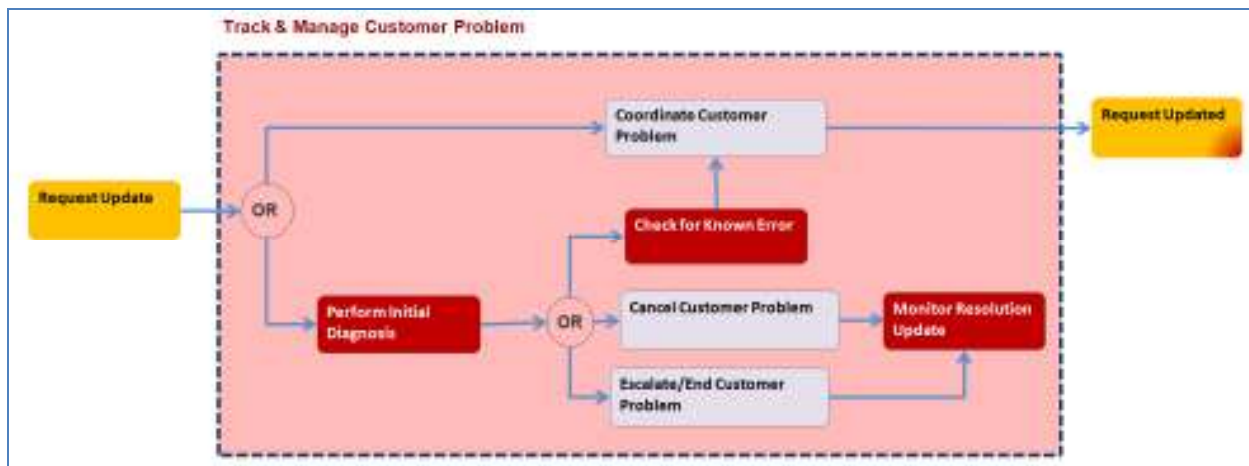


Figure 29 - Track & Manage Customer Problem L4 Concept Flow

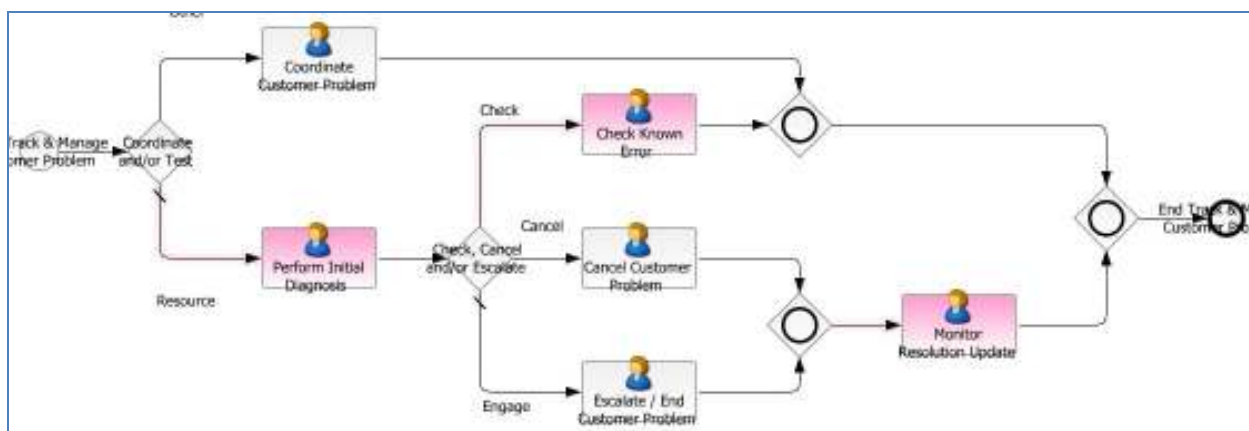


Figure 30 - Track & Manage Customer Problem L4 BPMN Flow

This process flow includes three original process elements derived from level 3 and adds three new process elements to coordinate with ITIL activities. The first step is to determine whether coordination and/or diagnosis are required. If diagnosis is required, an ITIL activity is invoked to perform it, and coordination of problem resolution efforts is also begun if necessary. Next a decision must be made as to problem handling. Depending on that decision, three additional steps may invoke ITIL activity to check for known errors, cancel the problem, or escalate it. If the problem is canceled or escalated, an additional ITIL activity is invoked to monitor it.

10. Service Problem Management Process Flows

This section contains level 4 process flows within the level 2 context of Service Problem Management.

10.1. Close Service Trouble Report

Brief description from GB921-DX: “Close a service trouble report when the service problem has been resolved.”



Figure 31 - Close Service Trouble Report L4 Concept Flow

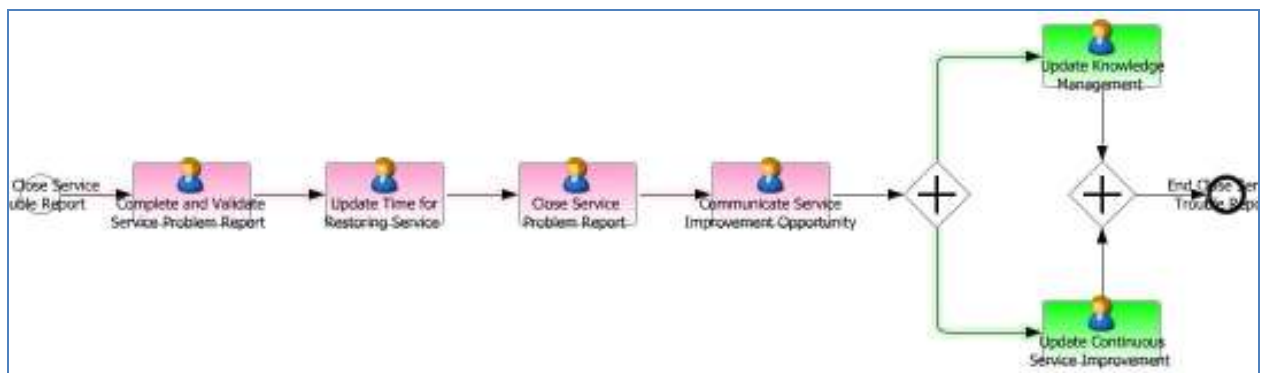


Figure 32 - Close Service Trouble Report L4 BPMN Flow

This process flow is entirely composed of new process elements to coordinate with ITIL activities. Once the service trouble report has been completed and validated, the service restoration time is updated, and the report is closed. The next step is to register the need for improvements in the service. Finally the ITIL knowledge management and continuous service improvement systems are updated.

10.2. Correct & Resolve Service Problem

Brief description from GB921-DX: “Restore the service to a normal operational state as efficiently as possible.”

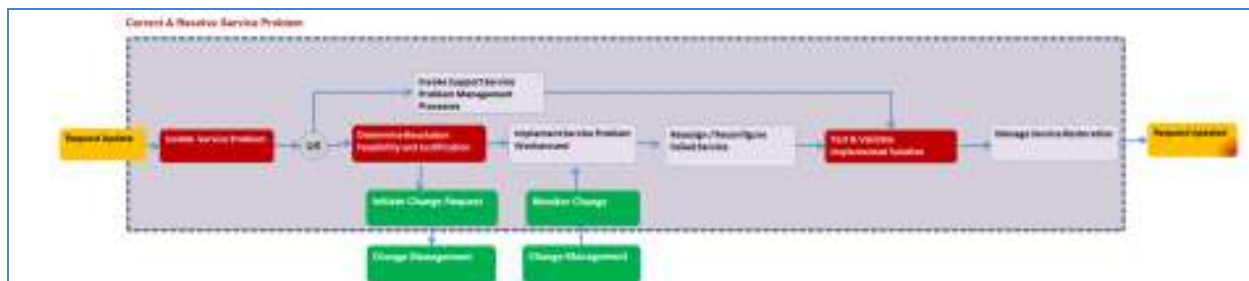


Figure 33 - Correct & Resolve Service Problem L4 Concept Flow

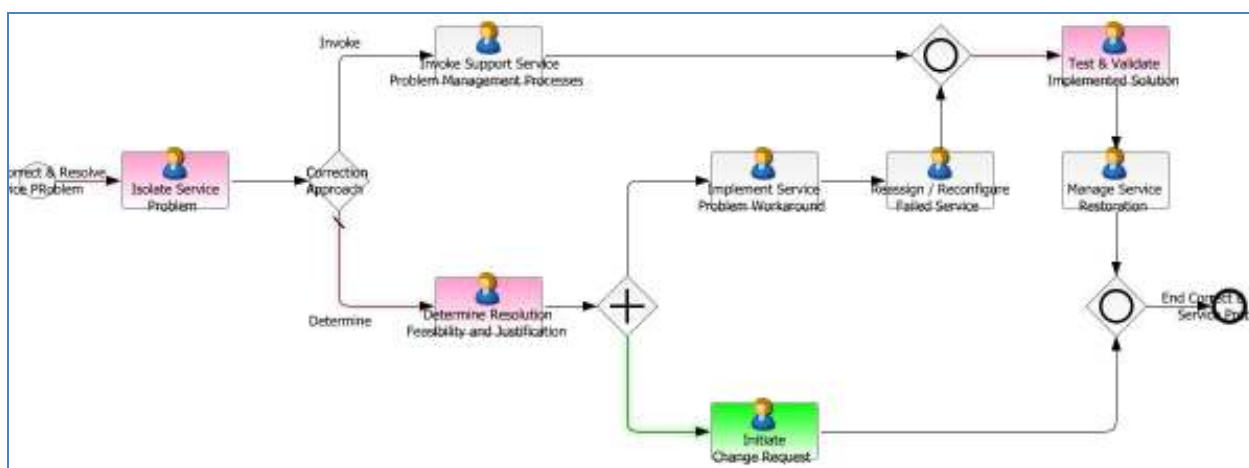


Figure 34 - Correct & Resolve Service Problem L4 BPMN Flow

This process flow includes four original process elements derived from level 3 and adds four new process elements to coordinate with ITIL activities. The first step is to isolate the service problem. Next, in parallel the process determines whether the problem can be resolved and what will be required, while at the same time ensuring that processes to support service problem management are started. Next, an ITIL change request will need to be initiated. In parallel with that process, a series of steps will implement a workaround for the problem and reassign or reconfigure the service, test the solution, and manage the restoration of the service.

10.3. Create Service Trouble Report

Brief description from GB921-DX: “Create a new service trouble report.”

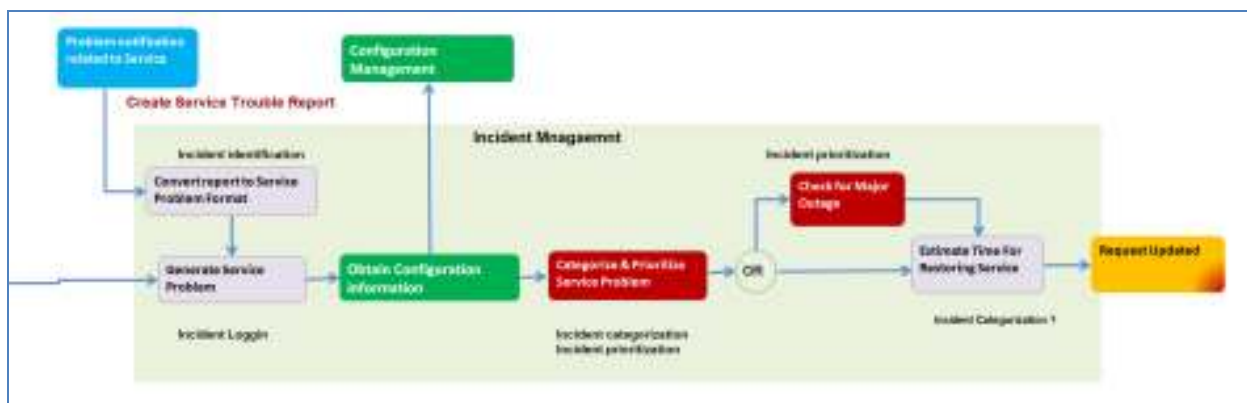


Figure 35 - Create Service Trouble Report L4 Concept Flow

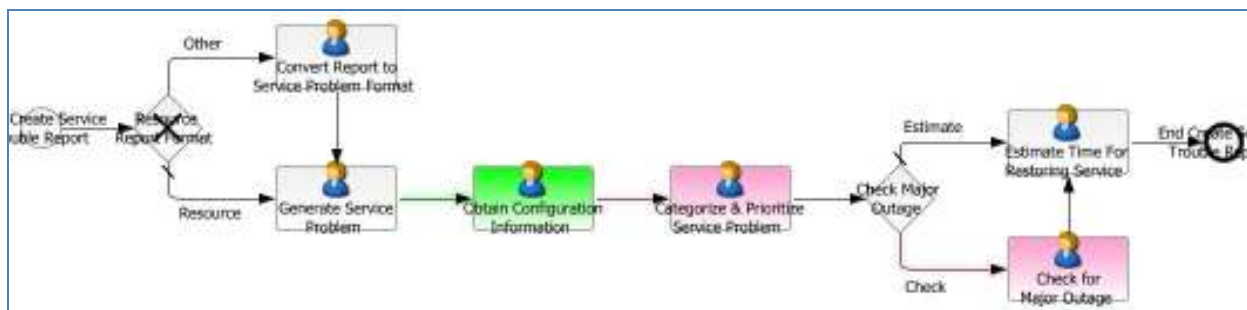


Figure 36 - Create Service Trouble Report L4 BPMN Flow

This process flow includes three original process elements derived from level 3 and adds three new process elements to coordinate with ITIL activities. The first step is to determine whether the incoming report is already in the form of a service problem, and if not, to convert it. The next steps are to obtain configuration information from the ITIL CMS and to place the service problem in a known category and priority. Next, an ITIL check is made to determine whether the problem is related to a major outage. In parallel with that process, an initial estimate is made of the time required to restore the service.

10.4. Diagnose Service Problem

Brief description from GB921-DX: “Identify the root cause of the specific service problem.”



Figure 37 - Diagnose Service Problem L4 Concept Flow

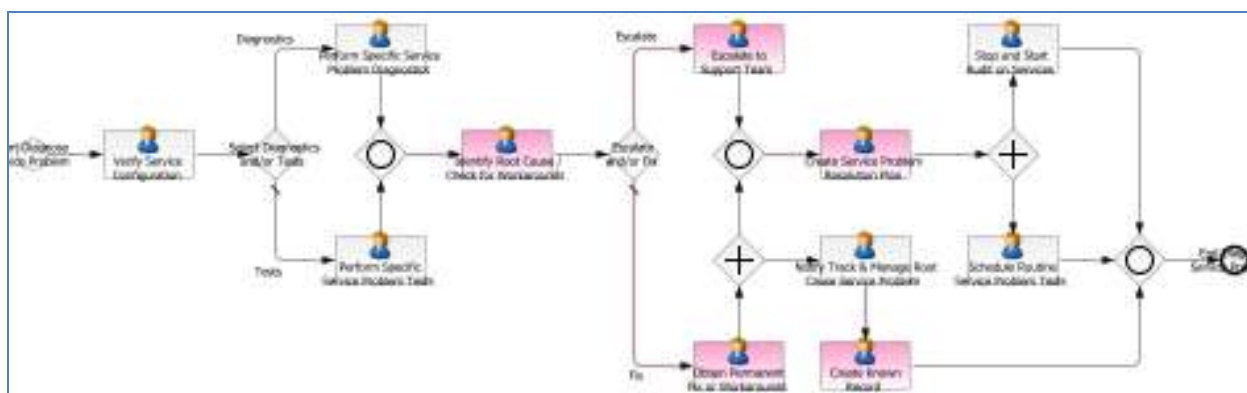


Figure 38 - Diagnose Service Problem L4 BPMN Flow

This process flow includes six original process elements derived from level 3 and adds five new process elements to coordinate with ITIL activities. The first step is to verify the configuration of the service for which a problem was reported. Next, it may be necessary to run various tests and/or diagnostics. Once those have been completed, an ITIL activity identifies the root cause of the problem and available workarounds for it. Escalation may be required, which will use an ITIL activity to involve the appropriate support team. At the same time another ITIL activity checks for permanent fixes and workarounds, followed by notification of the process responsible for tracking and management of the service problem, and by an ITIL activity to create a record in the known error database. In any case another ITIL activity will create a plan for service restoration, after which additional steps manage service audits and schedule tests related to the problem.

10.5. Report Service Problem

Brief description from GB921-DX: “Monitor the status of service trouble reports, provide notifications of any changes and provide management reports.”

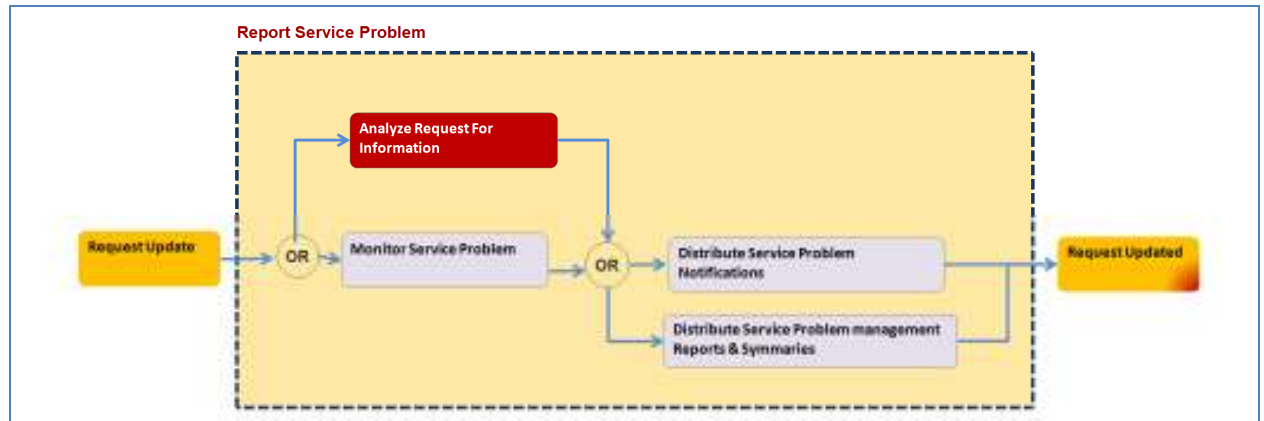


Figure 39 - Report Service Problem L4 Concept Flow

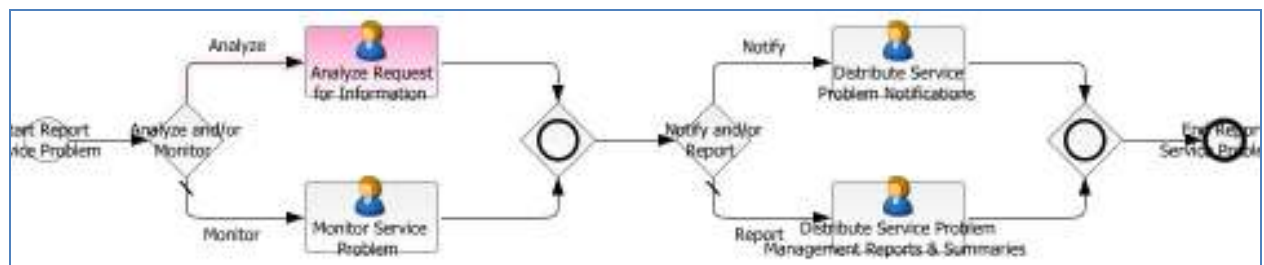


Figure 40 - Report Service Problem L4 BPMN Flow

This process flow includes three original process elements derived from level 3 and adds one new process element to coordinate with ITIL activities. The first step is to determine whether analysis and/or additional problem monitoring is required. If analysis is required, an ITIL activity is invoked, and monitoring is also begun if necessary. Next a decision must be made as to required notifications and reports. Depending on that decision, two additional steps may distribute notification of the problem and distribute management reports and summaries.

10.6. Survey & Analyze Service Problem

Brief description from GB921-DX: “Monitor service alarm event notifications and manage service alarm event records in real-time.”

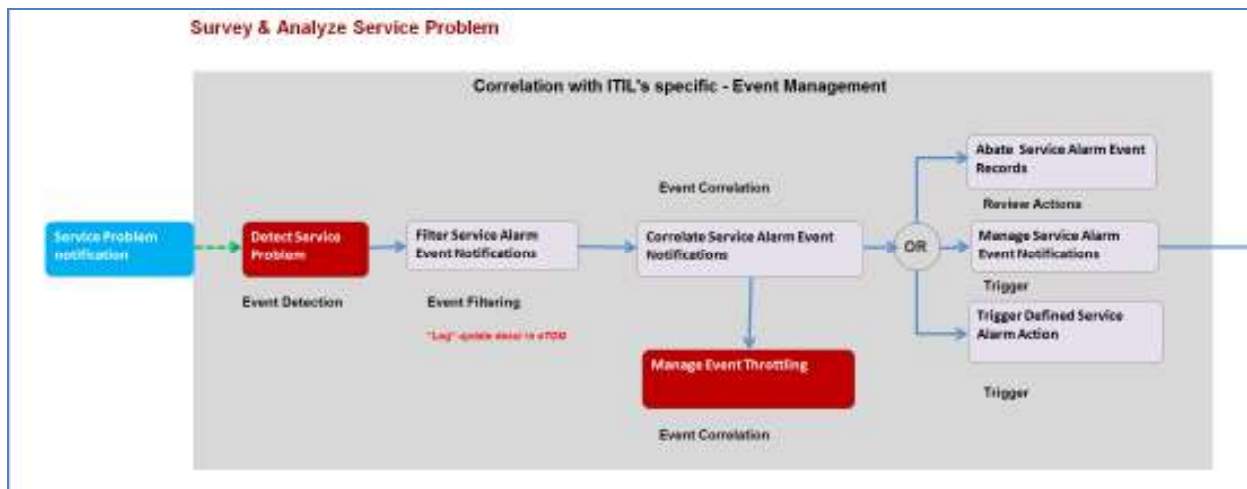


Figure 41 - Survey & Analyze Service Problem L4 Concept Flow

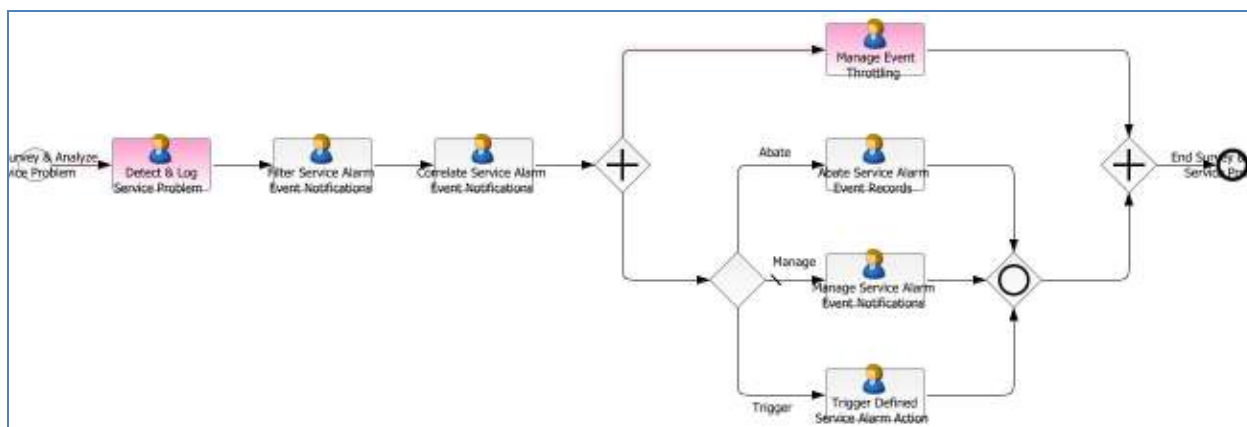


Figure 42 - Survey & Analyze Service Problem L4 BPMN Flow

This process flow includes five original process elements derived from level 3 and adds two new process elements to coordinate with ITIL activities. The first step is to receive and log the incoming service problem. The next steps filter and correlate service alarm event notifications. Then, in parallel with an ITIL activity to manage event throttling, up to three additional steps will abate alarm records, manage alarm notifications, and trigger predefined actions.

10.7. Track & Manage Service Problem

Brief description from GB921-DX: “Ensure that testing, repair and restoration activities are assigned, coordinated and tracked efficiently, and that escalation is invoked as required for any open service trouble reports in jeopardy.”

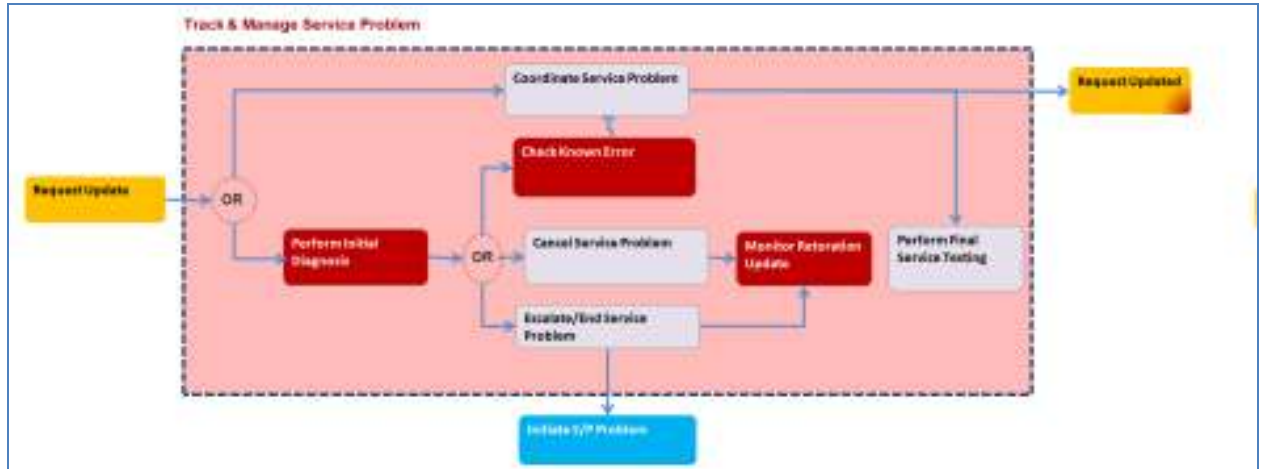


Figure 43 - Track & Manage Service Problem L4 Concept Flow

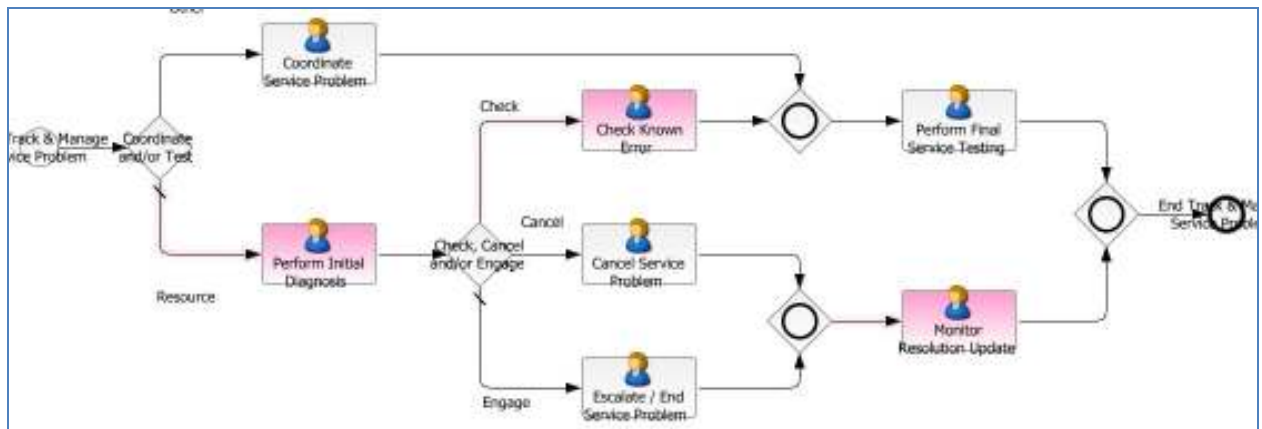


Figure 44 - Track & Manage Service Problem L4 BPMN Flow

This process flow includes four original process elements derived from level 3 and adds three new process elements to coordinate with ITIL activities. The first step is to determine whether coordination and/or diagnosis are required. If diagnosis is required, an ITIL activity is invoked to perform it, and coordination of problem resolution efforts is also begun if necessary. Next a decision must be made as to problem handling. Depending on that decision, three additional steps may invoke ITIL activity to check for known errors, cancel the problem, or escalate it. If the problem is canceled or escalated, an additional ITIL activity is invoked to monitor it. If a known error check is made or additional coordination is required, then final service testing is performed.

11. Resource Trouble Management Process Flows

This section contains level 4 process flows within the level 2 context of Service Problem Management.

11.1. Close Resource Trouble Report

Brief description from GB921-DX: “This process monitors the status of all open resource trouble reports, and recognizes that a resource trouble report is ready to be closed when the status is changed to cleared.”

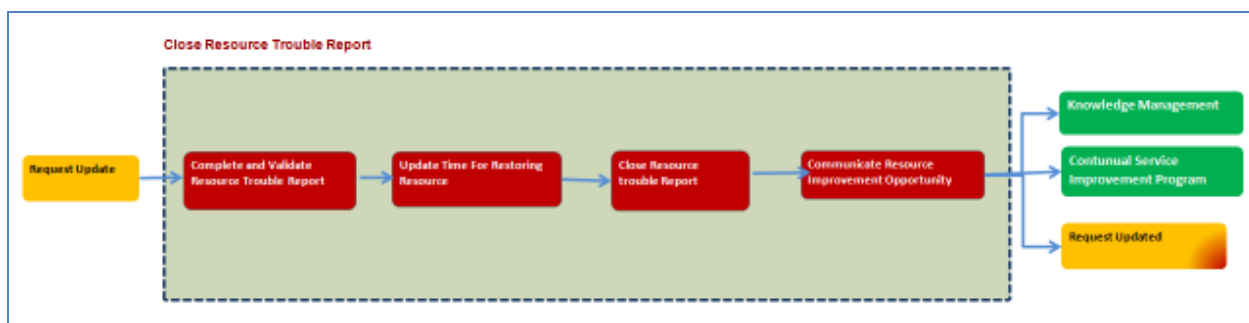


Figure 45 – Close Resource Trouble Report L4 Concept Flow

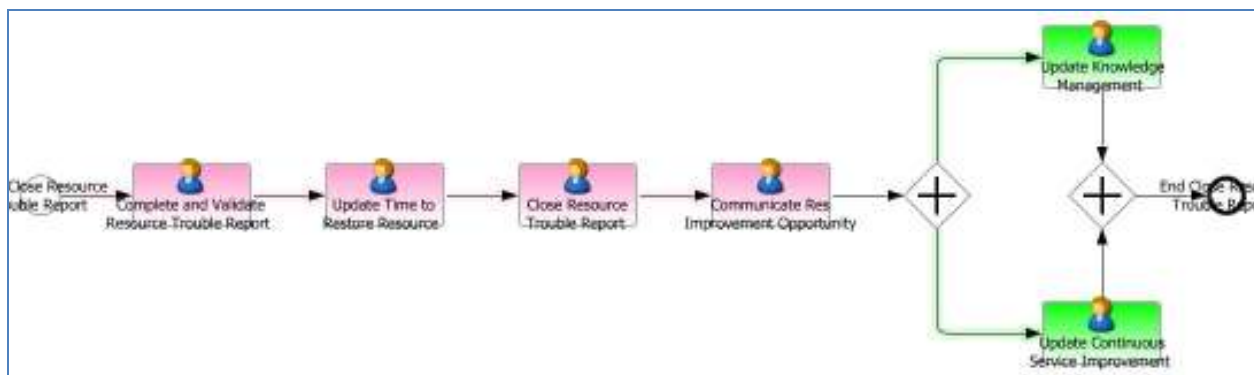


Figure 46 - Close Resource Trouble Report L4 BPMN Flow

This process flow is entirely composed of new process elements to coordinate with ITIL activities. Once the resource trouble report has been completed and validated, the resource restoration time is updated, and the report is closed. The next step is to register the need for improvements in service. Finally the ITIL knowledge management and continual service improvement systems are updated.

11.2. Correct & Resolve Resource Trouble

Brief description from GB921-DX: “Restore or replace resources that have failed as efficiently as possible.”

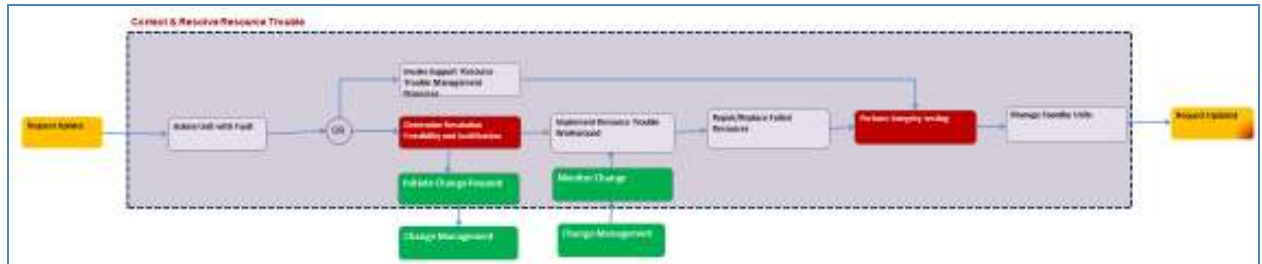


Figure 47 - Correct & Resource Trouble L4 Concept Flow

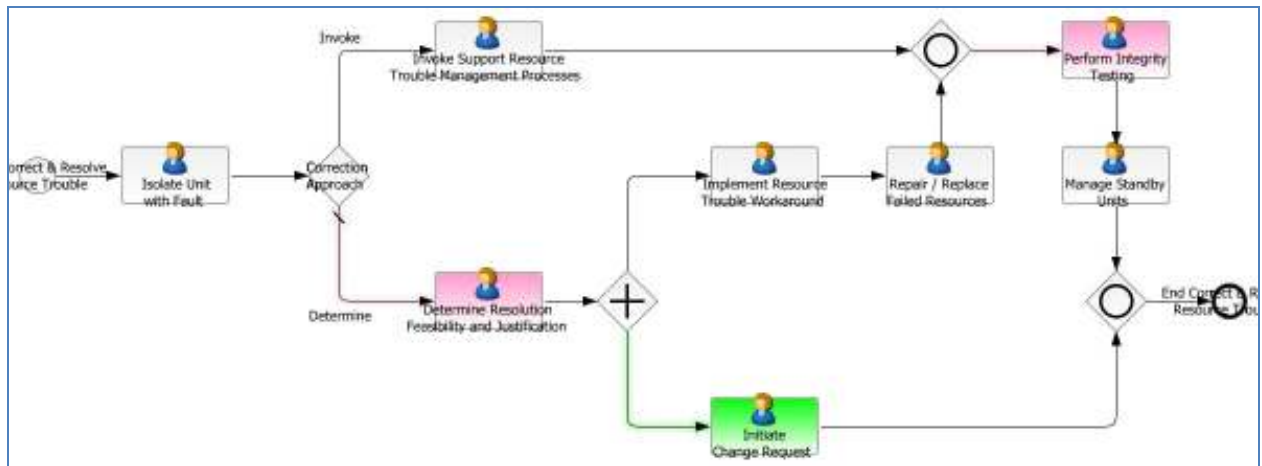


Figure 48 - Correct & Resolve Resource Trouble L4 BPMN Flow

This process flow includes five original process elements derived from level 3 and adds three new process elements to coordinate with ITIL activities. The first step is to isolate the failing resource. Next, in parallel the process determines whether the trouble can be resolved and what will be required, while at the same time ensuring that processes to support resource trouble management are started. Next, an ITIL change request will need to be initiated. In parallel with that process, a series of steps will implement a workaround for the trouble and repair or replace the resource, test the repair or replacement, and manage backup resources.

11.3. Create Resource Trouble Report

Brief description from GB921-DX: “Create a new resource trouble report.”

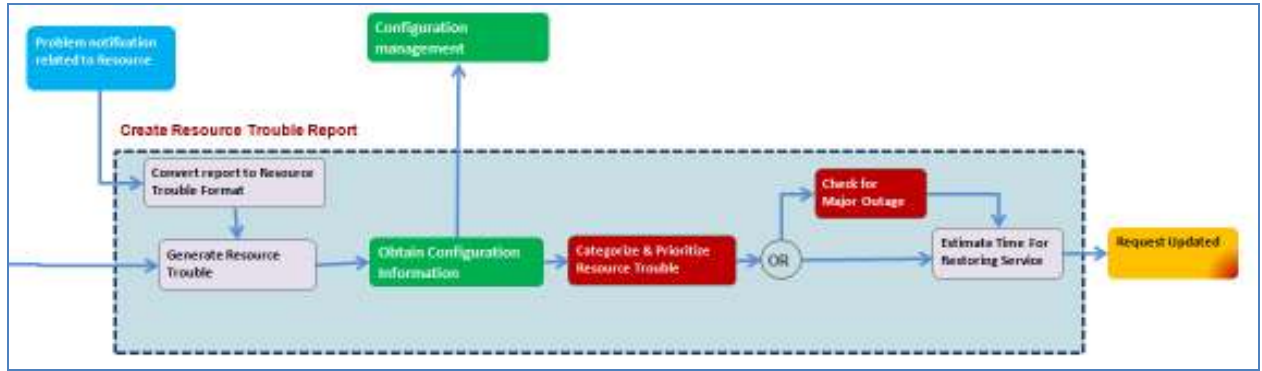


Figure 49 - Create Resource Trouble Report L4 Concept Flow

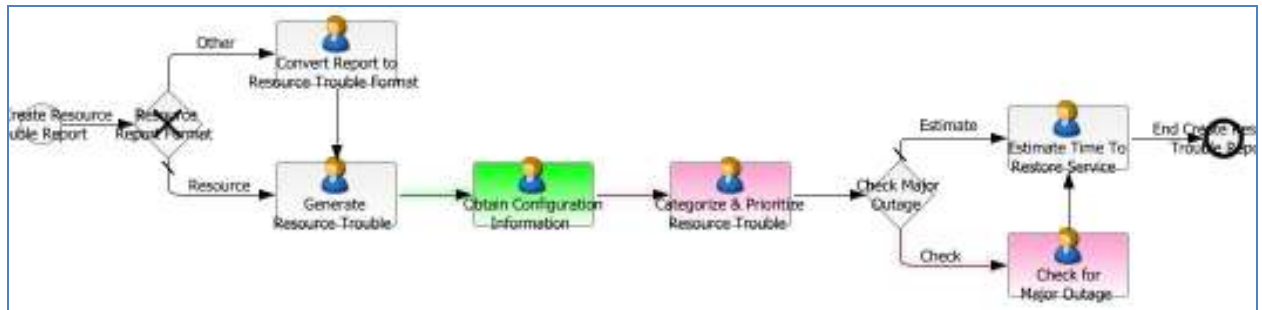


Figure 50 - Create Resource Trouble Report L4 BPMN Flow

This process flow includes three original process elements derived from level 3 and adds three new process elements to coordinate with ITIL activities. The first step is to determine whether the incoming report is already in the form of a resource trouble, and if not, to convert it. The next steps are to obtain configuration information from the ITIL CMS and to place the resource in a known category and priority. Next, an ITIL check is made to determine whether the problem is related to a major outage. In parallel with that process, an initial estimate is made of the time required to restore service.

11.4. Localize Resource Trouble

Brief description from GB921-DX: “Identify the root cause of the specific resource trouble.”

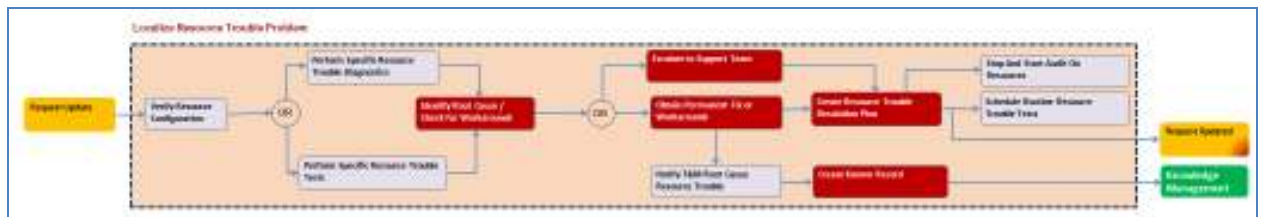


Figure 51 - Localize Resource Trouble L4 Concept Flow

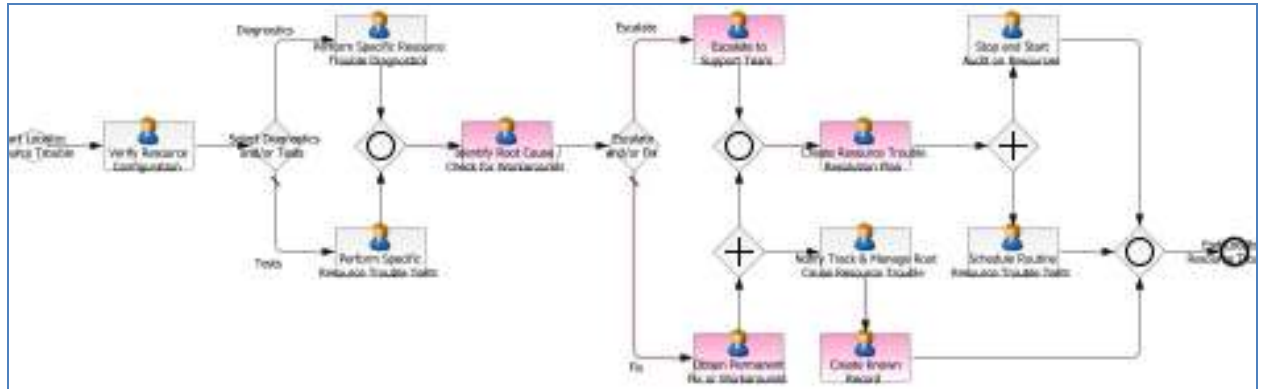


Figure 52 - Localize Resource Trouble Report L4 BPMN Flow

This process flow includes six original process elements derived from level 3 and adds five new process elements to coordinate with ITIL activities. The first step is to verify the configuration of the resource for which a trouble was reported. Next, it may be necessary to run various tests and/or diagnostics. Once those have been completed, an ITIL activity identifies the root cause of the trouble and available workarounds for it. Escalation may be required, which will use an ITIL activity to involve the appropriate support team. At the same time another ITIL activity checks for permanent fixes and workarounds, followed by notification of the process responsible for tracking and management of the resource trouble, and by an ITIL activity to create a record in the known error database. In any case another ITIL activity will create a plan for resource restoration, after which additional steps manage resource audits and schedule tests related to the trouble.

11.5. Report Resource Trouble

Brief description from GB921-DX: “Monitor the status of resource trouble reports, provide notifications of any changes and provide management reports.”

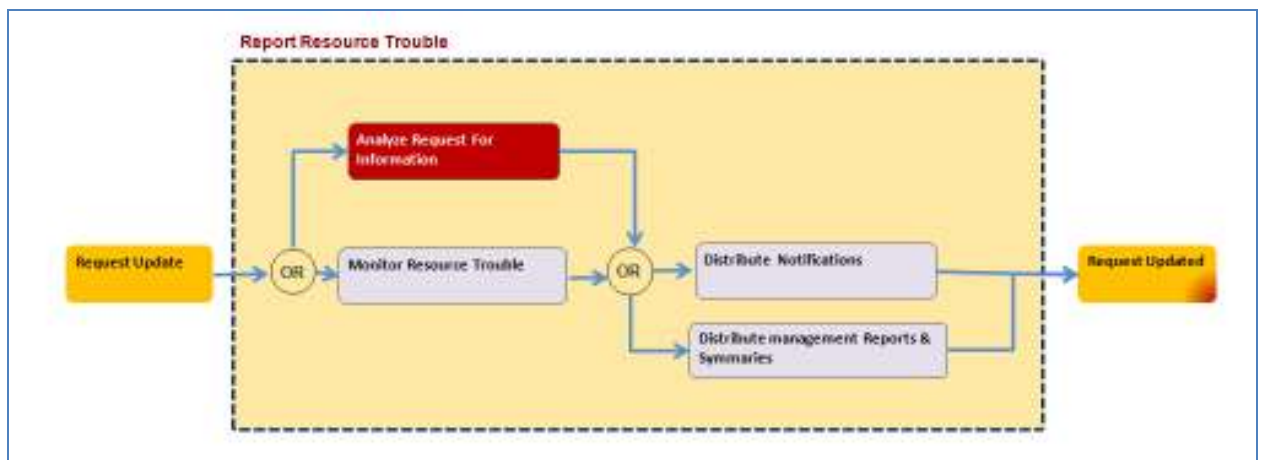


Figure 53 - Report Resource Trouble L4 Concept Flow

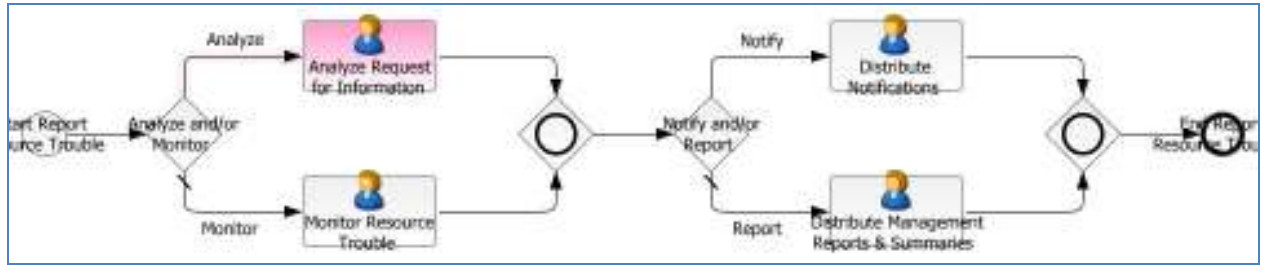


Figure 54 - Report Resource Trouble L4 BPMN Flow

This process flow includes three original process elements derived from level 3 and adds one new process element to coordinate with ITIL activities. The first step is to determine whether analysis and/or additional problem monitoring is required. If analysis is required, an ITIL activity is invoked, and monitoring is also begun if necessary. Next a decision must be made as to required notifications and reports. Depending on that decision, two additional steps may distribute notification of the trouble and distribute management reports and summaries.

11.6. Survey & Analyze Resource Trouble

Brief description from GB921-DX: “Monitor resource alarm event notifications and manage resource alarm event records in real-time.”

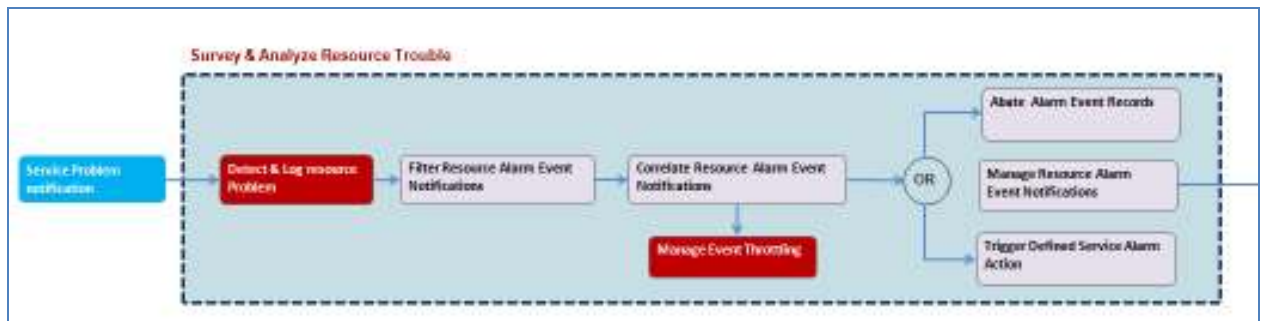


Figure 55 – Survey & Analyze Resource Trouble L4 Concept Flow

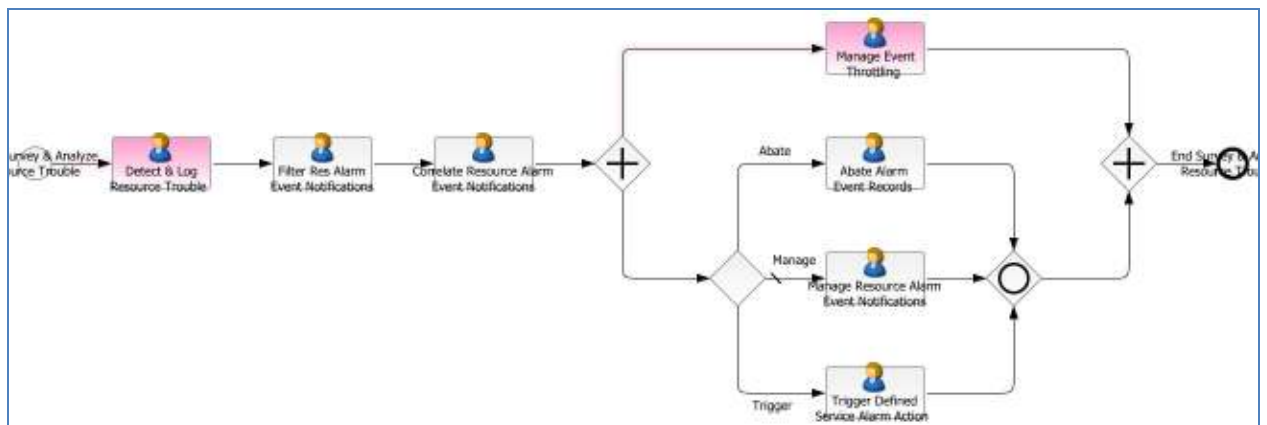


Figure 56 – Survey & Analyze Resource Trouble L4 BPMN Flow

This process flow includes five original process elements derived from level 3 and adds two new process elements to coordinate with ITIL activities. The first step is to receive and log the incoming resource trouble. The next steps filter and correlate resource alarm event notifications. Then, in parallel with an ITIL activity to manage event throttling, up to three additional steps will abate alarm records, manage alarm notifications, and trigger predefined actions.

11.7. Track & Manage Resource Trouble

Brief description from GB921-DX: “Ensure testing, repair and restoration activities are assigned, coordinated and tracked efficiently, and that escalation is invoked as required for any open resource trouble reports in jeopardy.”

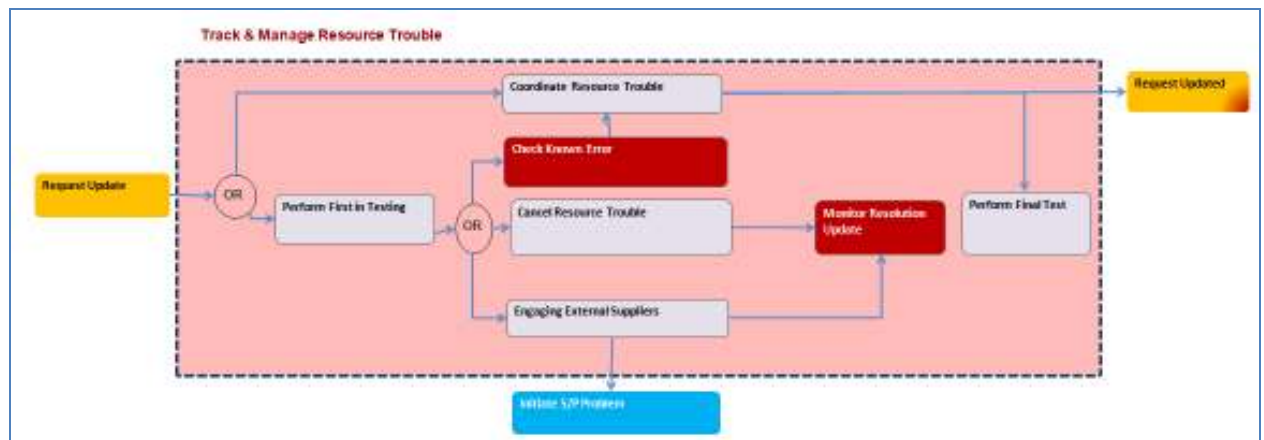


Figure 57 - Track & Manage Resource Trouble L4 Concept Flow

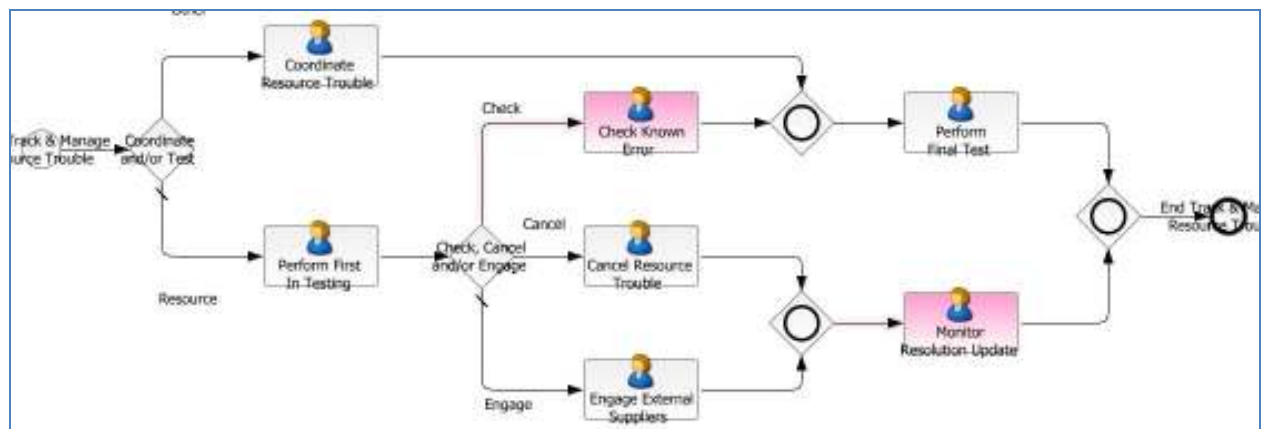


Figure 58 - Track & Manage Resource Trouble BPMN Flow

This process flow includes four original process elements derived from level 3 and adds three new process elements to coordinate with ITIL activities. The first step is to determine whether coordination and/or testing are required. Coordination of problem resolution efforts is also begun if necessary. If testing is required, a decision must be made as to trouble handling. Depending on that decision, three additional steps may invoke ITIL activity to check for known errors, cancel the trouble, or escalated to external suppliers to address it. If the trouble is canceled or escalated, an additional ITIL activity is invoked to monitor it. If a

known error check is made or additional coordination is required, then final testing is performed.

12. Multi-Actors Process Flows at Assurance Level

The objective of this section is to propose new scenarios at assurance level for Telecom Operators and other actors involved in the value chain of the operation of telco traditional services and digital services, in order to:

- Proposing a multi-actors environment in order to support new real scenarios for digital services,
- Developing process flows at assurance level showing specific scenarios with multi-actors, escalations and level supports,
- Designing the process flows based on BPMN notation and collaboration diagram.

12.1. Actors Involved and overall process flows

The actors involved in the process flows are the following:

- Customer
- Operating Businesses (OBs): Responsible for marketing the service (telco traditional service and/or digital service).
- Service Provider: Responsible for developing the service.
- Resource Provider: Responsible for managing the infrastructure of the service (hardware, networking, housing,..).
- Supplier / Partner: Third-party involved in the value chain of the service, such as, content providers, payment Methods, Support L3, etc.
- Operation Provider: Responsible for operating the service and orchestrating the relationships between actors involved in the operation activities.

And the process flows proposed are as follows:

- Customer Complaint
- Service Problem Management at Operation Provider Level
- Service Problem Management at Service Provider Level
- Resource Trouble Management at Resource Provider Level

- S/P Problem Management at Supplier/Partner Level

Each process flow will include two kinds of flows:

Operational Flows: It describes the sequence of steps carried out in the process flow, including escalations between actors. (synchronous flow)

Notification Flows: It describes the notifications required between actors while the operational flows are carried out. (asynchronous flow)

12.2. Process Flow: Customer Complaint (Multi-Actors and Escalations)

The customer opens a complaint to the OB actor and processes at this level are invoked. If the customer complaint cannot be solved at this level, then, a ticket is opened and escalated to Operation Provider actor, who will manage the ticket within their support levels. If the ticket cannot be solved at Operation Provider level, then, the ticket could be escalated to other actors: Service Provider / Resource Provider / Supplier&Partners who will manage the ticket within their support levels.

Once the ticket is solved, it is closed at all level involved and finally the customer is notified about the resolution.

On the other hand, notification flows are established between actors involved while the operational flows are carried out. Note that Operation Provider actor orchestrates overall notification flows between actors.

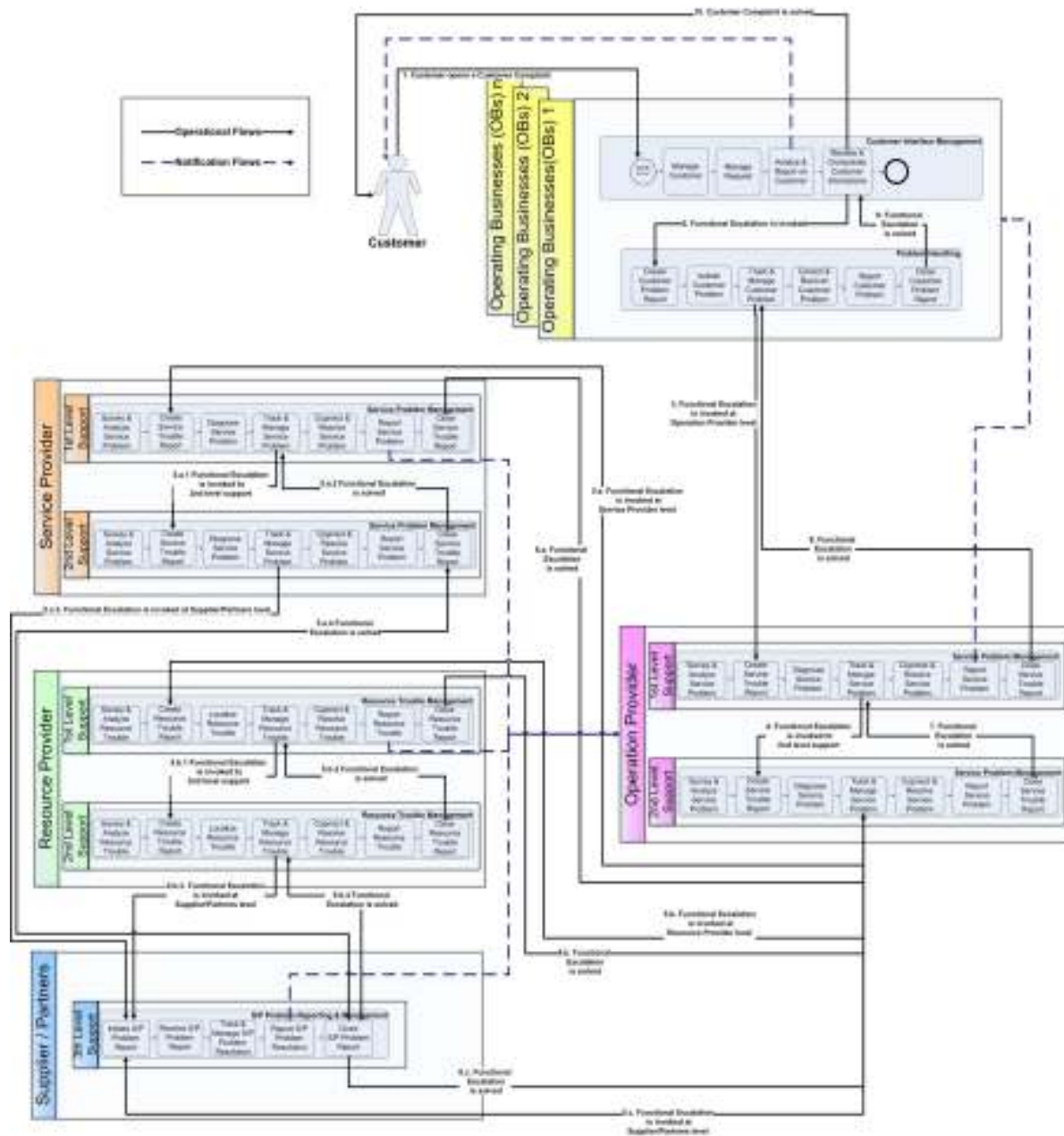


Figure 59 – Customer Complaint Flow (Multi-Actors and Escalations)

12.3. Process Flow: Service Problem Management Case 1 (Multi-Actors and Escalations)

The Operation Provider actor carries out supervision and monitoring activities where service problems can be detected based on events, alarms and operation activities, therefore, these service problems must be managed at this level within their support levels. If the service problem cannot be solved at Operation Provider level, then, a ticket could be escalated to other actors: Service Provider / Resource Provider / Supplier&Partners who will manage the ticket within their support levels.

Once the ticket is solved, it is closed at all level involved.

On the other hand, notification flows are established between actors involved while the operational flows are carried out. Note that Operation Provider actor orchestrates overall notification flows between actors.

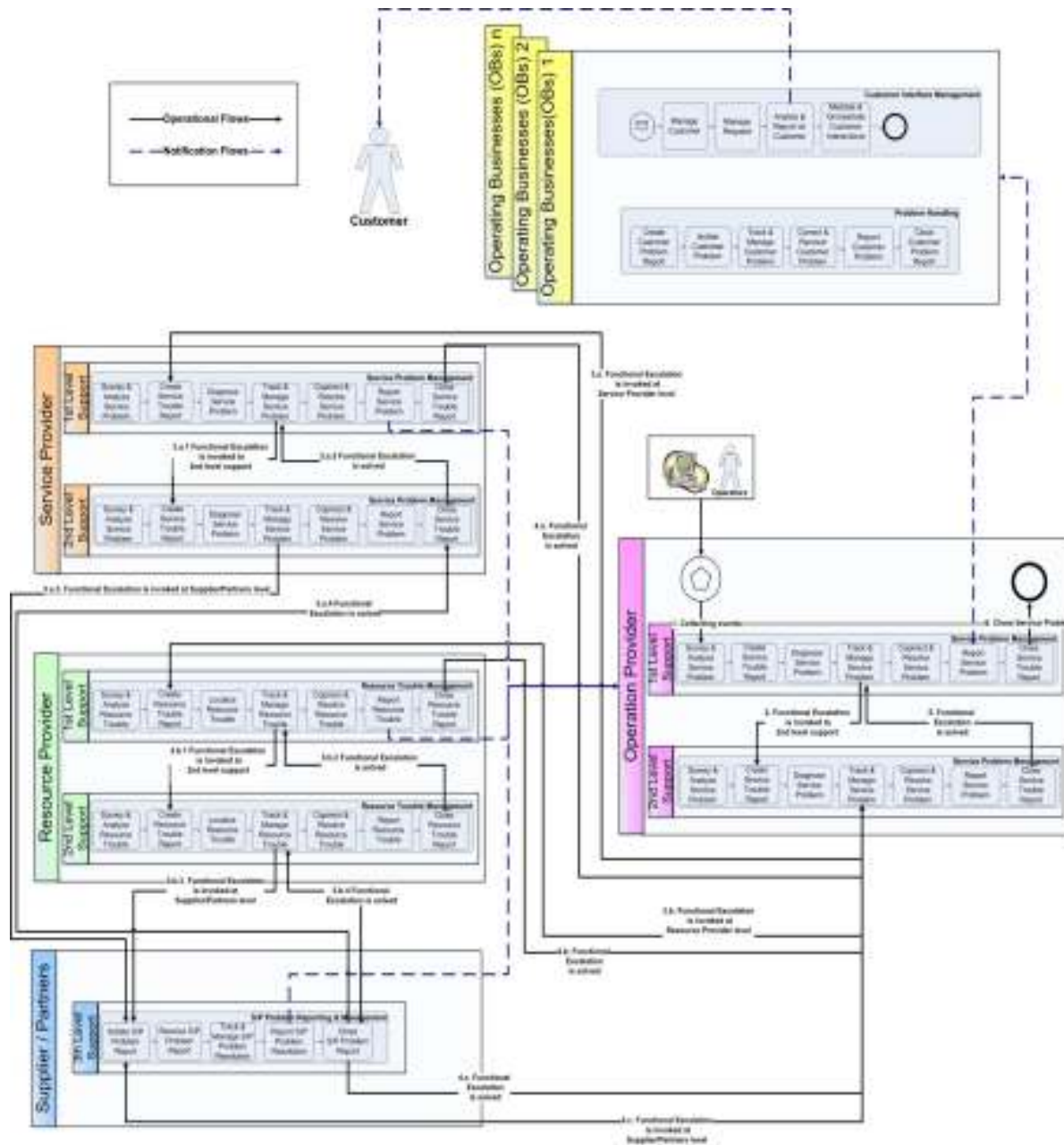


Figure 60 – Service Problem Management Flow Case 1 (Multi-Actors and Escalations)

12.4. Process Flow: Service Problem Management Case 2 (Multi-Actors and Escalations)

The Service Provider actor carries out supervision and monitoring activities where service problems can be detected based on events, alarms and operation activities, therefore, these service problems must be managed at this level within their support levels. If the service problem cannot be solved at Service Provider level, then, a ticket could be escalated to Supplier&Partners who will manage the ticket within their support levels.

Once the ticket is solved, it is closed at all level involved.

On the other hand, notification flows are established between actors involved while the operational flows are carried out. Note that Operation Provider actor orchestrates overall notification flows between actors.

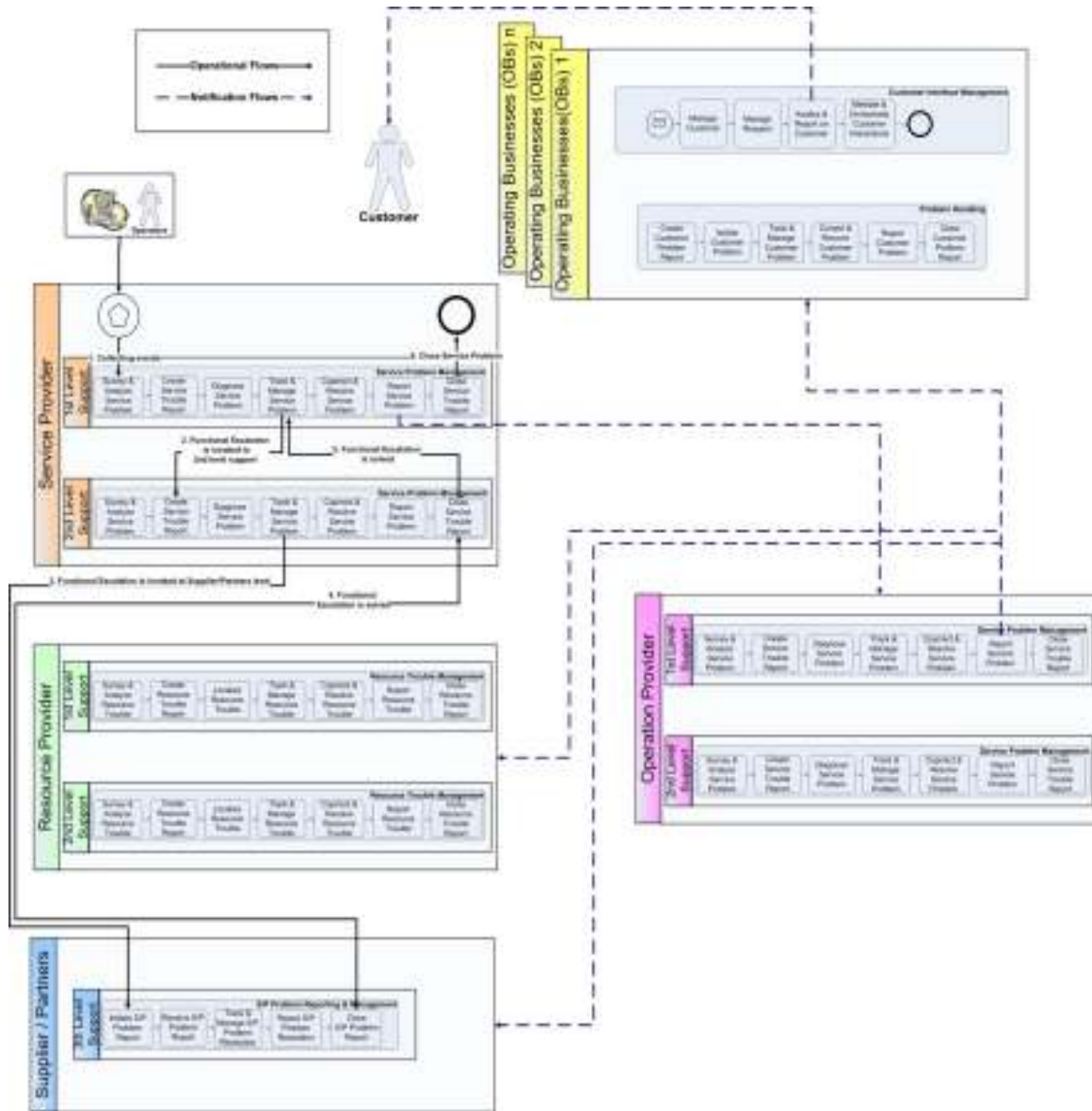


Figure 61 – Service Problem Management Flow Case 2 (Multi-Actors and Escalations)

12.5. Process Flow: Resource Trouble Management (Multi-Actors and Escalations)

The Resource Provider actor carries out supervision and monitoring activities where resource troubles can be detected based on events, alarms and operation activities, therefore, these resource troubles must be managed at this level within their support levels. If the resource trouble cannot be solved at Resource Provider level, then, a ticket could be escalated to Supplier&Partners who will manage the ticket within their support levels.

Once the ticket is solved, it is closed at all level involved.

On the other hand, notification flows are established between actors involved while the operational flows are carried out. Note that Operation Provider actor orchestrates overall notification flows between actors.

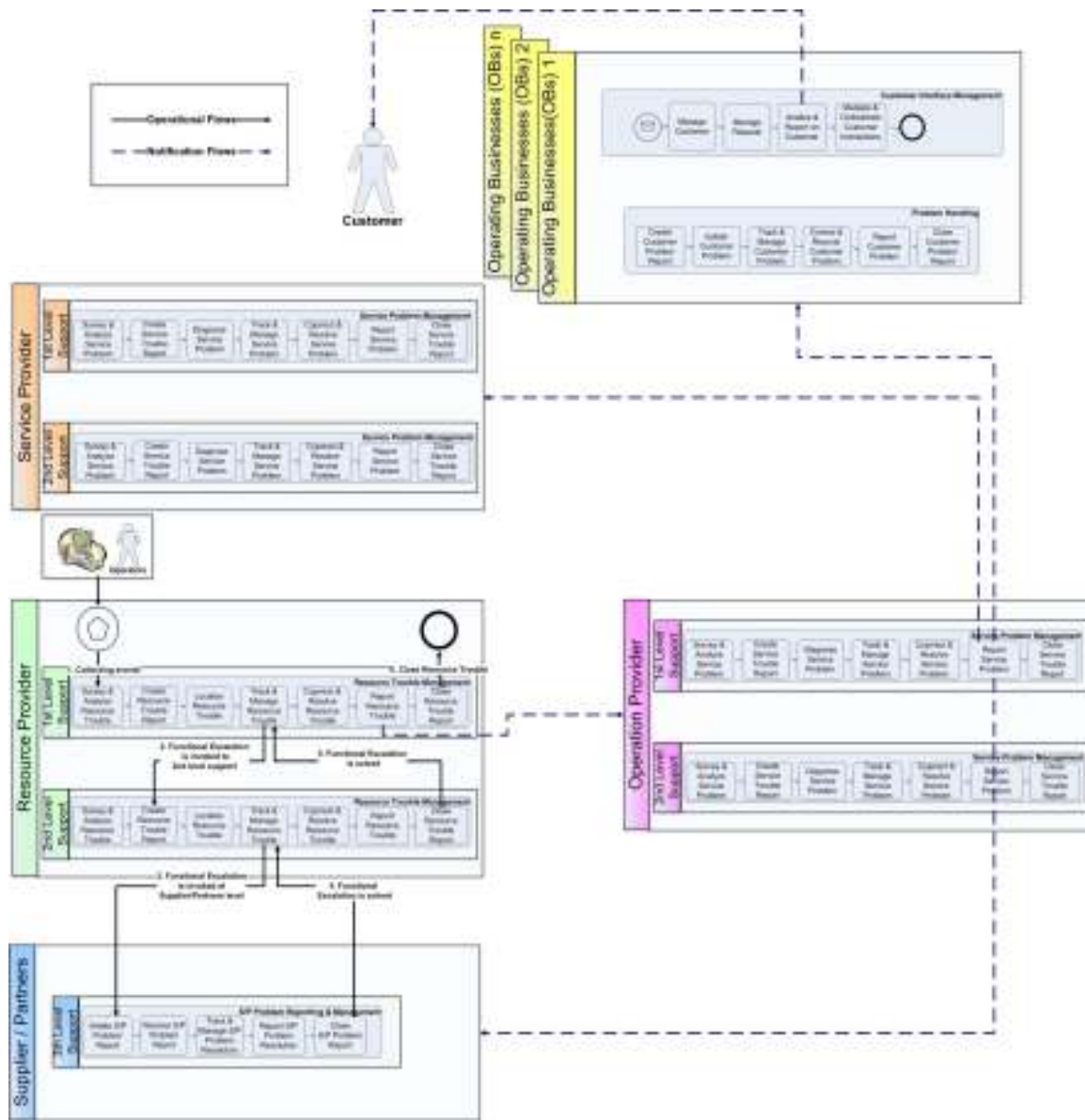


Figure 62 – Resource Trouble Management Flow (Multi-Actors and Escalations)

12.6. Process Flow: S/P Problem Management (Multi-Actors and Escalations)

The Supplier/Partner actor carries out supervision and monitoring activities where problem reports can be detected based on events, alarms and operation activities, therefore, these problem reports must be managed at this level within their support levels and other actors involved in their resolution chain.

Once the ticket is solved, it is closed at all level involved.

On the other hand, notification flows are established between actors involved while the operational flows are carried out. Note that Operation Provider actor orchestrates overall notification flows between actors.

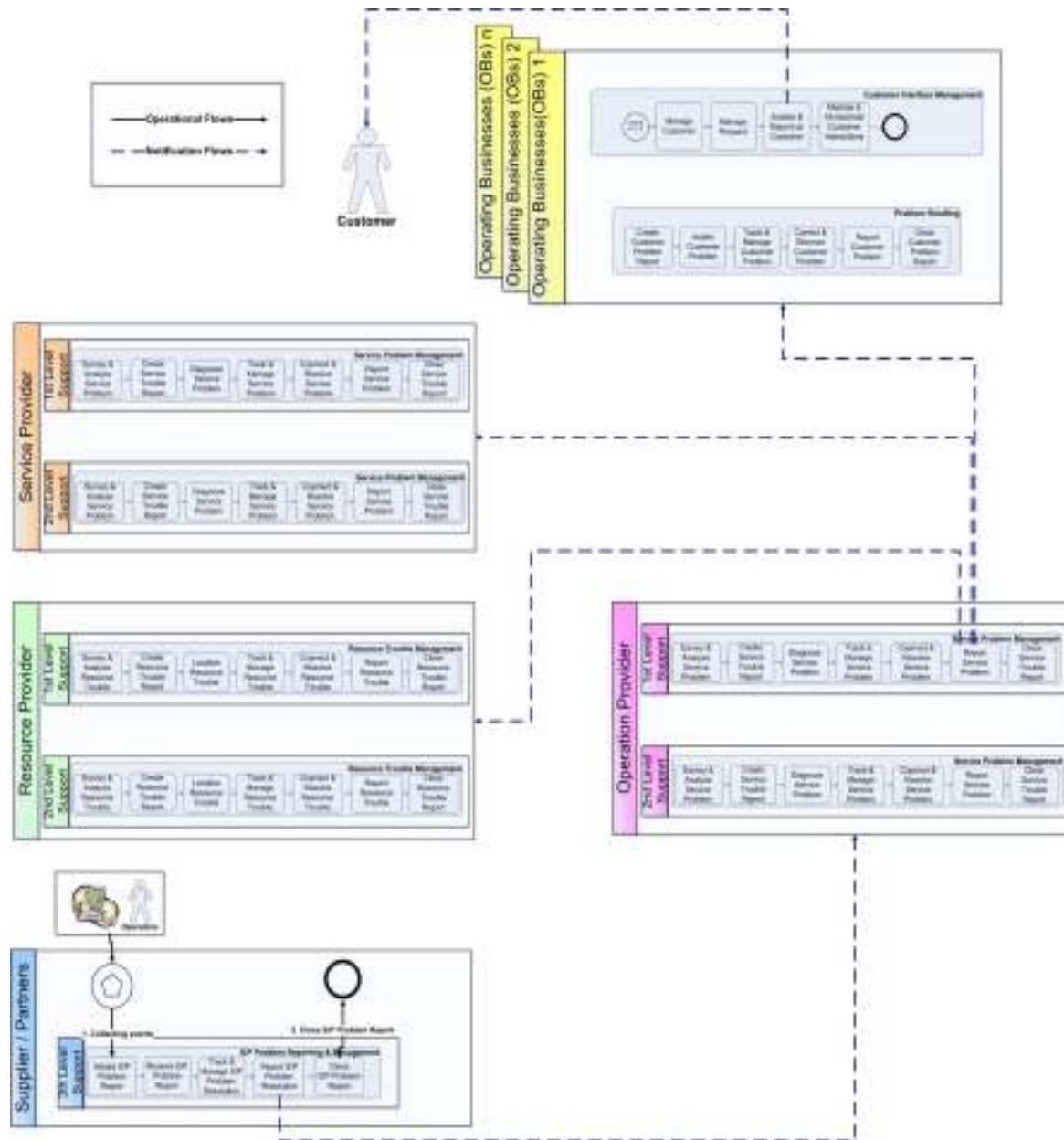


Figure 63 – S/P Problem Management Flow (Multi-Actors and Escalations)

13. Appendix A: Historical Process Flows

The example scenarios described in this Appendix make use of a tried and proven method intended to ensure that process flows can be built using the eTOM process elements in order to address the actual business needs identified in each case.

For the scenarios included here, some description is included with each explaining the scenario concerned and its scope of application.

A number of diagrams have been developed to assist in fleshing-out these scenarios. The scenario on Fulfillment explains the use of these.

Many of the diagrams are produced with the aid of a process analysis tool, and some of the conventions involved may not be obvious. The flow diagrams are organized into "swim lanes" or horizontal tracks that follow the layers visible in the eTOM framework (e.g. CRM, SM&O, etc). This is done to assist readers by positioning processes in their familiar relative orientation as seen in the eTOM structure. Within each swim lane, individual processes are then shown with interactions that link the processes within and between the swim lanes. Note that these interactions are primarily concerned with event transitions, i.e. the interaction is labeled to identify the event that causes the transition from the originating to the destination process. This transition may imply transfer of information, but it is not the primary purpose of the labeling to highlight the information that may be involved. This reflects the reality that other mechanisms for information sharing (e.g. access to common databases) may be involved and are documented separately. Also, the binding of information with process has implementation implications and therefore needs to be done in recognition of potential implementation choices. Further work on these information aspects is underway in conjunction with other work and activities within TM Forum, and will be documented in due course.

Process flows are initiated and terminated in the diagrams by boxes that may be shown outside of the swim lane area. Arrowed boxes pointing right-wards indicate Events (initiating a flow), while arrowed boxes pointing left-wards indicate results (terminating a flow). As flow diagrams can become very extended, in some cases these have been broken into sub-flows for convenience. These can then be linked together via Events and Results, as indicated.

It should be noted that the example flows shown here have been created at various stages in the evolution of eTOM, and effort has not been available to rework all of these in line with later eTOM updates. They are therefore classified as historical examples, and should be reviewed in that context.

13.1. Service Delivery and other Flows

The flows in this section have been added as part of the Release 8.0 eTOM package.

They cover a range of topics, that all have flavors of what is often termed "service delivery" (although "product delivery" might be more appropriate).

Firstly, in conjunction with the Service Delivery Framework (SDF) activity within TM Forum, several process flows were developed as examples of how the existing eTOM process elements can support new situations emerging from this work.

This also led to interest in examining “horizontal” flows in eTOM, that show how the overall lifecycle of products, services, etc., can be modeled using process flows that span SIP and OPS.

Finally, some flows that look at particular cases around order handling are included.

13.1.1. SDF: New Product Delivery

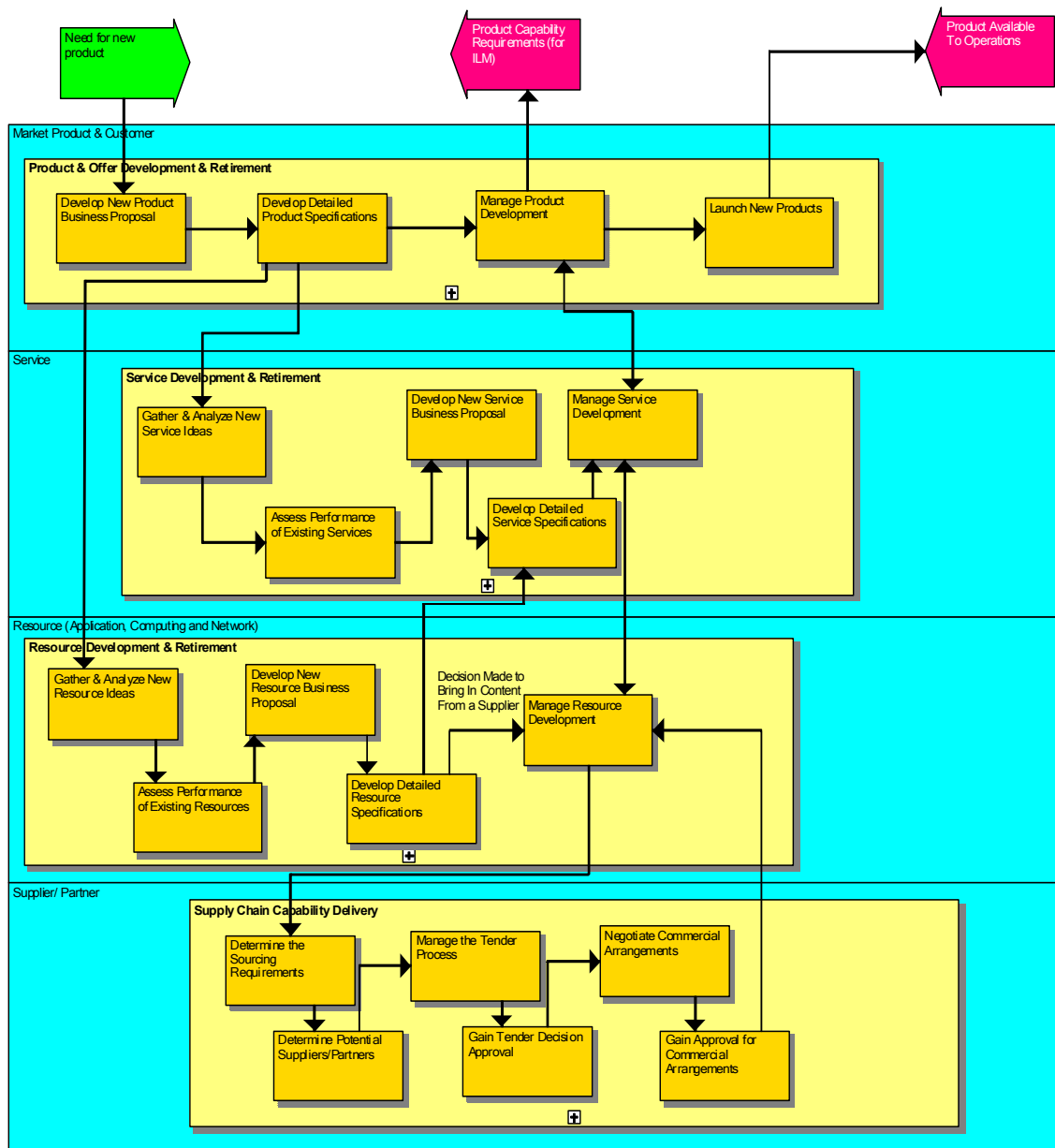


Figure 3.1: New Product Delivery Flow (for SDF)

This process flow shows how a new product is identified, defined and delivered in support of an SDF environment.

13.1.2. SDF: Populate Content Library

Another scenario identified by the SDF work concerns content-based services, and the creation of a content library.

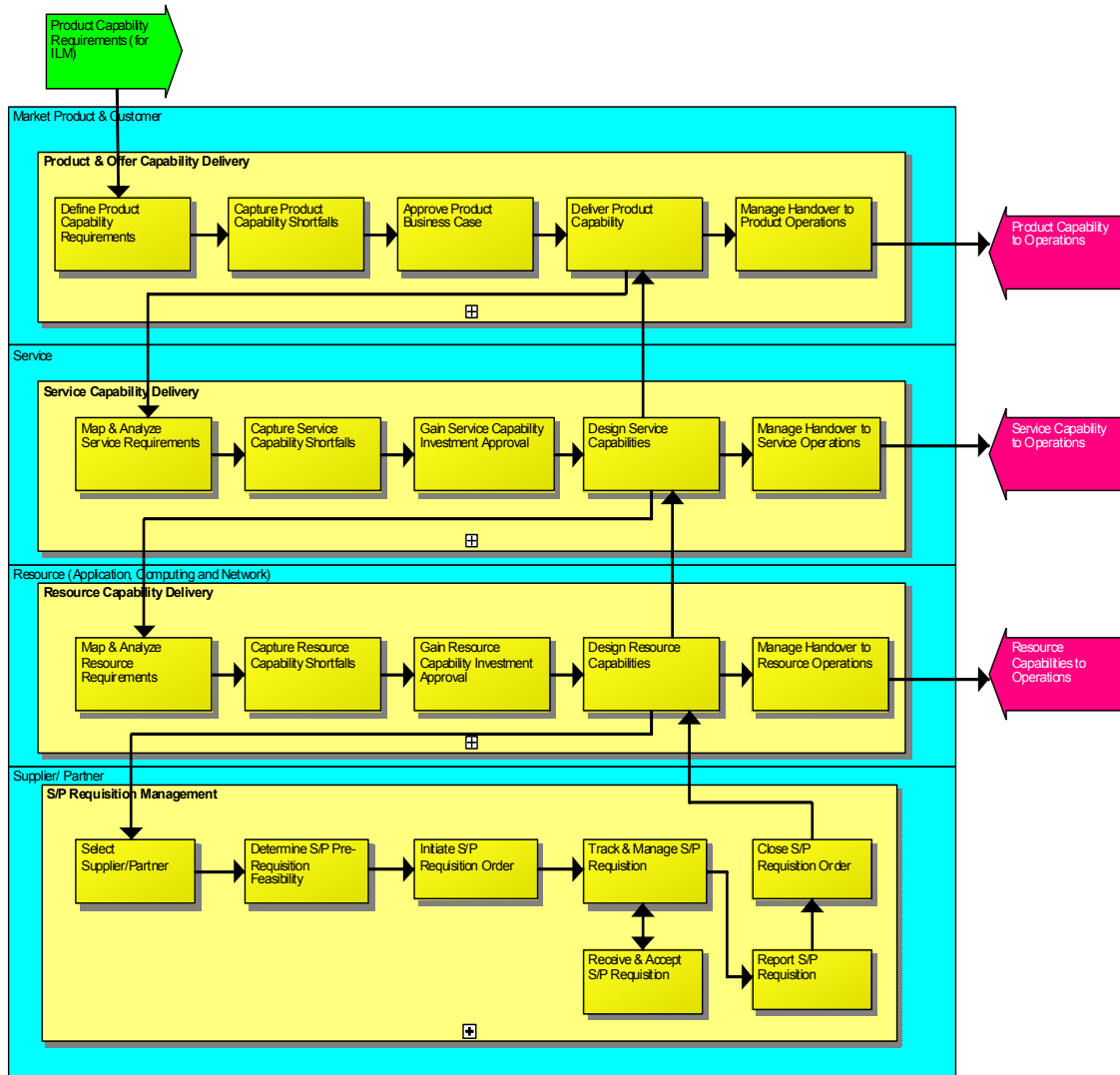


Figure 3.2: Populate Content Library Flow (for SDF)

13.1.3. New Product & Offer Development Flow

The previous flows looked at scenarios identified through the SDF work. A similar kind of analysis can be applied for “horizontal” flows that address how the SIP area of eTOM can be used to deliver products and services into use within OPS.

This process flow looks at the general issue of developing new products and bringing these into use.

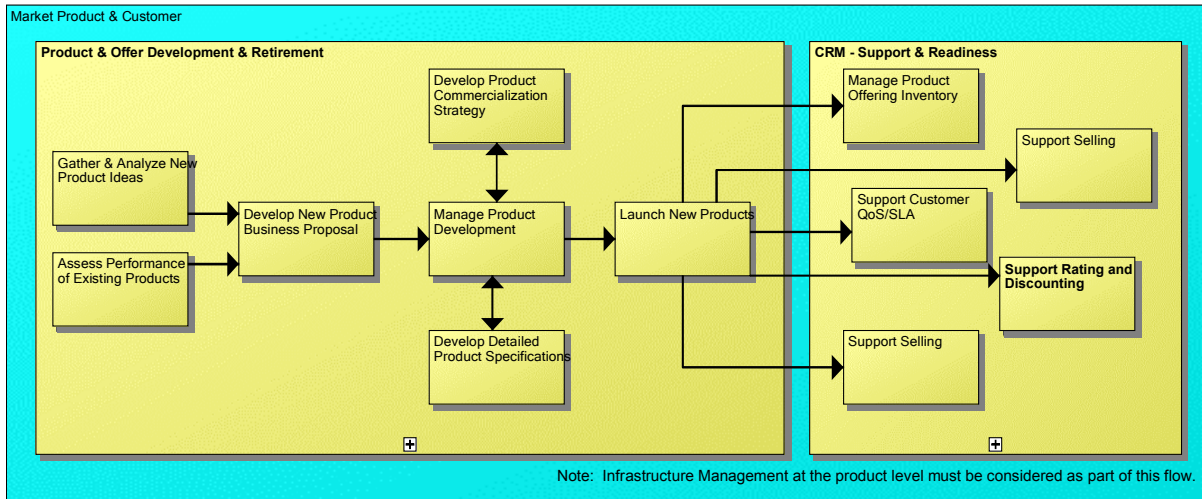


Figure 3.3: New Product & Offer Development Flow

13.1.4. New Resource Development Flow

In a similar fashion to the product example above, a “resource layer” flow can be developed.

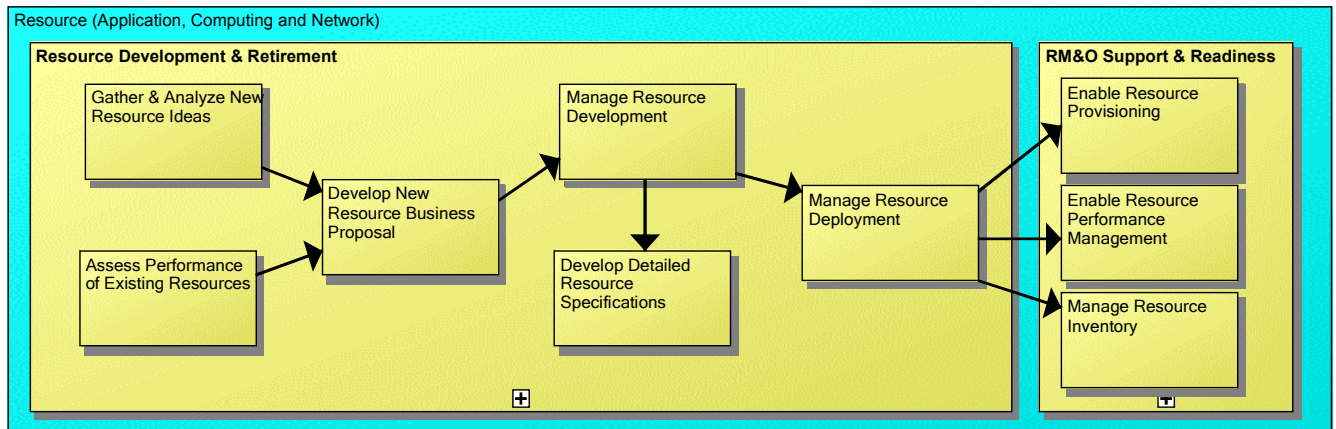


Figure 3.4: New Resource Development Flow

13.1.5. Plan and Build Flow

In the Infrastructure area, this is an example of a Plan and Build flow, that shows how infrastructure is readied for use in Operations.

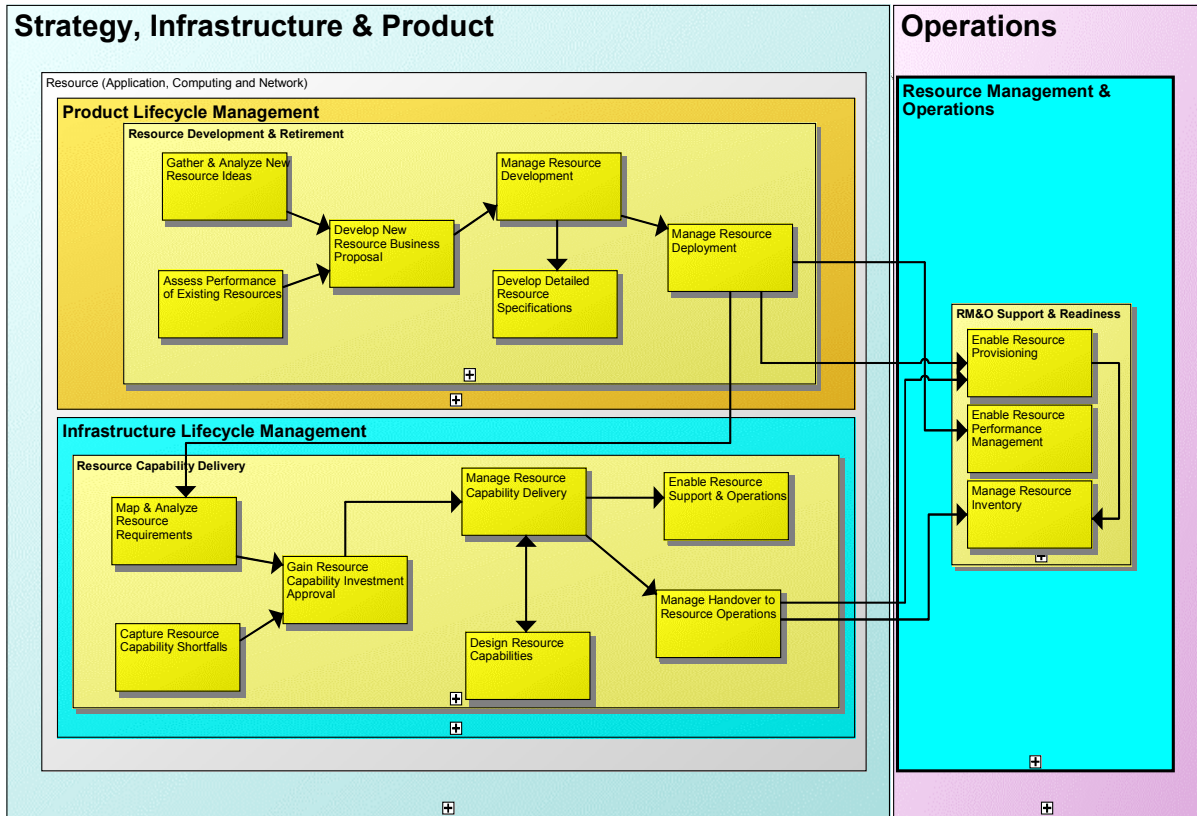


Figure 3.5: Plan and Build Flow

13.1.6. Order Handling: End-End Fulfillment flows

We can look at how flows might be applied in individual organizations. The next two flows show examples around Order Handling; for a Customer Order and for Quadruple Play, that an individual company might use.

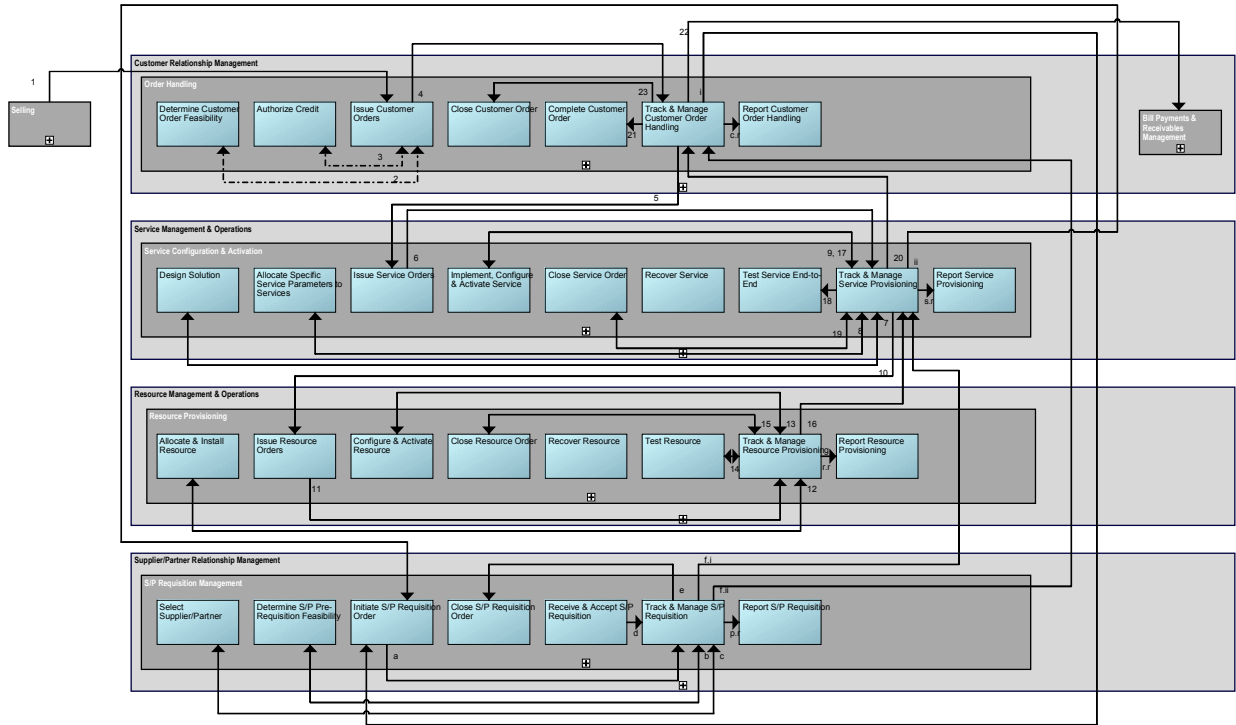


Figure 3.6: Order Handling - Customer Order Flow

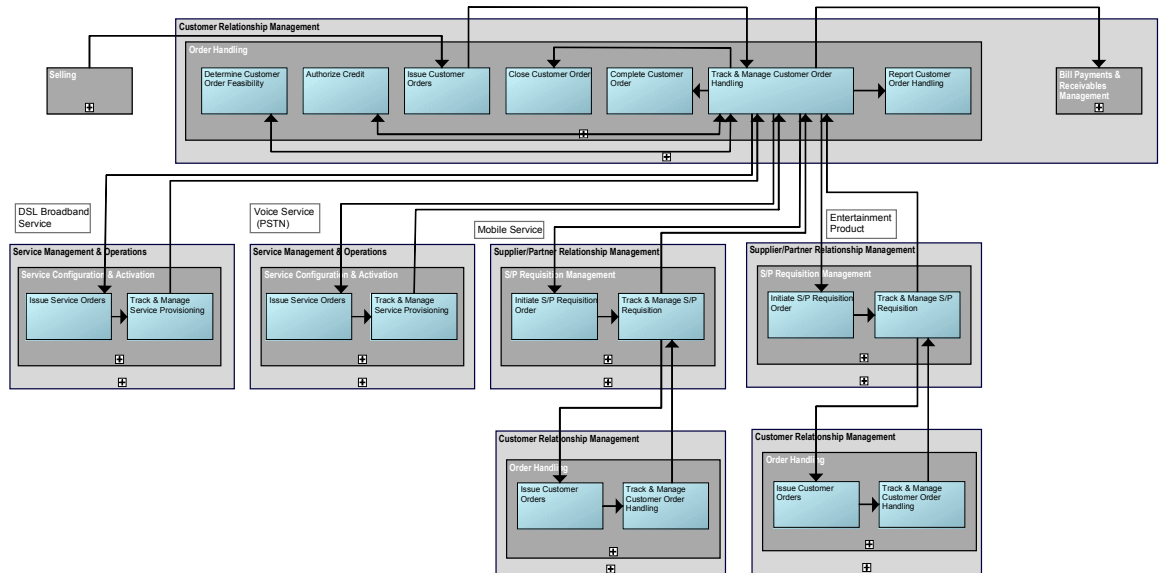


Figure 3.7: Order Handling - Sample Quadruple Play Flow

13.2. Billing-Related Flows: Prepaid Billing

13.2.1. Context

A customer is using his prepaid mobile device to make a voice phone call that does not involve roaming.

During this call, events are being generated by network equipment. Those events are sent to a real time system that will identify the customer account, check the balance, authorize (or not) the call and decrease the balance accordingly.

Note: The scenario described below only focus on the billing aspects of a larger scenario that would be the “setting and rating of prepaid voice call”. The network aspects are not discussed here.

Scenario 1: “Authorization Request/Balance reservation” (enough balance) description

user places a call using a prepaid account. Events being generated are authorization The end request for the call with balance reservation. There is enough balance for the duration implied by the reservation request.

The flow below (see Figure 4.1) is repeated for the duration of the call.

Pre Conditions

The end user uses a prepaid account

The end user places a voice call

There is a sufficient balance for the duration of the call implied by the reservation request

Post Conditions

There is a balance reservation

The end user is still talking on his voice call

Process Flow (eTOM Level 3 processes)

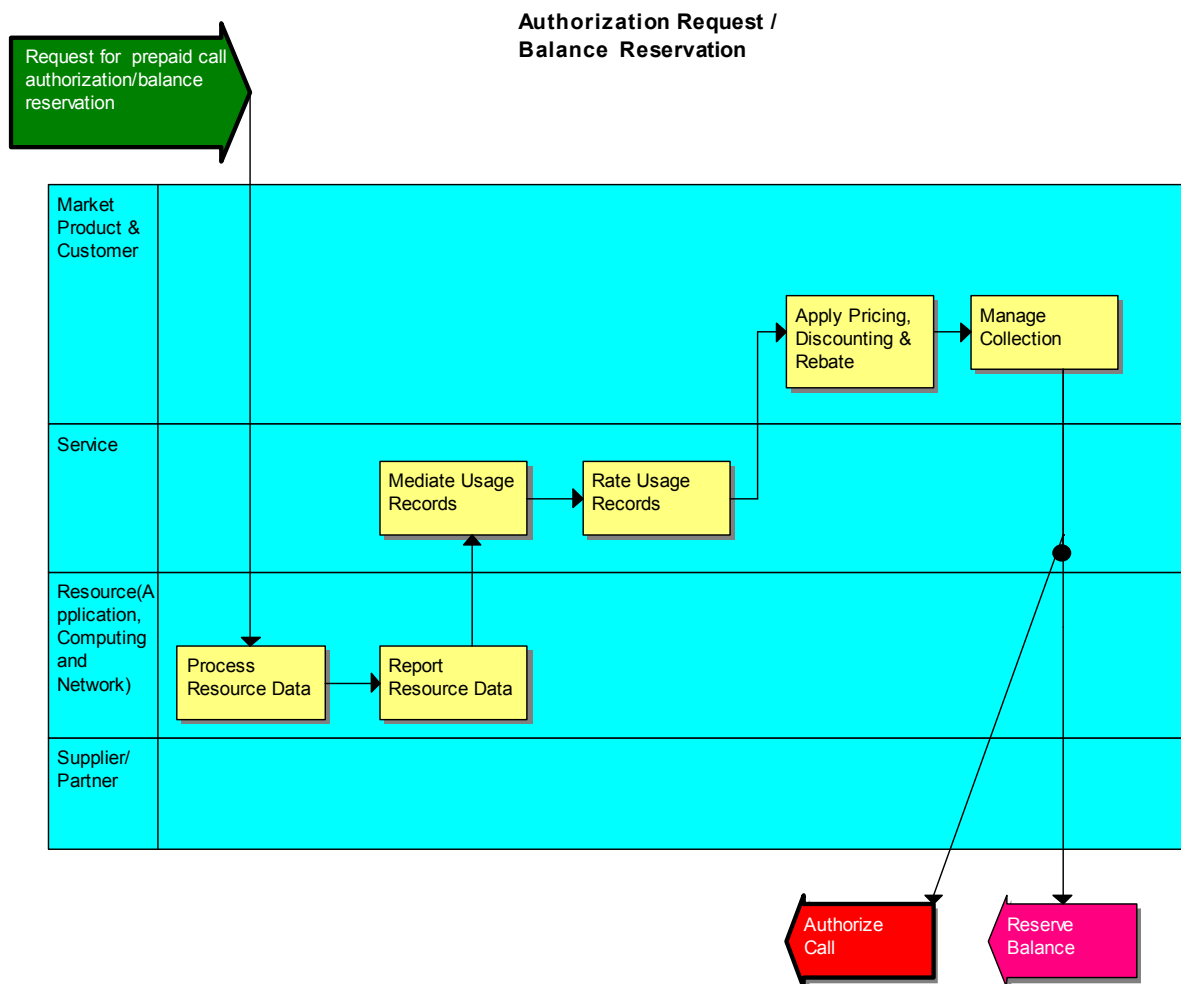


Figure 4.1: Billing flow prepaid: Authorization request /balance reservation (enough balance)

Scenario 1a: “Authorization Request/Balance reservation” (not enough balance) description

The end user places a call using a prepaid account, or the end user has placed a call already. Events being generated are authorization request for the call with balance reservation. The balance of the prepaid account has reached zero or a negative value, therefore the call cannot be authorized anymore. A non authorization event will be generated.

Pre Conditions

The end user has a prepaid account

The end user places a voice call

There is no sufficient balance for the duration of the reservation requested (according to policy of the SP).

Post Conditions

The call was rated correctly

The balance has been decreased for the correct amount and reached 0 or less.
 The call is cut because of a zero or negative balance

Process Flow (eTOM level 3 processes)

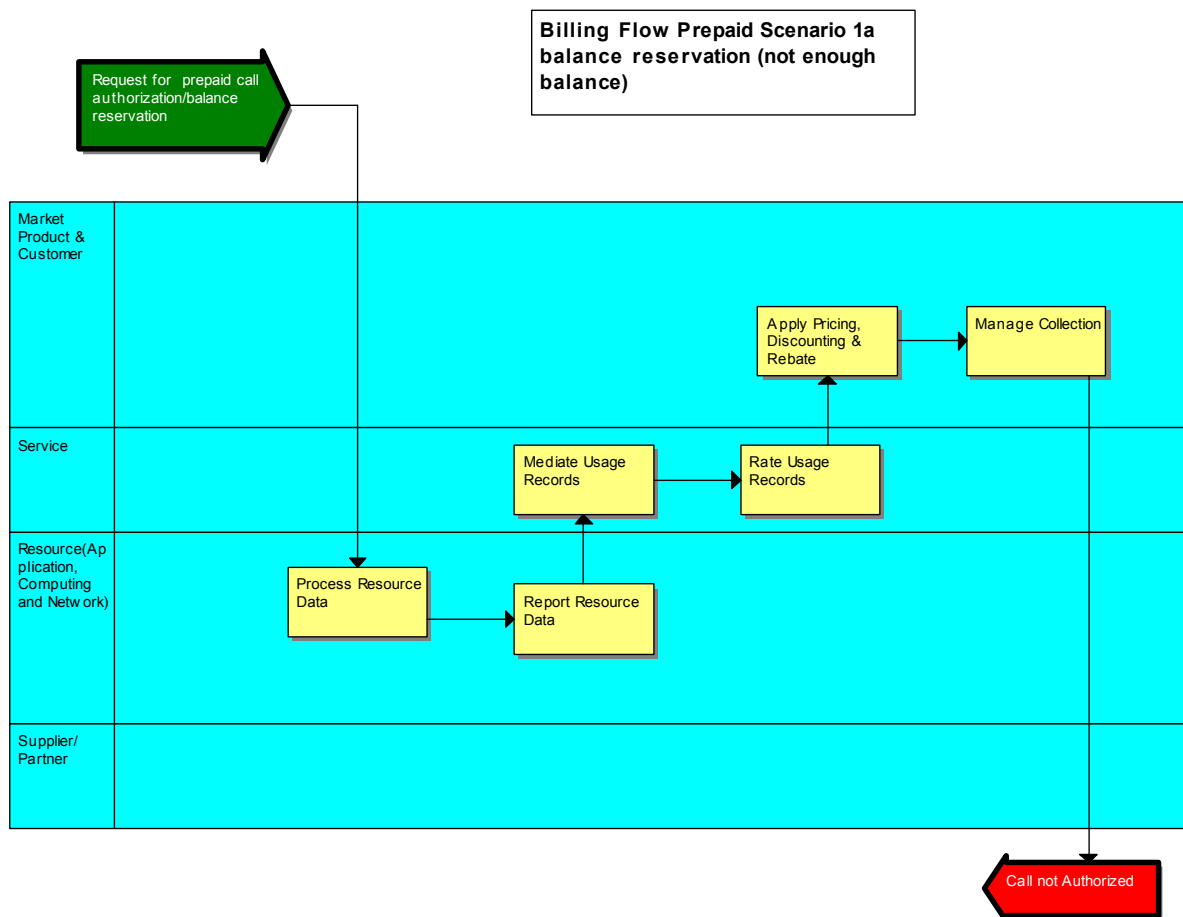


Figure 4.2: Billing flow Authorization Request/Balance reservation” (not enough balance)

Scenario 2: “Debit Request” description

The end user is finishing a call using a prepaid account. A debit request events was generated for charging the call, i.e.; decreasing the balance. (see Figure 4.3). Balance has been previously reserved, the call is rated correctly and the balance is decreased, the reservation is released. There is enough balance for the duration of the call.

Pre Conditions

- The end user uses a prepaid account
- The end user has ended a voice call
- There was sufficient balance for the duration of the call.

Post Conditions

- The call has terminated normally
- The call was rated correctly
- The balance has been decreased for the correct amount

The balance reservation made for this call is released

Process Flow (eTOM Level 3 processes)

Debit Request

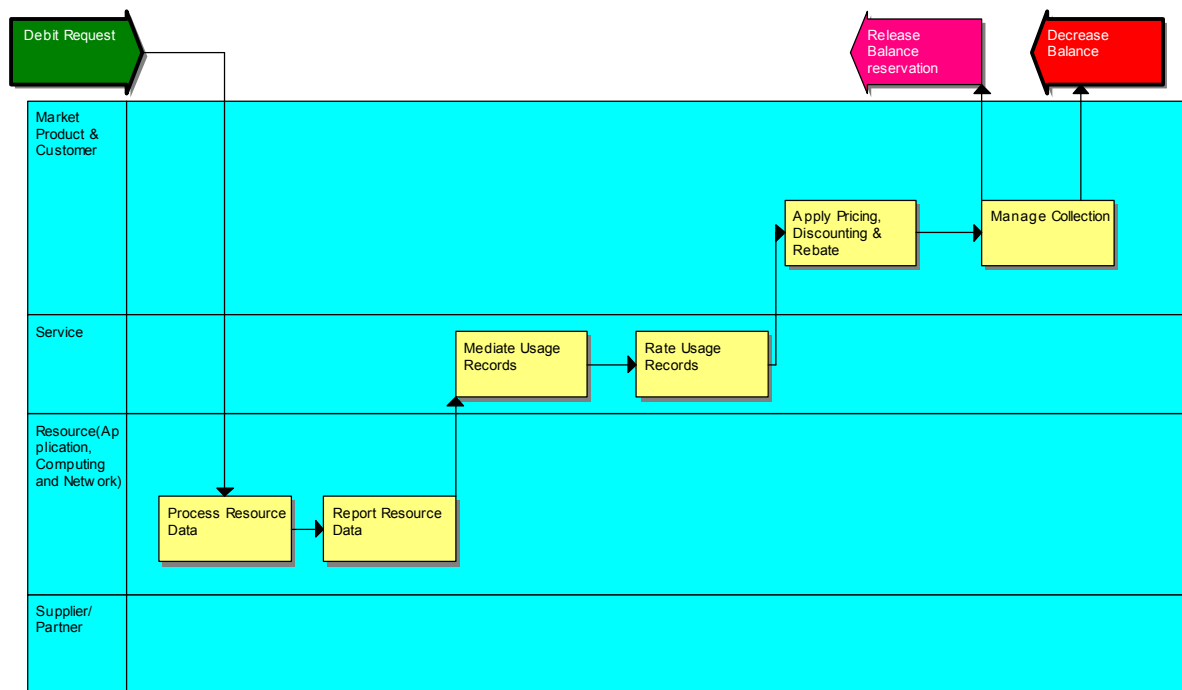


Figure 4.3: Billing flow prepaid: Debit request

13.3. Billing-Related Flows: Federated Billing

13.3.1. Context

The business relationship model of this scenario is that of a Mobile Portal Service Provider providing services to customers, some of which are provided by third party service providers. As a service aggregator, the Mobile Portal Service Provider undertakes order handling and subscription, customer care, QoS monitoring, and billing functionality associated not only with the services of the Mobile Portal Service Provider but also with the services from third party service providers that it offers via its portal. Customers can access their services wherever they are located as a subscription with the Mobile Portal Service Provider includes network access (see Figure 5.1). The customers have postpaid accounts and receive a regular, for example monthly, bill.

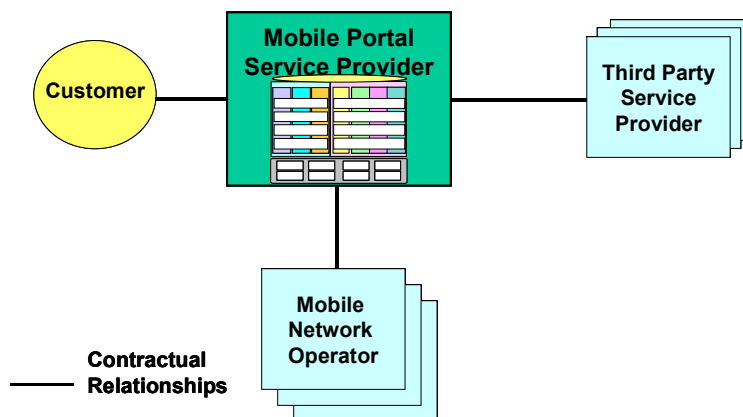


Figure 5.1 Business Relationship Context for Federated Billing

In order to bill customers for the services they use, the charging model for each of the services has to be known. If service usage is charged for, the usage data needs to be collected and processed so that the usage records can be used for rating and charging purposes. As the Mobile Portal Service Provider is the service provider issuing the individual bills to customers for their usage of all the services they are subscribed to, it requires charging data to be sent to it by the third party service providers and mobile network operators that can be aggregated into a single bill for each customer.

It is anticipated that further work will be done on the Federated Billing scenario to give it a more generic use. A new role of “Billing Aggregator” may need to be defined to cover the functionality currently contained in the Mobile Portal Service Provider and a clearer understanding of the relationship between the Billing Aggregator, the Service Content and Network Providers and the Customer established

13.3.2. Scenario description

The customer uses services that have been subscribed to. After the services have been used the required usage and charging data is sent from third party service providers / mobile network operators to the Mobile Portal Service Provider for incorporation into a single bill for the customer.

13.3.3. Pre Conditions

The contracts between the Mobile Portal Service Provider and the third party service providers / network operators have been signed and are in place

The customer has subscribed to services offered via the Mobile Portal Service Provider and has concluded an appropriate contract with the Mobile Portal Service Provider

The customer has a postpaid account

The customer uses the services subscribed to

13.3.4. Post Conditions

There was normal operation of the services supplied and no SLA violation occurred

Each service provider / network operator involved in providing a service rated the service usage correctly and provided the Mobile Portal Service Provider with the appropriate usage and charging data

The Mobile Service Provider aggregated the external data with its internal usage and charging data

The customer's account was updated by the correct amount for the service usage

The billing information encompassing all the individual services used by the customer via the Mobile Portal Service Provider was provided to the customer for payment

13.3.5. Process Flow (eTOM Level 3 processes)

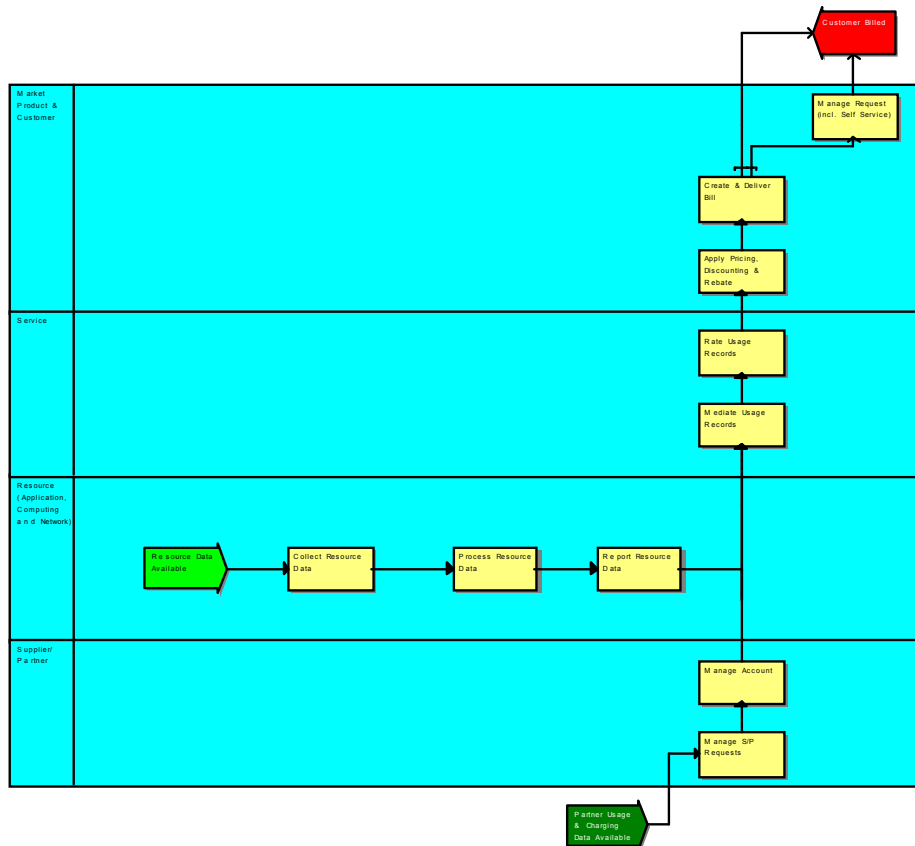


Figure 5.2 Federated Billing Flow

13.4. Billing-Related Flows: Advice of charge

13.4.1. Context

The end user, using a device (phone, mobile or fixed / PDA/ PC / etc.), accesses a specific, value added product, i.e. a product, which is not included in the customer's subscription, or which has different pricing rules from the norm. This product may carry dynamic charging. The customer will not buy this product until an indication of the cost of the product or a rate for the product has been presented to her/him.

13.4.2. Scenario description

The end user indicates an interest in buying a product, a charge or rate for this product is displayed to the customer. The end user is presented with this information, aka Advice of Charge (AoC) via a screen display, voice message, text message, etc. This may also involve presenting relevant (to that user) alternative charges.

Example.1: A video clip of a goal scored may be more expensive in the first ½ hour after the match is played and/or follow 'normal' time related charging rules, e.g. cheaper after 18.00 hours. The AoC would display the current cost of the video clip download, plus may display the reduced cost of the video clip if the user is prepared to wait until a later time. (NB. this is down to the business rules/policy of the company concerned).

Example.2: The download of a music CD may take 3 hours via a 500k Broadband line and cost \$5 for the video and nothing for transport (covered by normal flat rate subscription), or it may take 5 minutes to download via the 500 BB line temporarily boosted to 10M and cost \$5 for the video and \$3 for the extra temporary bandwidth. (NB. The charges displayed here would be decided by the company involved, but best practice would suggest both charges are displayed.)

13.4.3. Pre Conditions

The user must be using a valid/authorized device,

The end user must be a valid/authorized user of that network

The user must be permitted to buy that product (e.g. End user of corporate intranet often have restrictions on value-add services)

The Network/Service Provider (whichever is responsible for the billing for this product) has dynamic access to the charging and rating rules for the specific service required

or*

The Network/Service Provider has dynamic access to the charging and rating rules for the specific service required plus the charging /discount rules for the individual end customer*.

* This will depend on whether the customer is a subscriber of the Network/Service Provider and/or whether that Network/Service Provider wishes to offer such an individualized AoC service.

13.4.4. Post Conditions

The customer is presented with the charge or rate that will be applied to that user if they buy this product, (and if applicable any alternative charging options), so the user can continue or otherwise with buying this product

There has been no change made to the customer's account records

No call records have been established

MIS data may have been recorded for that query – dependant on business /marketing policy of that Network/Service Provider.

13.4.5. Process Flow (eTOM Level 3 processes)

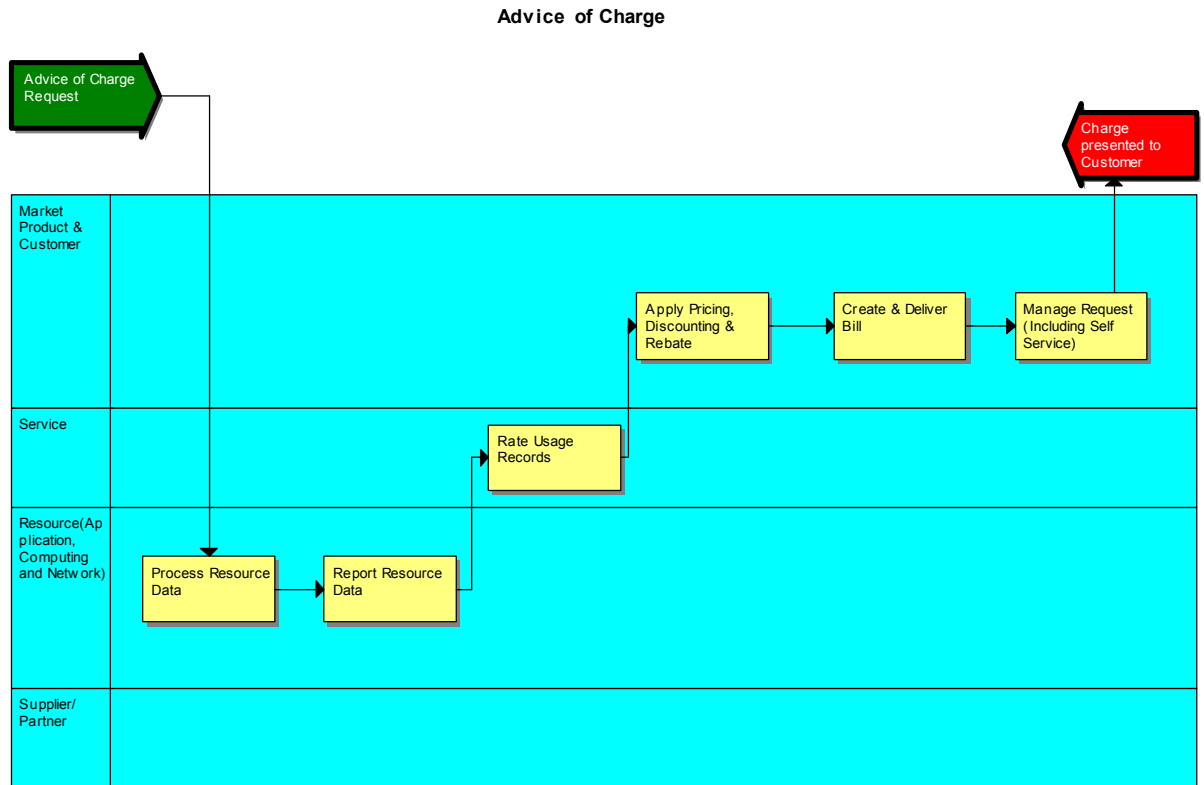


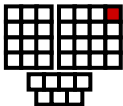
Figure 6.1 Level 3 Process Flow Advice of Charge

13.5. eTOM Level 3 Processes involved in Billing Flows

The following processes are used in the different scenarios described above. Their definitions will need adjustment to encompass these scenarios.

13.5.1. Manage Collection

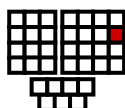
Manage Collection needs to encompass balance management processes in its description (increase/decrease/:reserve and release reserved balance)



| | |
|---------------------------|---|
| Process Name | Manage Collection |
| Process Identifier | 1.B.1.8.5 |
| Brief Description | Collect payments for service consumed by the customer and match to invoices if needed |

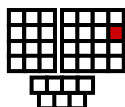
| | |
|-----------------------------|---|
| Extended Description | The purpose of this process is to collect payments made by the customer. For prepaid customer this process will handle the customer balance management processes. Furthermore this process matches these payments with the services/invoices delivered to this customer. This process is also meant to manage the amount due from the customer, i.e. check whether the payments are made in time. If not so, this might result in putting the customer on hold. |
|-----------------------------|---|

13.5.2. Mediate Usage Records



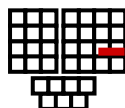
| | |
|-----------------------------|--|
| Process Name | Mediate Usage Records |
| Process Identifier | 1.B.2.5.1 |
| Brief Description | Validate, normalize, convert and correlate usage records collected from the resource layer |
| Extended Description | The purpose of the Mediate Usage Records processes is to validate, normalize, convert and correlate usage records collected from the resource layer. These processes also group usage records that relate to a specific service usage. |

13.5.3. Rate Usage Records



| | |
|-----------------------------|---|
| Process Name | Rate Usage Records |
| Process Identifier | 1.B.2.5.2 |
| Brief Description | Identify and apply tariffs and charging algorithms to specific parameters encapsulated in usage records |
| Extended Description | The purpose of the Rate Usage Records processes is to identify and apply tariffs and charging algorithms to specific parameters encapsulated in usage records in order to produce a charge that is then inserted in the usage record. |

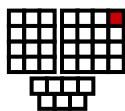
13.5.4. Process Resource Data (RM&O – AB)



| | |
|-----------------------------|--|
| Process Name | Process Resource Data |
| Process Identifier | 1.AB.3.5.2 |
| Brief Description | Process the raw data collected from the resources |
| Extended Description | The Process Resource Data processes are responsible for processing the raw data collected from the resources. This includes the filtering of |

| | |
|--|---|
| | Resource Data based on well-defined criteria, as well as providing summaries of the Resource Data through aggregation. These processes are also responsible for formatting the Resource Data before distributing it to other processes within the enterprise |
|--|---|

13.5.5. Apply Pricing, Discounting & Rebate



| | |
|-----------------------------|---|
| Process Name | Apply Pricing, Discounting & Rebate |
| Process Identifier | 1.B.1.8.2 |
| Brief Description | Ensure that the customer receives an invoice that is reflective of all the billable events delivered by the Service Provider as per the business relationship between the customer and the Service Provider |
| Extended Description | The purpose of this process is to ensure that the customer receives an invoice that is reflective of all the billable events delivered by the Service Provider as per the business relationship between the customer and the Service Provider. In addition, it ensures that the appropriate taxes, rebates (i.e. missed customer commitments) and credits are applied to the customer's invoice(s). This process contains the account and customer specific pricing, charges, discounting, credits and taxation for services delivered to the customer by the Service Provider. It accepts events that have been collected, translated, correlated, assembled, guided and service rated. It takes these events and determines the account or customer specific pricing, charges, discounts, and taxation that should be delivered to the invoice(s) for the customer. This process can occur in real-time as events are service rated, or can be on a scheduled on a periodic basis at the Service Provider's discretion. |

13.6. DSL Fulfillment process flows

13.6.1. DSL Fulfillment Assumptions

The Fulfillment process to be documented here is only one scenario out of many possible ways of delivering a Fulfillment process.

To scope a typical generic Fulfillment process, here are the assumptions used

- There is limited pre-provisioning of infrastructure to end users (perhaps more typical of HDSL than ADSL).
- Part of the resource needed will be provided internally and part externally using supplier-partner processes e.g. the ISP is the retailer and is buying the Local Loop from the incumbent carrier.
- At Level 2 only the dominant process flow is shown - exception cases (e.g. no resource available) may be detailed in Level 3 Flows.
- Multiple external suppliers will be considered for external supply of resources.
- The service has moderate complexity and after negotiations with the customer's purchasing staff are completed, the SP's technical contacts will interact with the customer's engineering staff.

13.6.2. DSL Fulfillment Process Interactions

The first step in documenting the end-to-end (E2E) flows is positioning the Fulfillment flows in their context within the overall eTOM model.

Figure 8.1 shows this context for Fulfillment. As would be expected, the majority of the high-level process linkages are within the Level 1 Fulfillment process grouping, but a number of significant interactions are identified outside of this vertical process area.

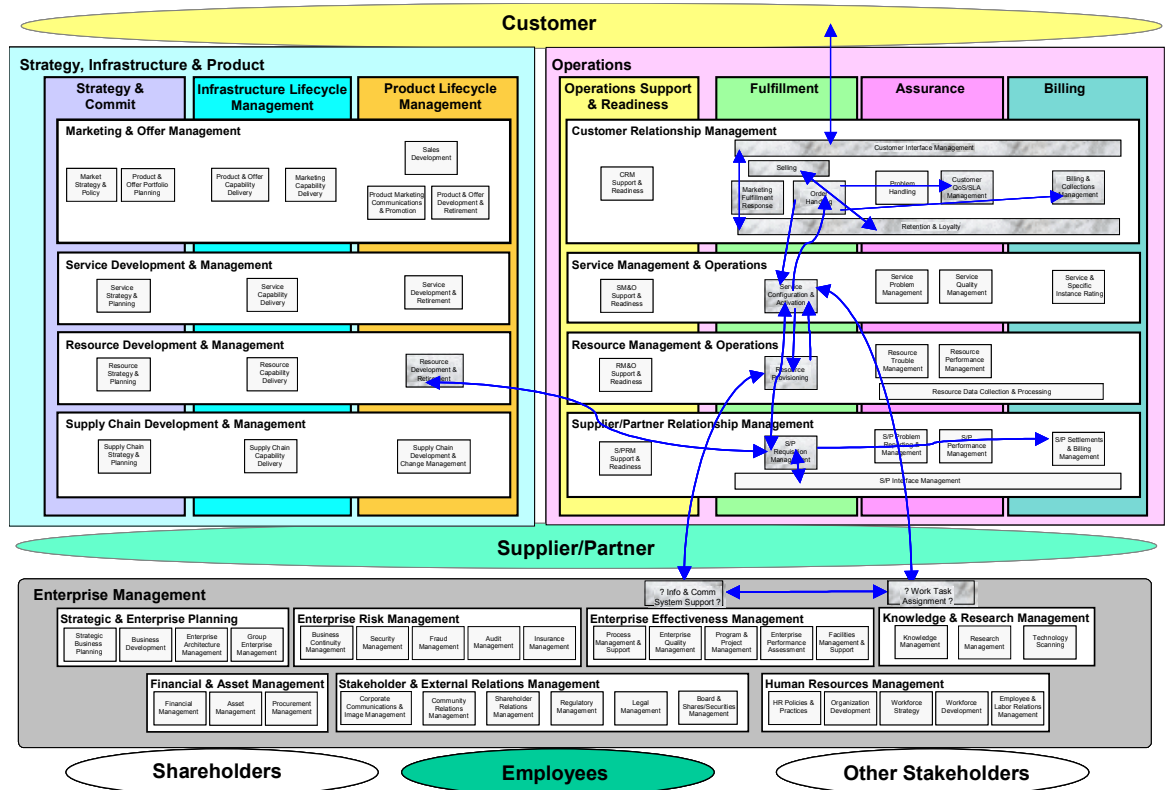


Figure 8.1: Fulfillment Process Interactions

13.6.3. DSL Fulfillment Process Flows

Further insight is developed through a more detailed illustration of the process interactions among the major Level 2 processes involved.

Flow diagrams for the DSL Fulfillment example are divided into three flows representing three phases within Fulfillment: pre-sales, ordering and post-ordering. This is shown in the three Level 2 Process Flow diagrams (Figures 8.2a, 8.3a and 8.4a) below.

Here the Level 2 processes are shown with relative positioning similar to that in the eTOM framework, to assist understanding and to make the diagrams more intuitive.

Start points for the Fulfillment process are shown, and the interconnecting arrows indicate events or information linking the Level 2 processes.

This view can be developed further to indicate sequencing, and to imply involvement by different Level 3 processes within the indicated Level 2 process, as shown in Process Dynamics diagrams (e.g. Figure 8.2b). Here, a given Level 2 process may be shown several times to allow the sequencing of its involvement in the flow to be more clearly seen. Typically, different functionality is involved at each point for a given Level 2 process, so this is a step towards identification of the specific Level 3 process or processes within the Level 2 process which will support the interactions.

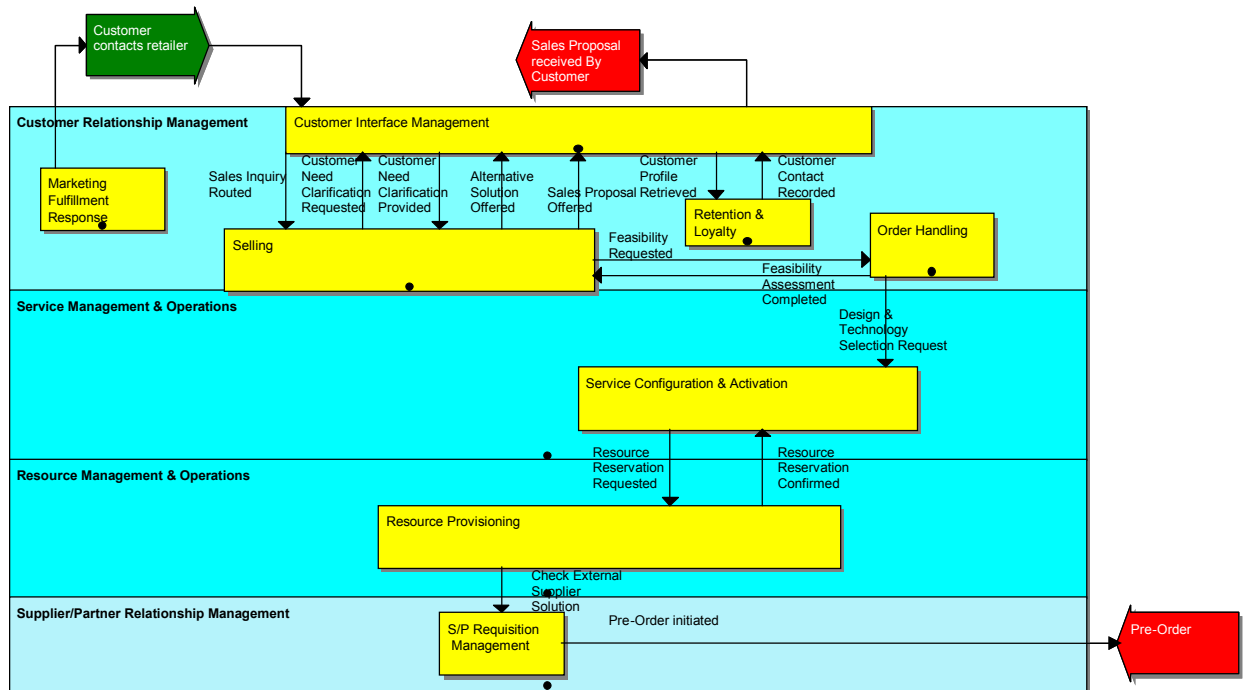


Figure 8.2a: Pre-Sales Level 2 Process Flow

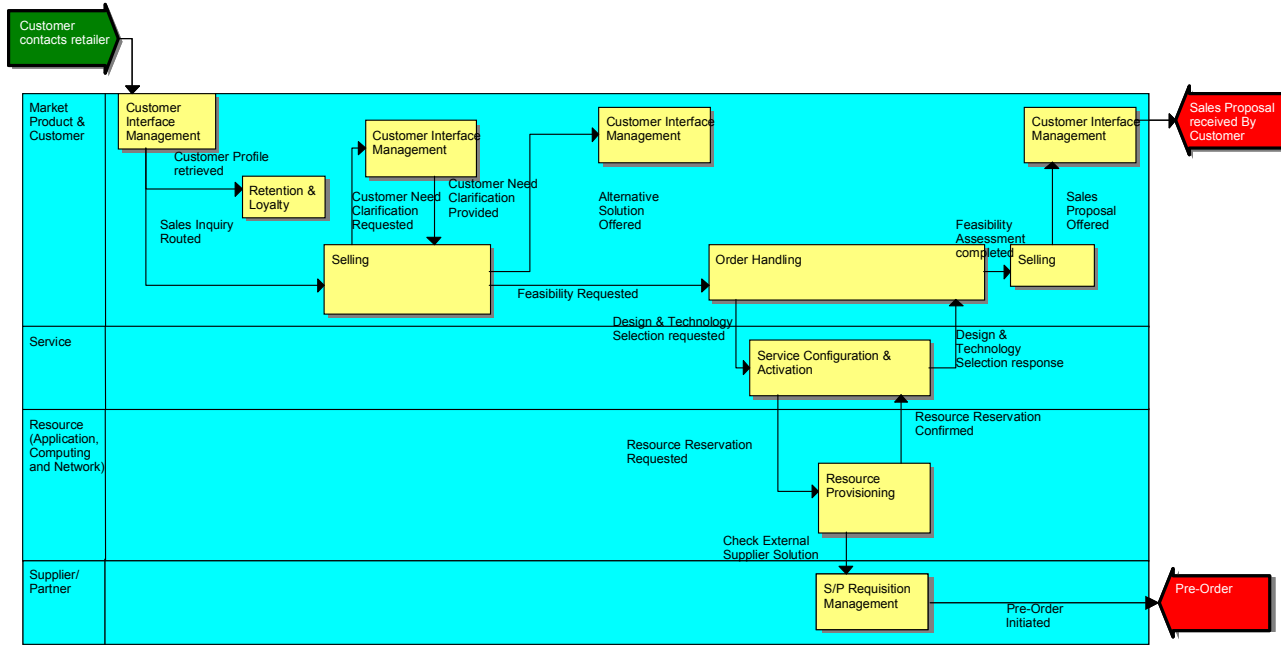


Figure 8.2b: Pre-Sales Process Dynamics Flow

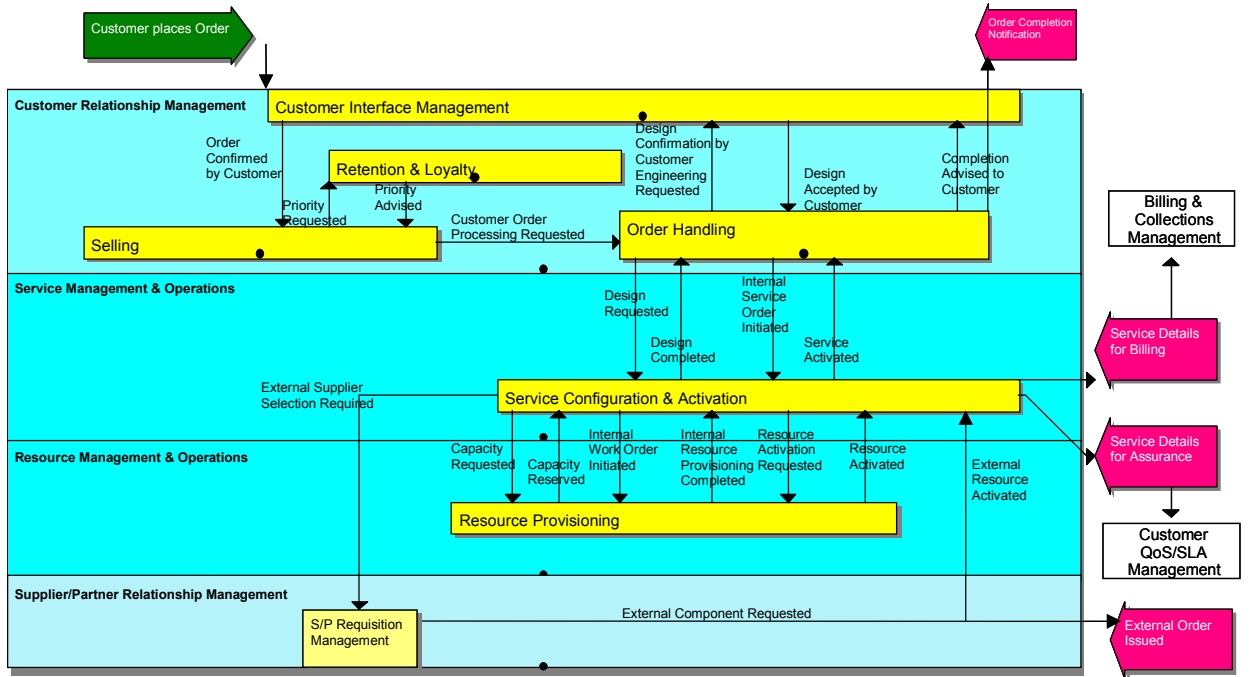


Figure 8.3a: Ordering Level 2 Process Flow

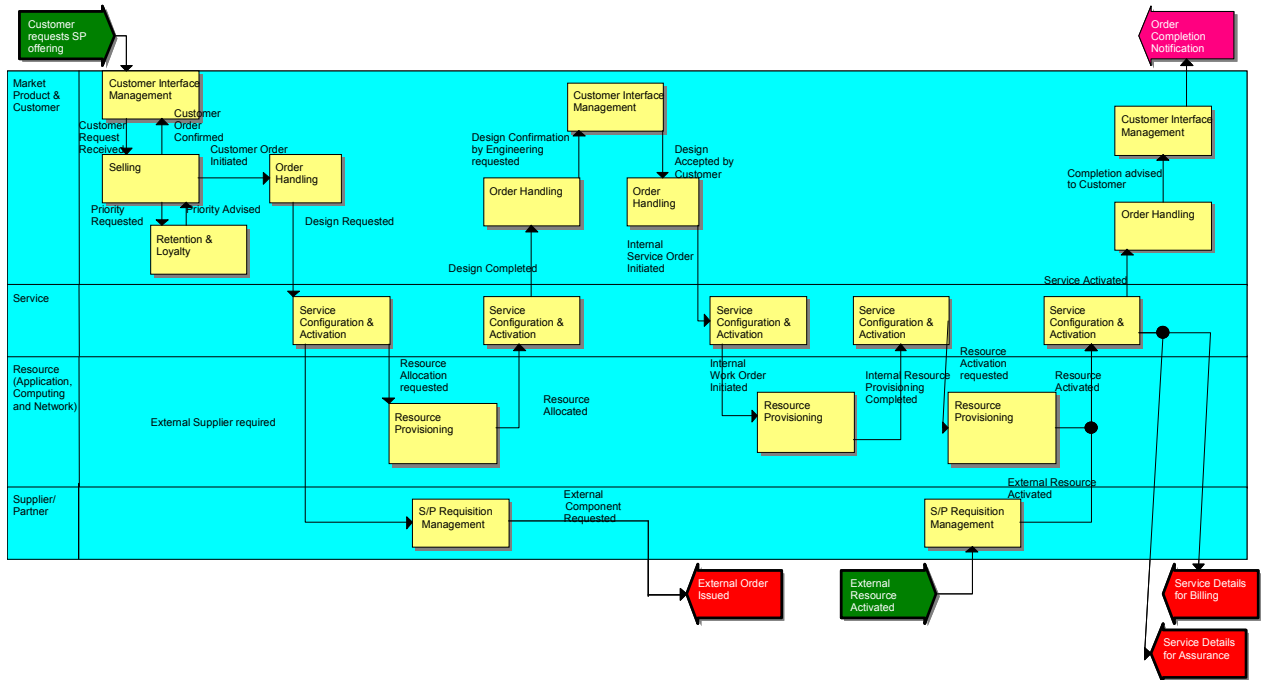


Figure 8.3b: Ordering Process Dynamics Flow

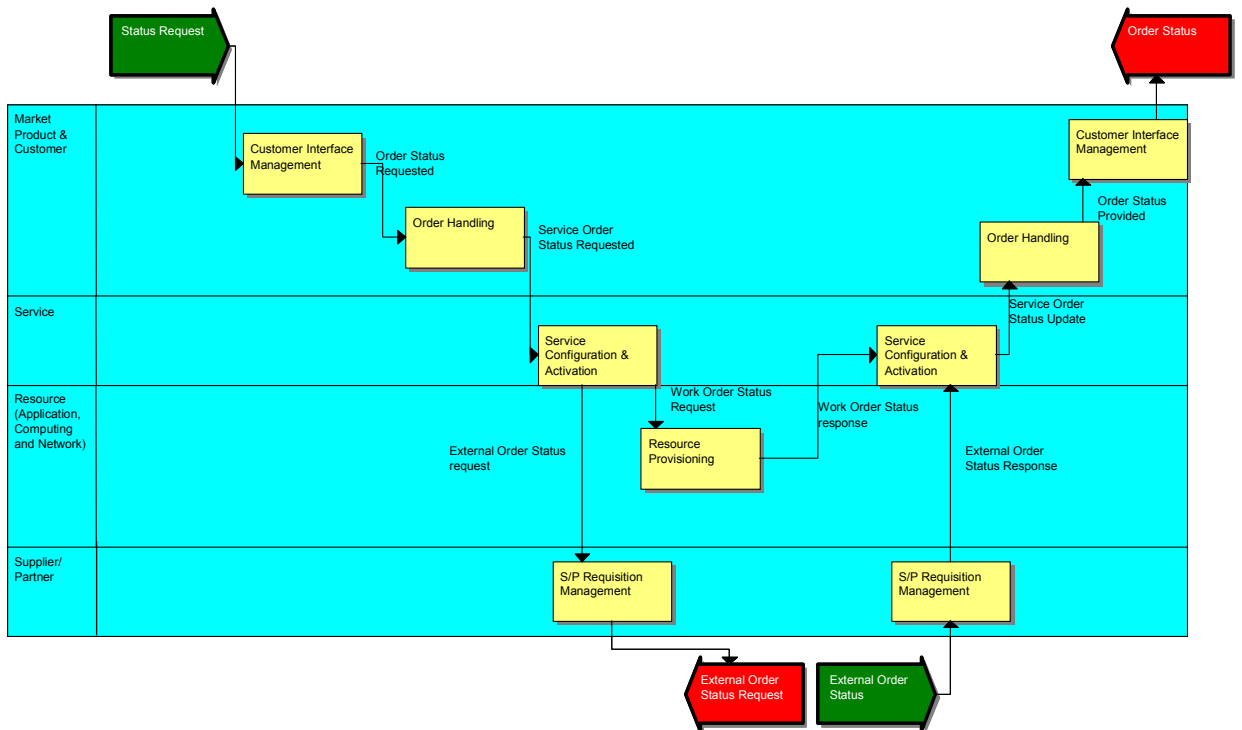


Figure 8.3c: Ordering Process Dynamics Flow: Status Updates

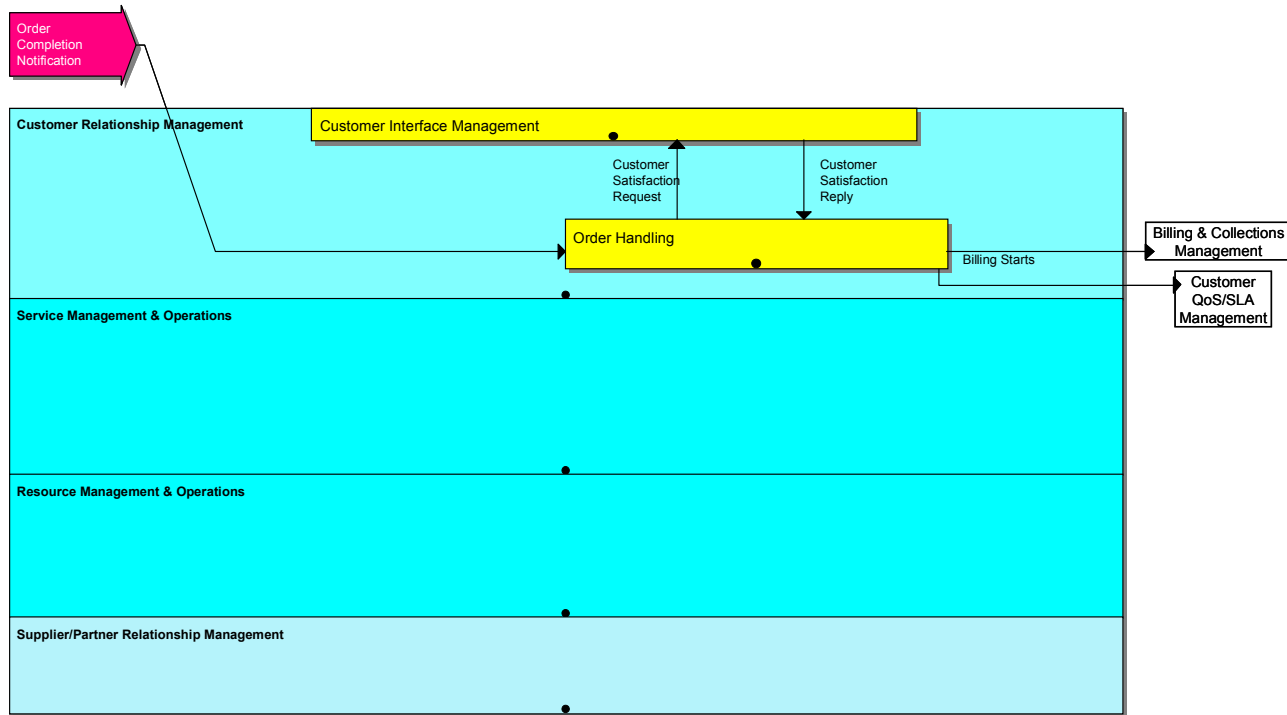


Figure 8.4a: Post-Ordering Level 2 Process Flow

13.7. PLM process flows

13.7.1. PLM Assumptions

Product Lifecycle Management encompasses the processes required for the definition, planning, design, build, delivery, maintenance, revision and retirement of all products in the enterprise's portfolio. They enable a Service Provider to manage products in relation to profit and loss margins, customer satisfaction and quality commitments.

PLM processes are end-to-end oriented processes that enable the enterprise strategic and business vision; they drive the core operations and customer processes to meet market demand and customer expectations.

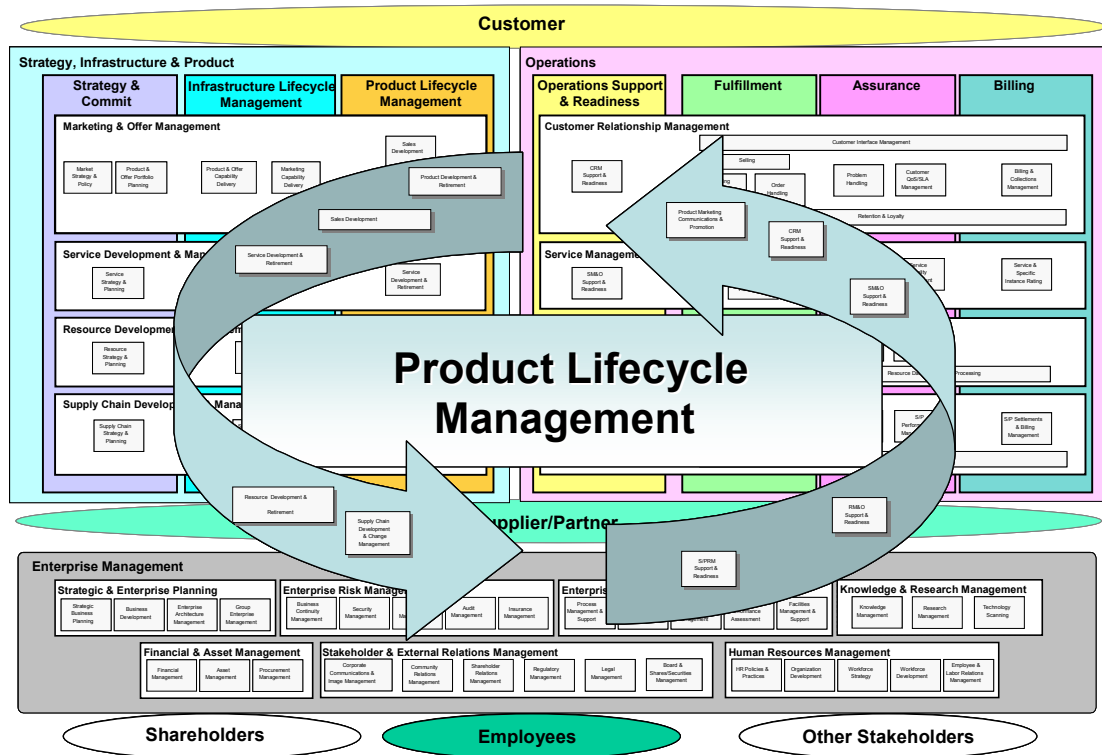


Figure 9.1: Scope of Product Lifecycle Management

PLM spreads across the whole enterprise; Figure 9.1 shows the scope of Product Lifecycle Management across the eTOM framework.

13.7.2. PLM Process Interactions

PLM processes are end-to-end processes that affect and have interactions with most entities in the enterprise. PLM process flows can be represented in many different ways depending on the use and the scope of application, and such interactions could become so dense that they could simply confuse. To simplify, Figure 9.2 selects an example of such process interactions in PLM; and the diagram depicts an extract of all the possible process flows from PLM. It should be noted that depicting the entire set of process interactions for PLM would require a significantly more complex diagram.

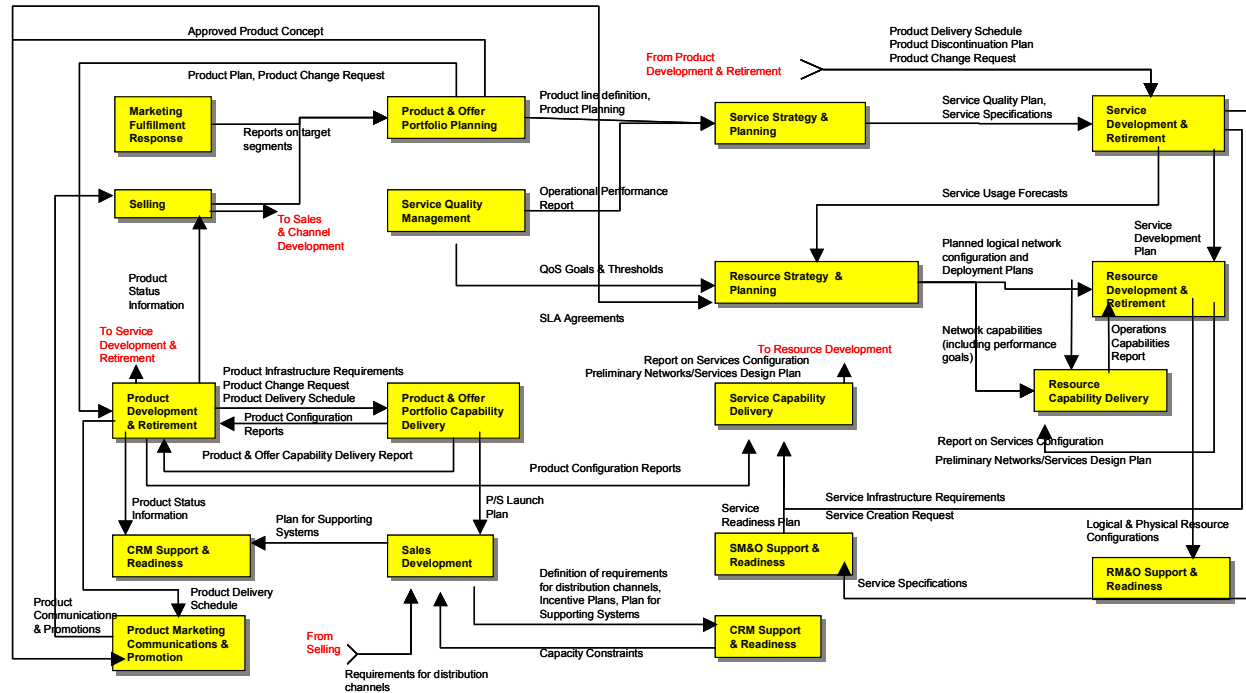


Figure 9.2: Example of PLM Process Interactions

To address this complexity, in the more general case, PLM processes could be organized according to different scope levels, for example, in terms of Core PLM, Strategic PLM, Operational PLM, E2E PLM, etc. as depicted in Figure 9.3.

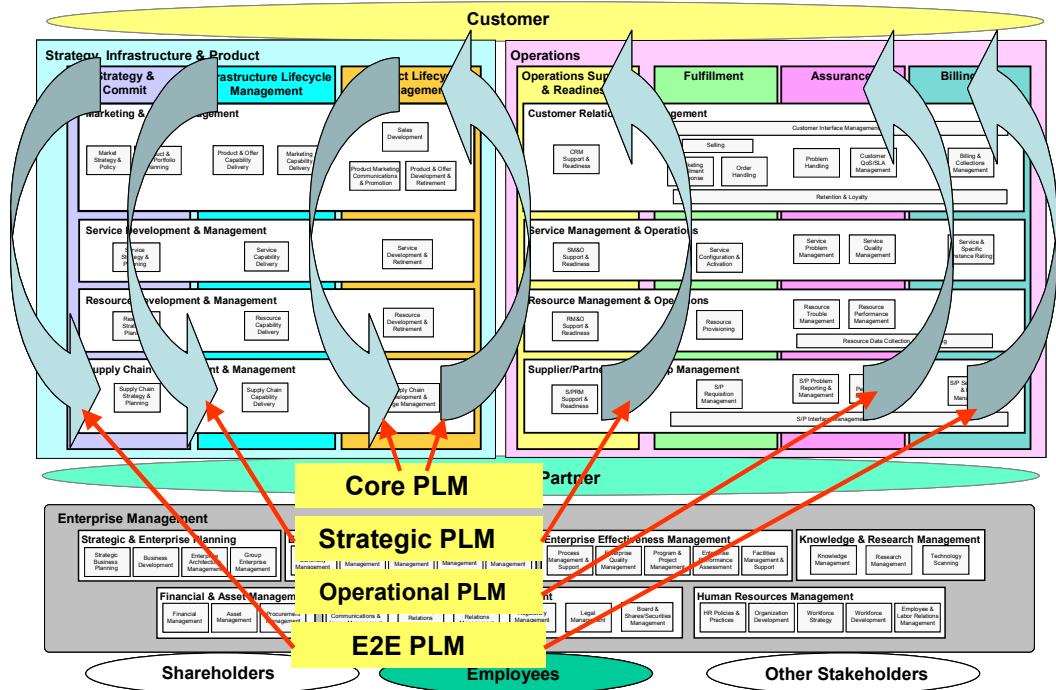


Figure 9.3: Different Scopes for PLM

13.7.3. Application of SIP Business Processes

In order to describe how the SIP (Strategy, Infrastructure and Product) business processes from the eTOM framework can be used in an actual environment, this example draws on the work of the Product Lifecycle Management (PLM) Catalyst project within the TM Forum's Catalyst program. This project illustrated how TM Forum NGOSS concepts and framework could be leveraged to dramatically improve the processes and systems for building and releasing new products, through the automatic linkage of appropriate product information to the right operations systems and information catalogs on the network side. It demonstrated integrated Product Lifecycle Management with established flow-through order processes, showing how product managers can effectively manage the product lifecycle from beginning to end, with a real-time capability to create, approve, release, distribute, order, fulfill, and bill for new services.

In support of this, the process flows included here show eTOM level 2 processes involved in PLM, with some aspects of relevant level 3 processes also included.

Approach

Based on a selected business scenario for PLM (see later), the relevant eTOM business processes have been identified. Additionally, business process KPIs and triggers have been defined to illustrate how these PLM scenario processes can be measured against their performance indicators.

In PLM a product can have one or more services and each service is supported by one or more resources. These and other rules were identified and mapped to corresponding eTOM business processes based on a commonality that determines the way business actions are executed whilst covering at the same time specific business requirements.

The results illustrate the effectiveness of the eTOM and related NGOSS work, such as SID, across all activities involved with the scope of the project, such as product, service, resource and supply chain planning, specification, development, test and delivery to the operations environment, using product and service bundle concepts. The insights gained on the SIP (Strategy, Infrastructure and Product) area of the eTOM framework have been used to feedback into the ongoing eTOM work.

13.7.4. PLM Process Flows

In order to define the business process flows across the SIP and Operations areas, a scenario with the following issues has been considered:

There are products and service bundles made of components that can be accessed at any time and reused to further define and build new products and services. A product manager can then generate ideas from the analysis of current product and service bundles. These aspects are covered by SM&O Readiness processes that also support Manage Service Inventory processes.

The new product proposal is then submitted for approval by the product manager. Once approved, the development project for the new product and related services and resources starts. The primary processes that support this project are: Product & Offer Portfolio Planning, Product Marketing Communications & Promotion, Product & Offer Development & Retirement, Service Strategy & Planning, Service Development & Retirement, Resource Development & Retirement, Product & Offer Capability Delivery, Service Capability Delivery and Resource Capability Delivery.

Once the new product with its associated services and resources is developed, tested and accepted, all of its configuration information including pricing rules and promotions are transferred to the Operations area through the Product Development & Retirement, Service Development & Retirement, and Resource Development & Retirement processes respectively. The configuration information is then transferred to the Manage Service Inventory and Manage Resource Inventory processes, which are part of the SM&O Support & Readiness and RM&O Support & Readiness processes respectively. Additionally, CRM Support & Readiness processes provide all of the necessary updates to support the new product as well as its marketing campaign and billing.

Customer Interface Management, Selling, Service & Specific Instance Rating and Billing & Collections Management processes create or update the necessary information to offer the new product and services to the market. This includes price, billing, discount and other parameters and rules.

The customer requests the new product through a call center, sales channel or self-provisioning via the Customer Interface Management and Selling processes. In order to fulfill the order and deliver the requested product, the following business processes are involved: Order Handling, Billing & Collections Management, SM&O Support & Readiness, Service Configuration & Activation, Service & Specific Instance Rating, RM&O Support & Readiness, and Resource Provisioning.

The customer invoice related to the new product and services is generated; the processes that support the business flows here are: Customer Interface Management, Billing & Collections Management, CRM Support & Readiness, Service & Specific Instance Rating, and Resource Data Collection & Processing.

If the customer later on requests a change in the new product, the following business processes will be involved: Customer Interface Management, Selling, Order Handling, Billing & Collections Management, SM&O Support & Readiness, Service Configuration & Activation, RM&O Support & Readiness, and Resource Provisioning.

The business process flows that support the above-described scenario are shown in Figures 9.4 and 9.5 below. Figure 9.4 describes the product manager accessing the product and service bundles inventory when envisioning a new product and/or service based on the components of existing ones; then further actions are described in order to obtain approval for a new product development project. Figure 9.5 depicts the process flows involved with product development after approval has been granted from the product manager or a higher executive committee. The business process flows described represent a change request received from a customer requiring the new product and/or service.

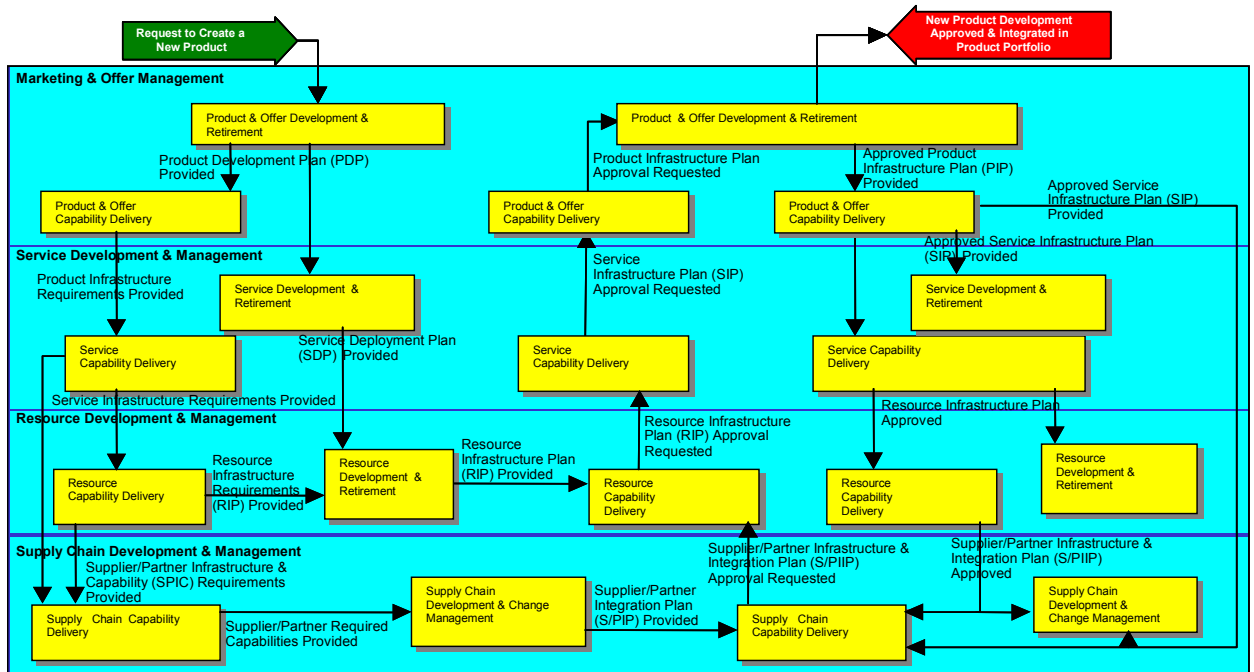


Figure 9.4: Approve the Development of a New Product (pre-approval)

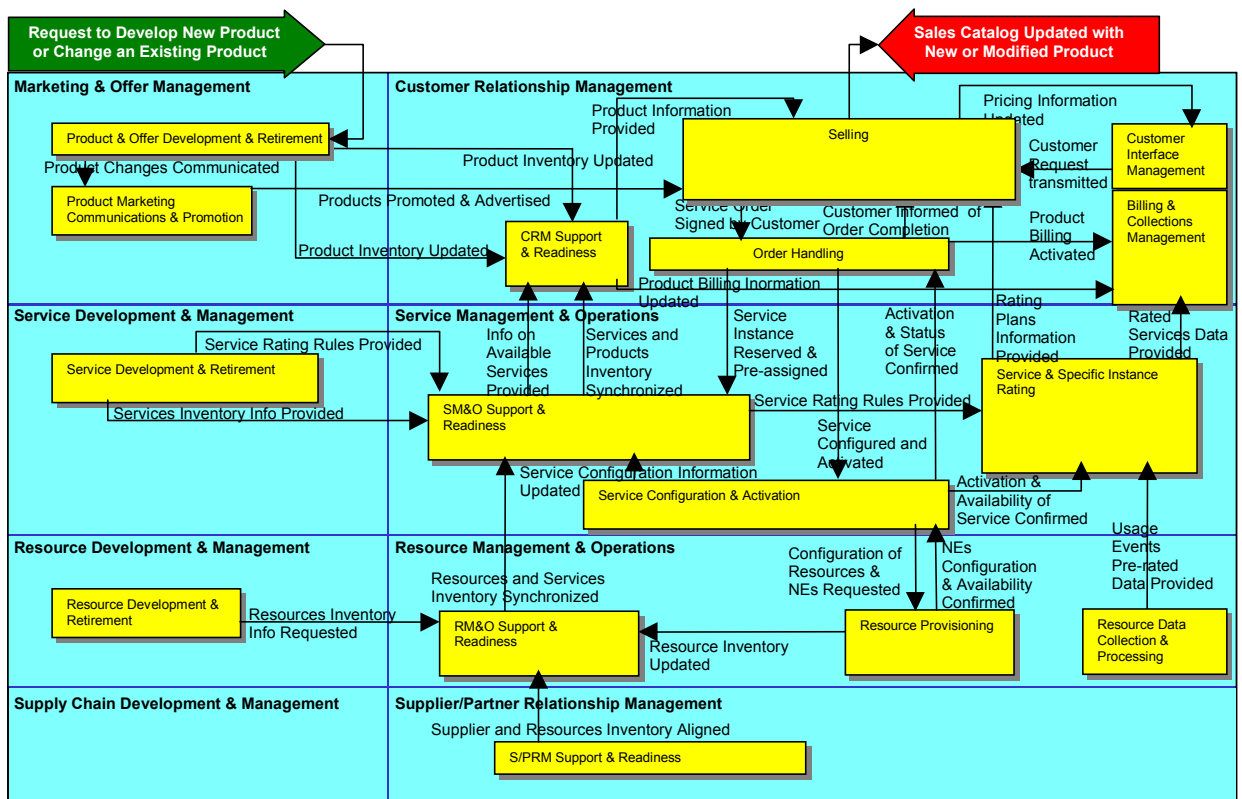


Figure 9.5: Develop New Product or Modify an Existing One (post-approval)

13.8. SLA process flows

13.8.1. SLA Assumptions

The SLA process flows depicted here have their origins in the *SLA Management Handbook* [ref F1] where a set of use case scenarios and TOM process flows were depicted in order to illustrate the interactions between the TOM processes involved in SLA management. In a liaison between the SLA Management Team and the eTOM Team, the TOM flows have been updated to eTOM process flows for version 2.0 of the SLA Management Handbook. A subset of these flows is provided in this chapter.

The lifecycle of an SLA is analyzed in the following five phases as shown in Figure 10.1.

- Product/Service Development
- Negotiation and Sales
- Implementation
- Execution
- Assessment

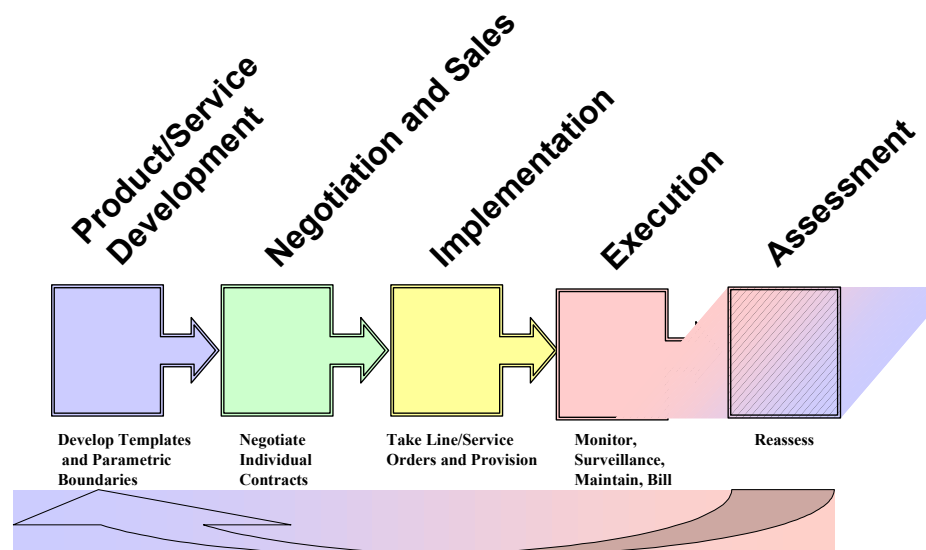


Figure 10.1: Product/Service and Associated SLA Lifecycle

Scenarios were selected to illustrate the process flows required to support the above SLA lifecycle phases. They were not intended to be prescriptive but were provided as one possible approach to the process flows involved in SLA management. The scenarios originally selected have not been changed for the eTOM flows except where it was thought necessary or desirable in the light of experience with the original flows and with the different scope of eTOM compared to TOM. This is evident, for example, in the fact that there were no processes for supplier/partner relationships in TOM, and so the original scenarios did not include such processes. In one of the flows depicted here, a relationship with a third party service provider has been included in order to show how supplier/partner processes can be used. Clearly, such relationships can be included in other flows, but the first step was to adapt the TOM flows to eTOM flows and then to exploit the wider scope of the eTOM framework as required.

Another point on which work within the TM Forum has progressed is in the clarification of the relationship between product and service, and the greater emphasis on marketing processes in the Service Provider enterprise. Although a product can consist of several services, the scenarios here retain the approach of the original flows in that a product consists of one service. In further work in this area, it would be desirable to coordinate the performance of several services comprising a product and to examine the flows required for the management of SLAs for such products, as well as between several service providers in a value chain.

The original TOM flows were designed to be generic as the focus was on SLA management and not on any specific implementation of a service, and this is also the case in the eTOM flows. Again, it would be desirable to examine this approach given the different kinds of service now available, particularly in the mobile environment, and the work being undertaken in this area by the TM Forum.

The process flows selected here are those for Stages 4 and 5 of the SLA lifecycle, i.e. the Execution and Assessment phases. The scenarios originally selected for these two phases are shown here, first as interaction diagrams and then as eTOM process flows. As with the TOM process flows, these flows are provided as examples depicting illustrative approaches to aspects of SLA management in the two lifecycle phases.

13.8.2. SLA Process Interactions

The process interactions are first shown as high-level linkages in the eTOM model. They are categorized as Normal Execution, Execution with SLA Violation, and Assessment.

Normal Execution

The Execution phase covers all normal operations of the service instances covered by the SLA.

Figure 10.2 presents normal in-service execution and monitoring where performance data is collected from resources and analyzed for resource performance, then for overall service quality, and finally checked against the customer SLA. In this case, a third party service provider is involved and performance data from the external service components is included in the service quality analysis. In addition, a billing flow was added to show how both internal usage data as well as data from the third party service provider is incorporated into the customer bill. All of these interactions occur in the Assurance process grouping for the resource performance and service quality analysis interactions and in the Billing process grouping for the billing interactions.

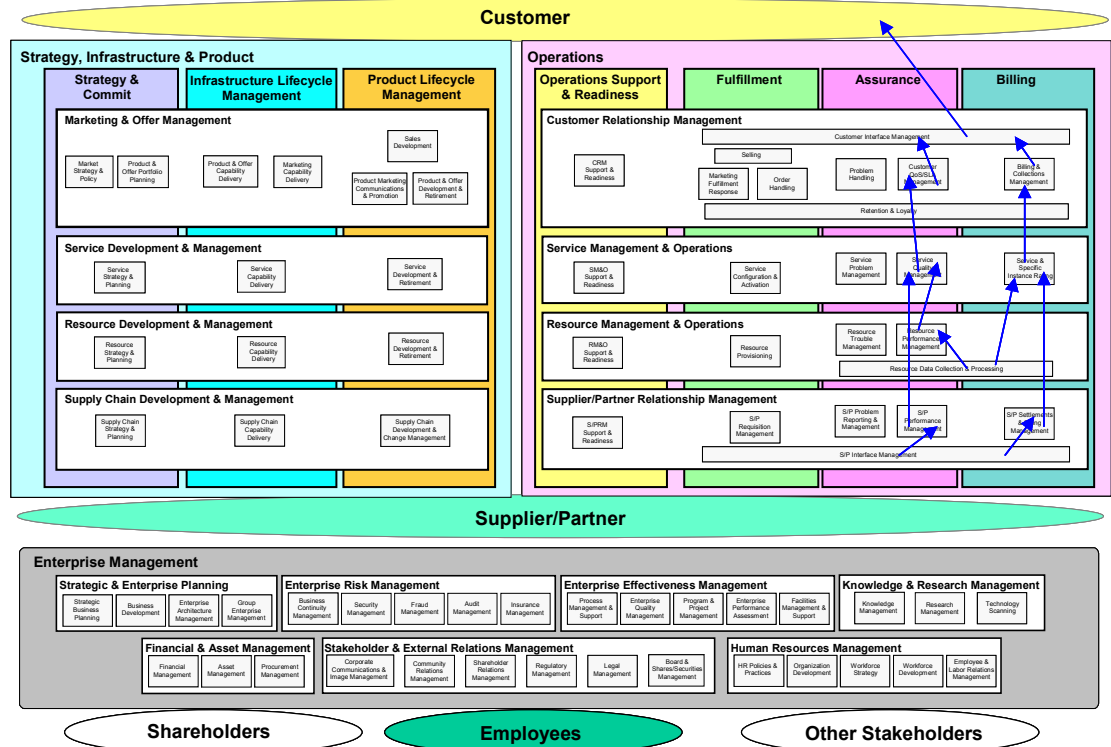


Figure 10.2: Normal Execution of SLA Service
Case A: Performance Data during Normal Operation

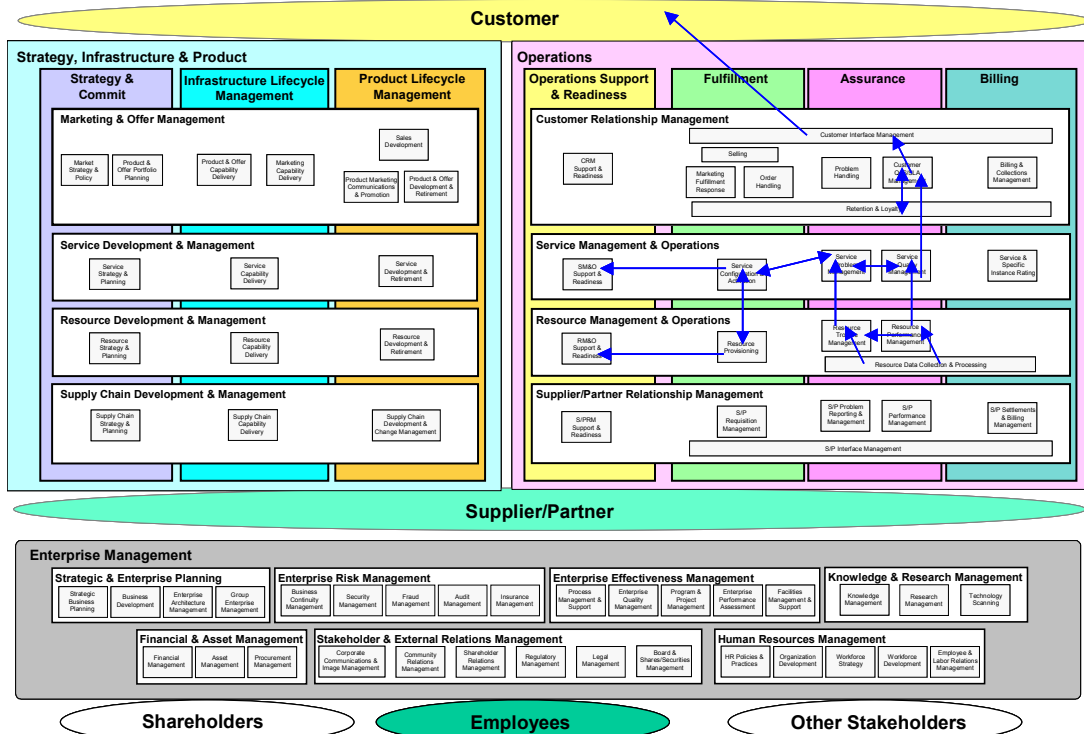


Figure 10.3: Normal Execution of SLA Service
Cases B and C: Threshold Crossing Alerts and Resource Failure Alarms

Figure 10.3 illustrates the case where threshold crossing alerts and resource failure alarms are reported and have to be rectified. However, after checking against the customer SLA it is established that no SLA violation has occurred. Most of these interactions occur in the Assurance process grouping, but interactions also take place with the Fulfillment and OSR process groupings.

Execution with SLA Violation

Figure 10.4 shows the operation of the service where real-time SLA violation handling is required. In this case, the customer reports a problem that is rectified but which leads to a violation of the customer SLA so that a Billing rebate is given. In this case, there is interaction between the Assurance and Billing process groupings, but interactions also take place with the Fulfillment and OSR process groupings.

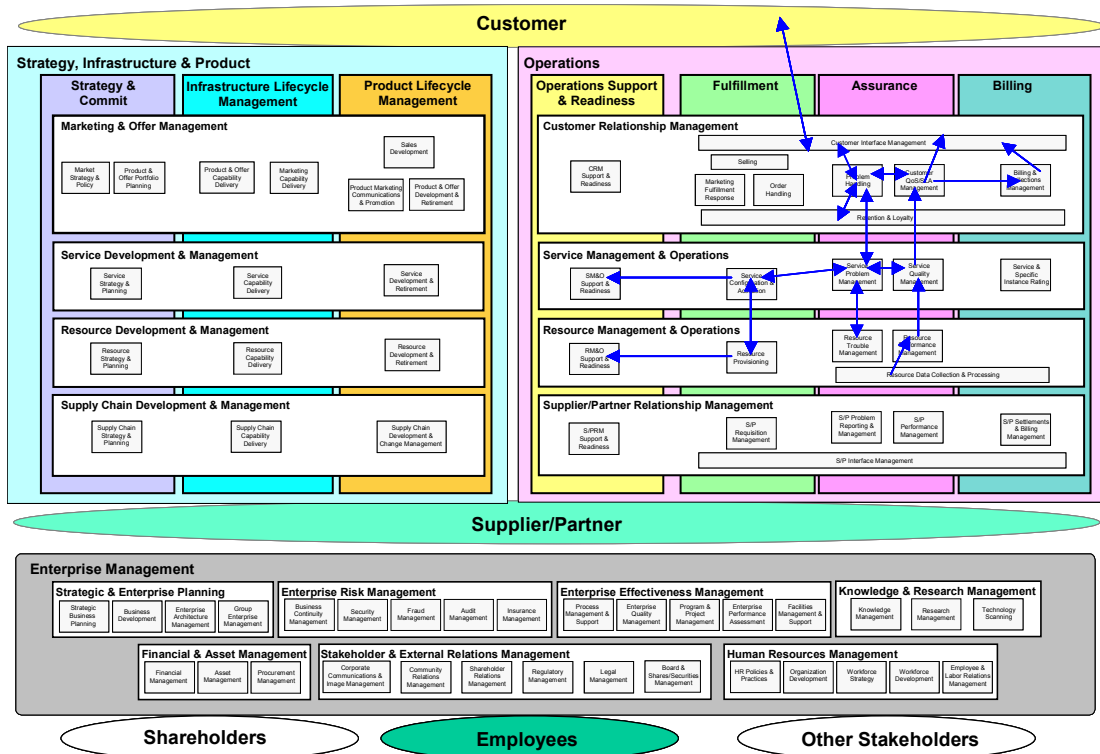


Figure 10.4: Customer Detected SLA Violation

Assessment

The Assessment phase can relate to a single customer SLA and the QoS required, or it can be related to the Service Provider's overall quality goals, objectives and risk management.

Figure 4.5 represents the case where the customer needs have changed and there is no SLA to meet these needs. The interactions occur in the Market, Product and Customer layer and involve not just Operations process groupings but also Product Lifecycle Management process groupings.

Figure 4.6 depicts the process interactions relating to the internal business review concerning the overall SLA performance across all customers as well as a realignment of service operations and service goals to improve overall service class performance. The process interactions here occur among the Assurance process groupings as well as among the OSR process groupings.

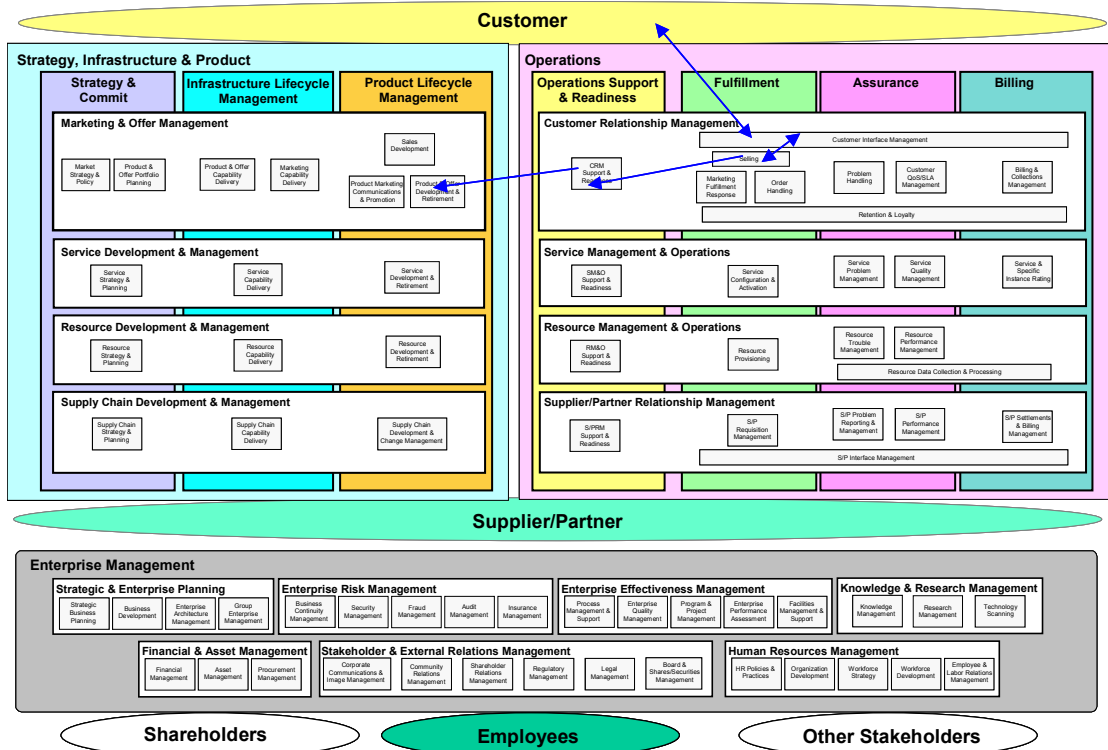


Figure 10.5 Assessment Initiation
Case A: Customer Needs Have Changed

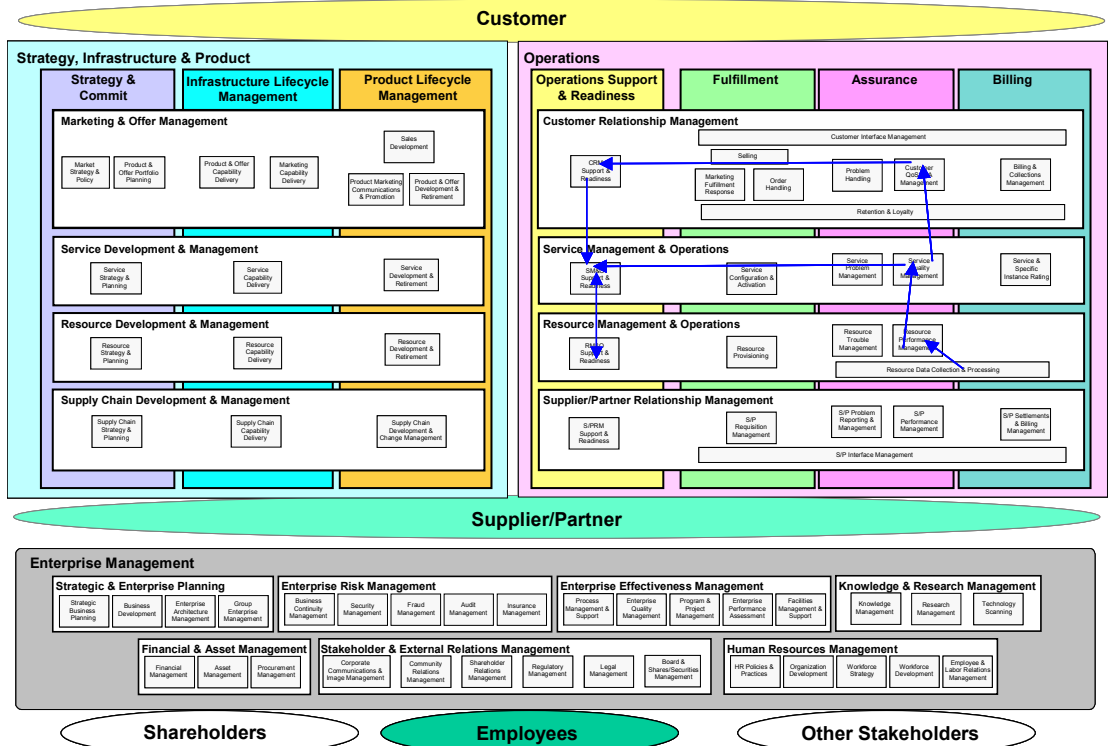


Figure 10.6 Assessment Initiation
Cases B and C: Internal Assessments at the Customer and Service Layers

13.8.3. SLA Process Flows

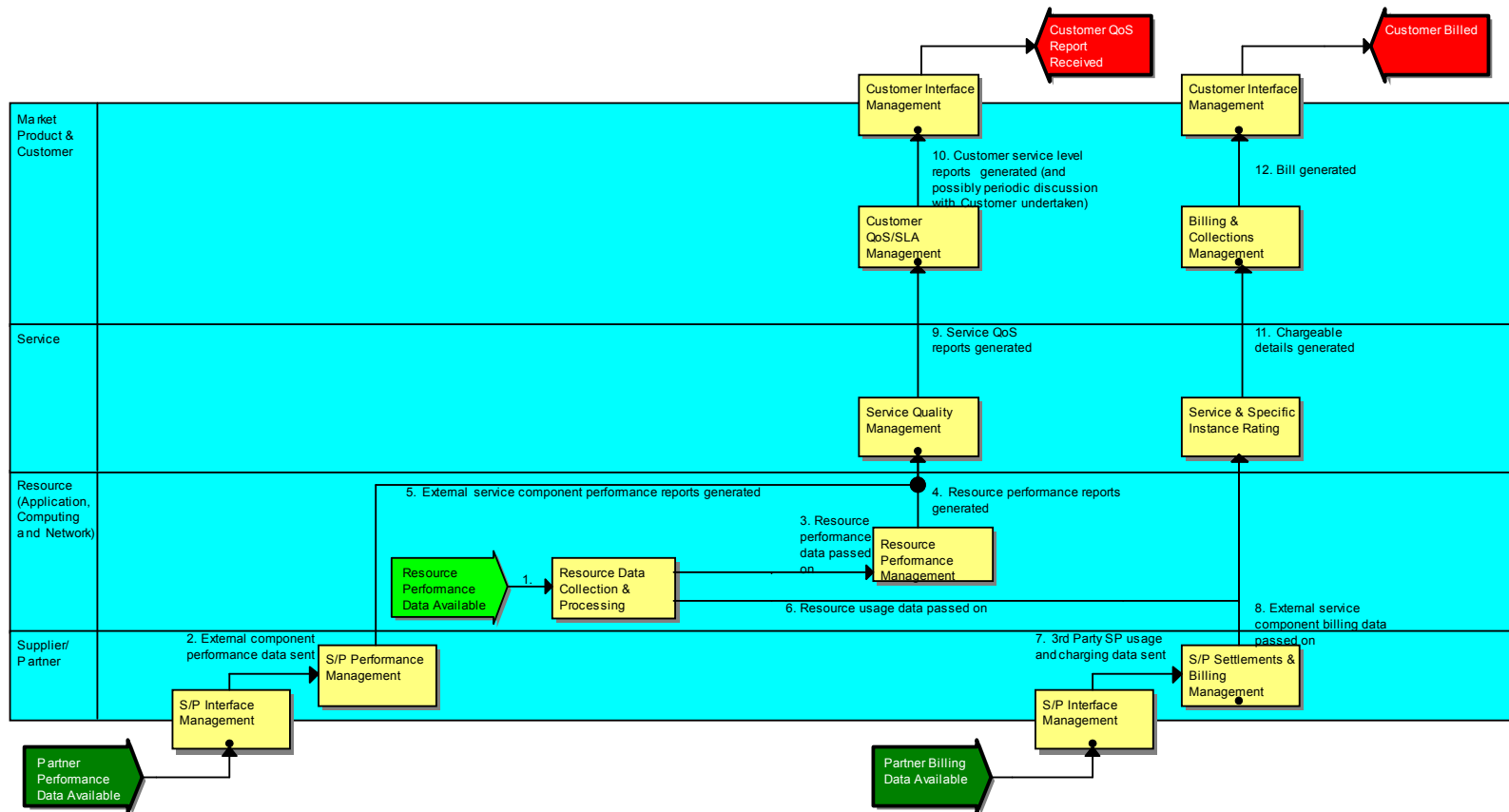
The process flows presented here are based on the process interactions between the Level 2 processes shown in the interaction diagrams and provide more detail of the processes involved and the actions undertaken for each of the scenarios depicted.

Normal Execution

Normal execution, also known as steady state, is the phase where the customer receives service on all the contracted and instantiated service instances. This section first analyzes in Case A a situation where no outages or other alerts occur and the customer is billed for the service used (Figure 10.7). It then analyzes in Cases B and C the situation where, although outages occur, no outage exceeds either the individual or aggregated parameters set in the SLA (Figures 10.8 and 10.9). In the first case of normal operation, a supplier/partner is also involved; in the second case the outages are within the Service Provider enterprise and so do not involve a supplier/partner.

The steps shown in Figure 10.7 for Case A are as follows:

1. During normal operation, performance data that is used for general monitoring of service levels as well as for longer-term capacity prediction is collected on an ongoing basis from the service-providing infrastructure by *Resource Data Collection & Processing*.
2. During normal operation, performance data from external service components of third party service providers is sent on an ongoing basis to *S/P Performance Management* for general monitoring of service levels, as well as for longer-term supplier/partner capacity prediction.
3. *Resource Data Collection & Processing* sends performance data to *Resource Performance Management* for further analysis.
4. *Resource Performance Management* sends resource performance reports to *Service Quality Management* for QoS calculations and averaging to maintain statistical data on the supplied service instances.
5. *S/P Performance Management* sends external service component performance reports to *Service Quality Management* for QoS calculations and averaging to maintain statistical data on the supplied service instances.



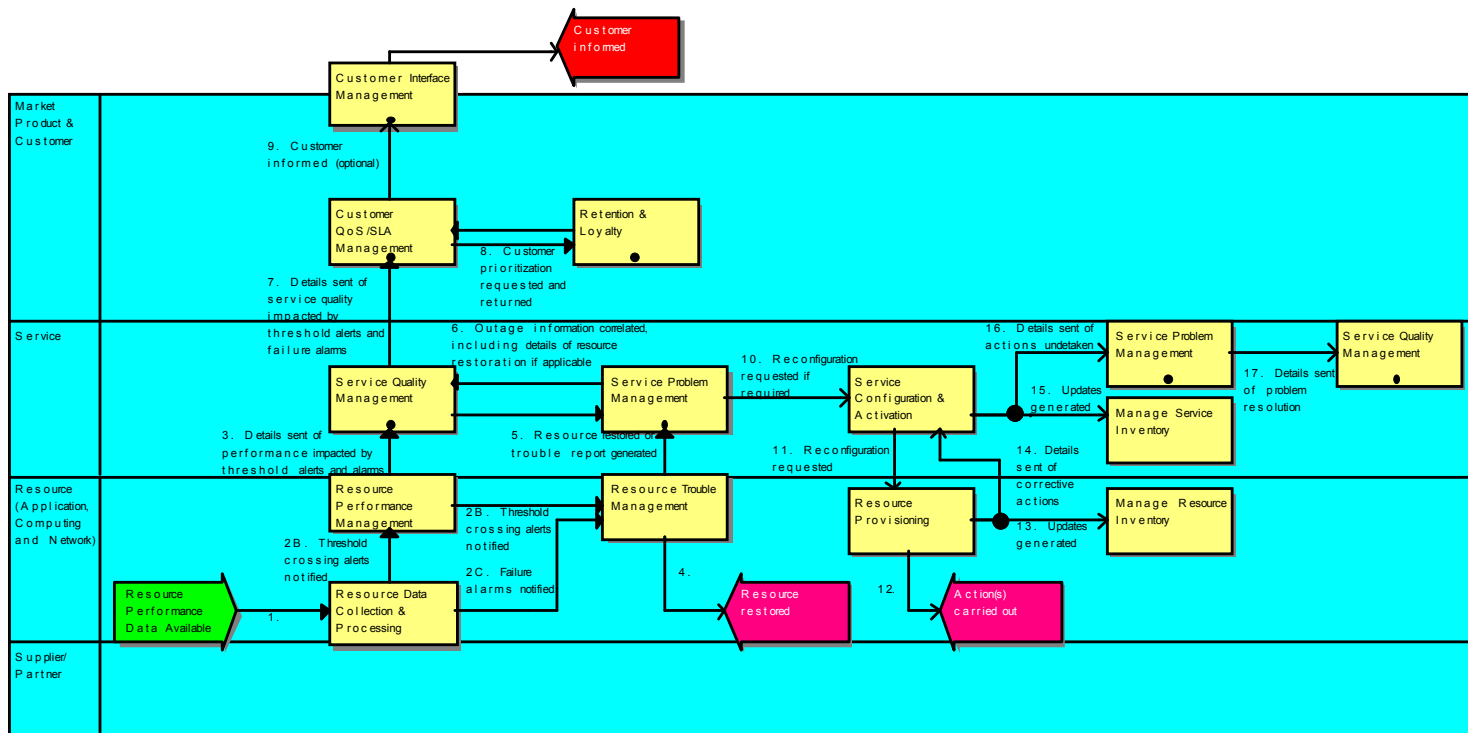
**Figure 10.7: Normal Execution of SLA Service
 Case A: Performance Data during Normal Operation**

6. *Resource Data Collection & Processing* sends resource usage data to *Service & Specific Instance Rating* for rating service usage.
7. Third party service providers send their usage and charging data to *S/P Settlements & Billing Management*.
8. *S/P Settlements & Billing Management* analyzes the data and passes it on to *Service & Specific Instance Rating* for rating service usage.
9. *Service Quality Management* analyzes the performance reports received and sends overall service quality reports to *Customer QoS/SLA Management* so that it can monitor and report aggregate technology and service performance.

10. *Customer QoS/SLA Management* checks the service quality reports it receives against the individual customer SLA and establishes that no SLA violation has occurred. *Customer QoS/SLA Management* sends periodic service level reports to the customer on either a requested or agreed basis.
11. *Service & Specific Instance Rating* sends charging details to *Billing & Collections Management*.
12. *Billing & Collections Management* generates bills for the customer on either a requested or agreed basis.

The steps shown in Figure 10.8 and 10.9 for Cases B and C are as follows:

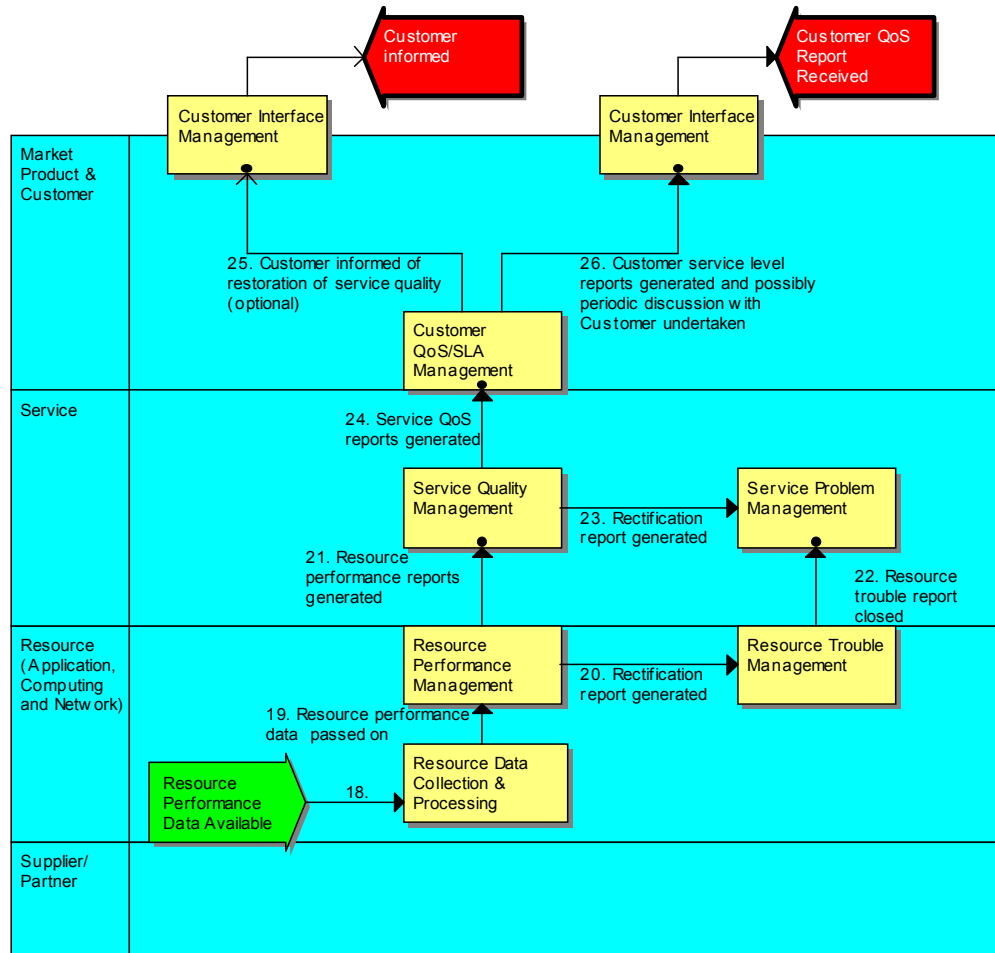
1. Notifications are collected from the service-providing infrastructure by *Resource Data Collection & Processing* on an ongoing basis. In Cases B and C these notifications are in the form of:
 - 2B. Threshold Crossing Alerts that represent congestion or performance degradation in a congestable resource that leads to slowed or diminished capacity to support customer services. *Resource Data Collection & Processing* sends all performance data to *Resource Performance Management*, which identifies a resource performance problem and requests *Resource Trouble Management* to discover the cause of the alert and possible impact on service performance.
 - 2C. Alarms that represent the failure of a component that affects the service of one or more customers. *Resource Data Collection & Processing* sends data on alarms to *Resource Trouble Management* for further action.
3. *Resource Performance Management* sends details of the Threshold Crossing Alerts to *Service Quality Management* so that various notifications and other steps may be taken to ensure that required service KQI levels are maintained.
- 4/5. Depending on the nature of the problem, *Resource Trouble Management* either triggers automatic resource restoration procedures itself and informs *Service Problem Management* of its actions, or it raises alarm reports to *Service Problem Management*, indicating the time and potential duration of any outage to allow *Service Problem Management* to determine potential alternate actions to minimize service impact.
6. *Service Problem Management* and *Service Quality Management* correlate their information about the problem.
7. *Service Quality Management* sends details of the service impact of Threshold Crossing Alerts and Alarms to *Customer QoS/SLA Management*.
8. *Customer QoS/SLA Management* checks the customer SLA and obtains information on the significance of the customer from *Retention & Loyalty*. It undertakes various notifications and other steps in order to prevent customer SLAs from being violated, e.g. clocks started, tracking initiated.



**Figure 10.8: Normal Execution of SLA Service
Cases B and C: Threshold Crossing Alerts and Resource Failure Alarms. Steps 1 to 17**

9. *Customer QoS/SLA Management* may inform the customer of the QoS degradation, depending on the significance of the customer and the extent of the degradation.
10. If *Resource Trouble Management* has not been able to trigger automatic resource restoration, *Service Problem Management* requests *Service Configuration & Activation* to undertake the required corrective actions. (Steps 10 to 17 are therefore only carried out if automatic resource restoration did not take place).
11. As the problems have been notified in the resource layer, *Service Configuration & Activation* will require changes to be made to the underlying infrastructure per contractual agreements. This requirement is sent to *Resource Provisioning* for activation.
12. *Resource Provisioning* undertakes the required resource configuration changes to ensure that resources meet service KQIs.
13. *Resource Provisioning* generates updates for *Manage Resource Inventory*.

14. *Resource Provisioning* reports the results of the changes as well as the time taken and all other infrastructure and operational parameters to *Service Configuration & Activation*.
15. *Service Configuration & Activation* generates updates for *Manage Service Inventory*.
16. *Service Configuration & Activation* reports on the actions undertaken to *Service Problem Management*.



**Figure 10.9: Normal Execution of SLA Service:
 Cases B and C: Threshold Crossing Alerts and Resource Failure Alarms. Steps 18 to 26**

17. *Service Problem Management* sends details of the corrective actions to *Service Quality Management* for incorporation into ongoing service quality monitoring and management.
18. Notifications and performance data are collected from the service-providing infrastructure by *Resource Data Collection & Processing*.
19. *Resource Data Collection & Processing* sends performance data to *Resource Performance Management* for further analysis.
20. *Resource Performance Management* establishes that the resources are meeting their KPIs and informs *Resource Trouble Management* that the trouble has been rectified.
21. *Resource Performance Management* sends resource performance reports to *Service Quality Management* for QoS calculations and averaging to maintain statistical data on the supplied service.
22. *Resource Trouble Management* informs *Service Problem Management* of the closed resource trouble report.
23. *Service Quality Management* analyzes the resource performance reports and sends a rectification report to *Service Problem Management* when it is established that the troubles causing the Threshold Crossing Alerts or Alarms have been resolved and that the service is meeting its KQIs.
24. *Service Quality Management* sends overall service quality reports to *Customer QoS/SLA Management* so that it can monitor and report aggregate technology and service performance.
25. *Customer QoS/SLA Management* checks the service quality reports it receives against the customer SLA and establishes that no SLA violation has occurred. It may inform the customer of the quality restoration, depending on the significance of the customer and the extent of the degradation.
26. *Customer QoS/SLA Management* sends periodic Service Performance reports to the customer on either a requested or agreed basis.

Execution with SLA Violation

From time to time, service conditions will exceed the parameters specified in the SLA. At least two cases need to be examined, one where the Service Provider detects the outage first, and one where the customer detects and reports it first. The second case is depicted in Figures 10.10 and 10.11.

The steps shown in Figures 10.10 and 10.11 are as follows:

1. The customer perceives service degradation and reports the visible parameters to *Problem Handling*.

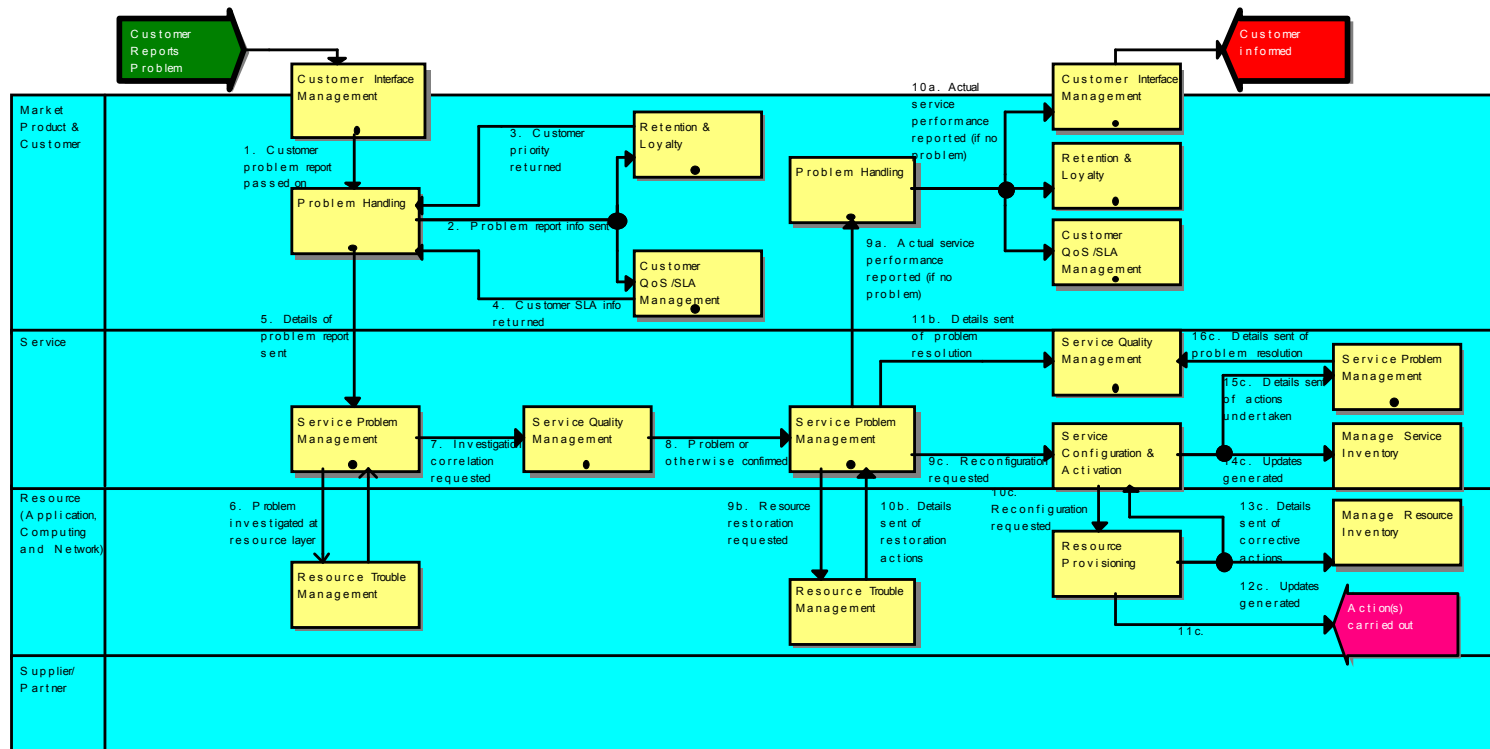


Figure 10.10: Customer Detected SLA Violation. Steps 1 to 16d

2. *Problem Handling* sends details of the problem as reported by the customer to *Customer QoS/SLA Management* and *Retention & Loyalty*.
3. *Retention & Loyalty* returns information to *Problem Handling* on the significance of the customer.
4. *Customer QoS/SLA Management* checks the customer SLA and undertakes various steps for tracking the problem in order to prevent the customer SLA from being violated, e.g. clocks started, tracking initiated. It determines potential priorities or other actions depending on the type of customer SLA and informs *Problem Handling*.
5. *Problem Handling* sends a detailed problem report with contract commitment data and request prioritization to *Service Problem Management* for normal flow handling.
8. 6/7. *Service Problem Management* investigates whether there is a problem, possibly engaging *Resource Trouble Management* for further investigation, and then requests *Service Quality Management* to correlate its findings. *Service Quality Management*

either confirms the trouble report or, if no problem is noted, returns the actual service performance to *Service Problem Management*.

Service Problem Management then carries out one of the three following alternatives:

Alternative a

9a. If there is no problem, *Service Problem Management* sends the actual service performance to *Problem Handling*.

10a. *Problem Handling* informs the customer of the actual service performance *as well as Retention & Loyalty* for future reference and *Customer QoS/SLA Management* so that any steps initiated can be terminated.

This flow alternative then terminates.

Alternative b

9b. In some cases, *Service Problem Management* requests automatic resource restoration procedures from *Resource Trouble Management*.

10b. *Resource Trouble Management* undertakes the required procedures and sends details of the actions to *Service Problem Management*.

11b. *Service Problem Management* informs *Service Quality Management* of the corrective actions.

The flow continues at step 17.

Alternative c

9c. In other cases, *Service Problem Management* requests *Service Configuration & Activation* to undertake the required corrective actions.

10c. *Service Configuration & Activation* will require changes to be made to the underlying infrastructure per contractual agreements. This requirement will be sent to *Resource Provisioning* for activation.

11c. *Resource Provisioning* undertakes the required resource configuration changes to ensure that resources meet service KQIs.

12c. *Resource Provisioning* generates updates for *Manage Resource Inventory*.

13c. *Resource Provisioning* reports the results of the changes as well as the time taken and all other infrastructure and operational parameters to *Service Configuration & Activation*.

- 14c. *Service Configuration & Activation* generates updates for *Manage Service Inventory*.
- 15c. *Service Configuration & Activation* reports on the actions undertaken to *Service Problem Management*.
- 16c. *Service Problem Management* sends details of the corrective actions to *Service Quality Management* for incorporation into ongoing service quality monitoring and management.

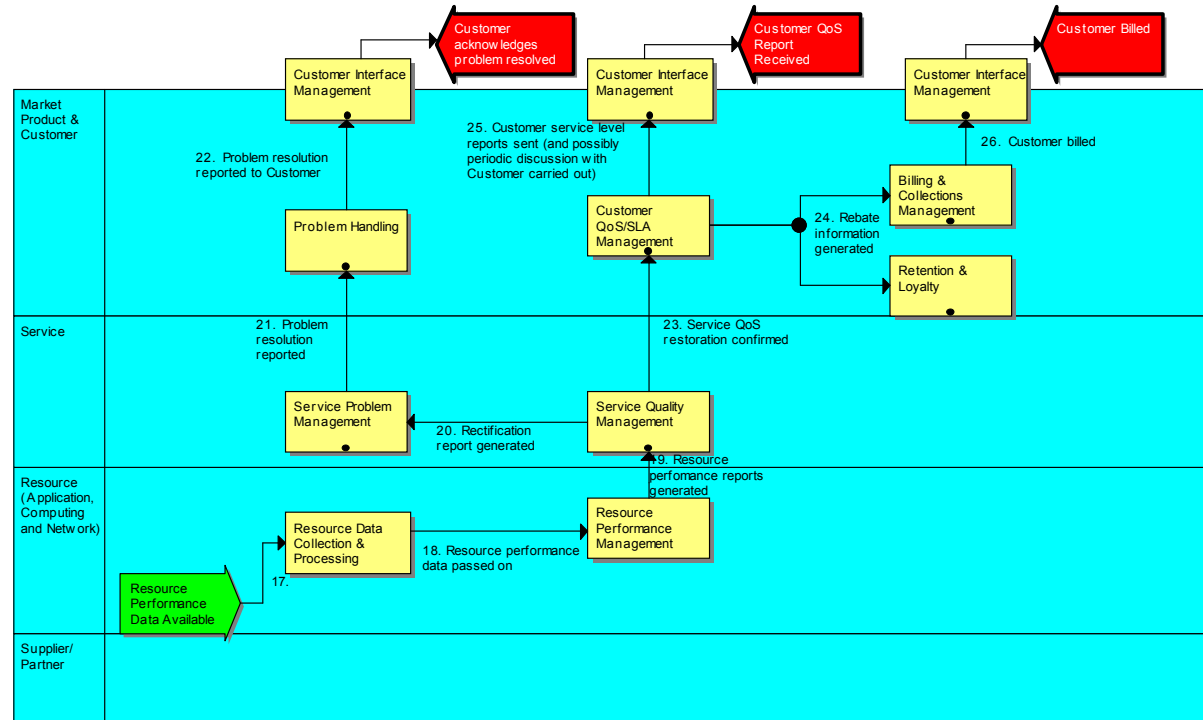


Figure 10.11: Customer Detected SLA Violation. Steps 17 to 26

- 17. Notifications and performance data are collected from the service-providing infrastructure by *Resource Data Collection & Processing*.
- 18. *Resource Data Collection & Processing* sends performance data to *Resource Performance Management* for further analysis.
- 19. *Resource Performance Management* sends resource performance reports to *Service Quality Management* for QoS calculations and averaging to maintain statistical data on the supplied service.

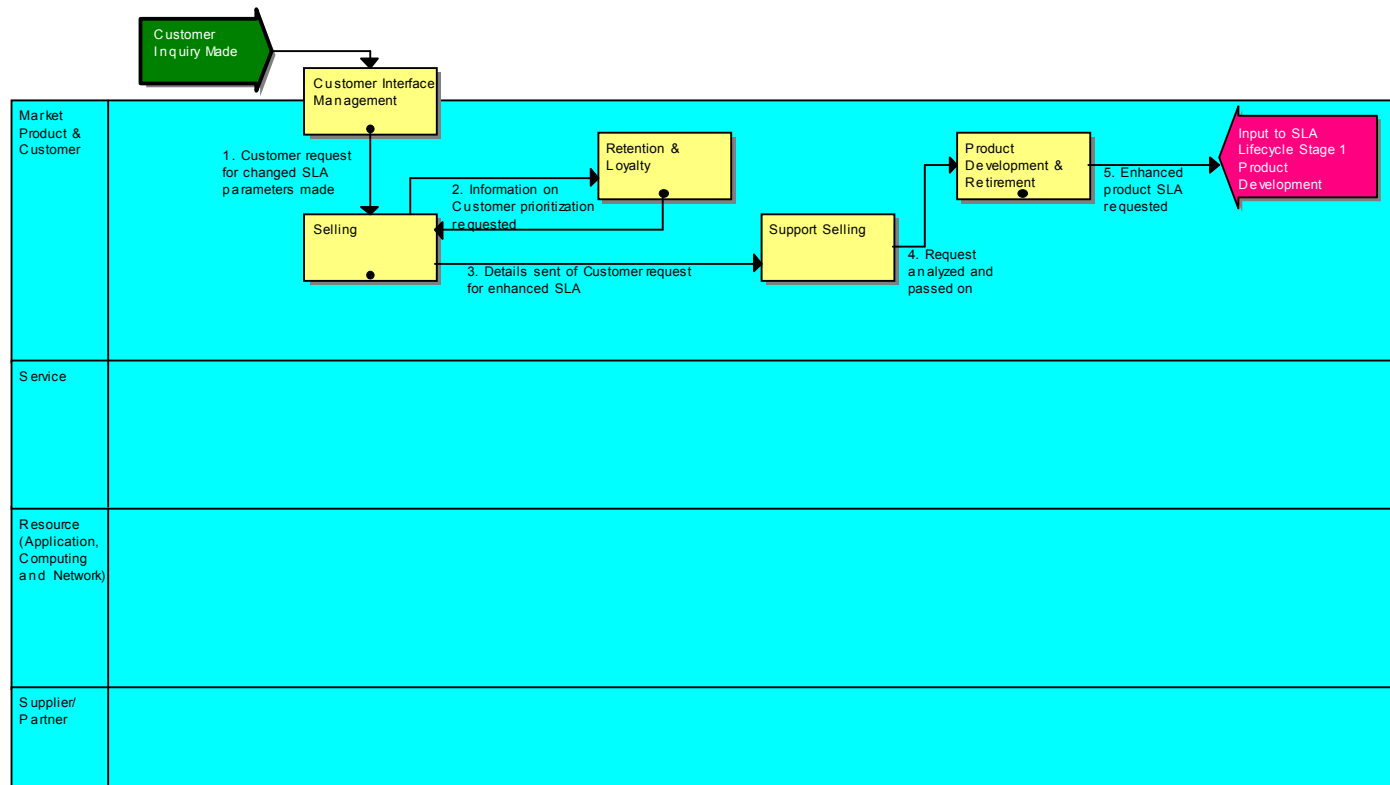
20. *Service Quality Management* analyzes the resource performance reports and sends a rectification report to *Service Problem Management* when it establishes that the problem has been resolved and that the service is meeting its KQIs.
21. *Service Problem Management* reports that the problem has been resolved to *Problem Handling*.
22. *Problem Handling* informs the customer and receives acknowledgement from the customer that the problem is resolved.
23. *Service Quality Management* reports the problem resolution to *Customer QoS/SLA Management*. *Customer QoS/SLA Management* checks the details against the customer SLA and establishes that an SLA violation has occurred.
24. *Customer QoS/SLA Management* reports the violation rebate to *Billing & Collections Management* for billing adjustment and to *Retention & Loyalty* for future reference.
25. The customer is notified in semi real-time about the actions taken on their behalf.
26. *Billing & Collections Management* bills the customer at the end of the billing cycle with the SLA agreed treatment included.

Assessment

During the assessment phase, SLAs are examined to determine if they still fit the business needs. There are several triggers for the assessment, including periodic either per service or overall, customer-triggered reevaluation, customer exit, etc. Figure 4.12 shows Case A where customer SLA needs have changed because the customer's business needs have changed and there is no SLA meeting these needs, leading to an assessment of the potential for an enhanced product SLA. Figure 4.13 shows Cases B and C where internal assessments at the Customer and Service layers lead to a realignment of infrastructure support for SLA parameters and service KQIs respectively. In these flows, Level 3 processes from the Operations Support & Readiness vertical are included for increased clarity.

The steps shown in Figure 10.12 for Case A are as follows:

1. The customer discusses changed requirements with *Selling*.
2. *Selling* checks the significance of the customer with *Retention & Loyalty*.



**Figure 10.12: Assessment Initiation
 Case A: Customer needs have changed**

3. *Selling* is unable to meet the customer’s requirements with existing product SLA(s). It sends details of the customer request to *Support Selling* for analysis.
4. After analyzing the request, *Support Selling* passes it on to *Product Development & Retirement* for a reassessment of the existing product SLA(s).
5. *Product Development & Retirement* reassesses the SLA parameters and sends a request for development of an enhanced product SLA to the product planning processes.

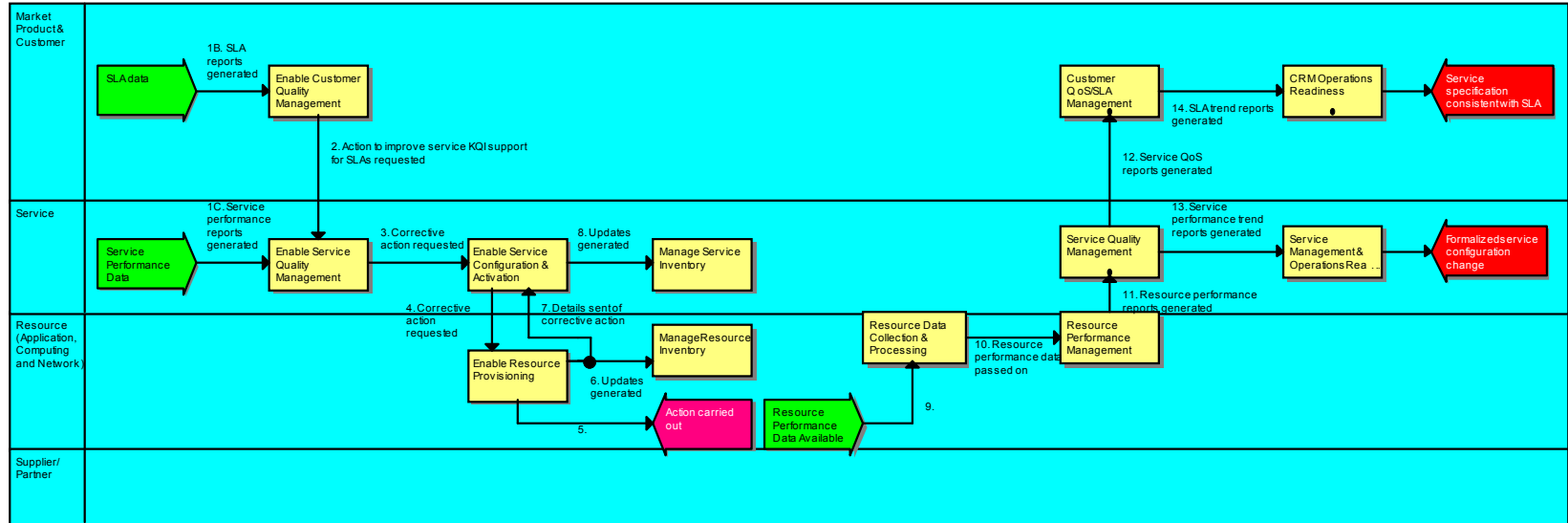


Figure 10.13: Assessment Initiation
Cases B and C: Internal Assessments at the Customer and Service Layers

The steps shown in Figure 10.13 for Cases B and C are as follows:

- 1B. *Enable Customer Quality Management* receives SLA reports for trend analysis (mainly from *Customer QoS/SLA Management*). *Enable Customer Quality Management* establishes that given SLAs are being violated too often, require excessive rebates, and that the service KQIs are not supporting the product KQIs.
- 1C. *Enable Service Quality Management* receives service quality reports for trend analysis (mainly from *Service Quality Management*). *Enable Service Quality Management* establishes that the service being provided is not meeting the required levels on an average basis.
2. *Enable Customer Quality Management* requests *Enable Service Quality Management* to undertake the required service class KQI improvements so that they will support the SLAs more adequately.
3. *Enable Service Quality Management* analyses the problems and requests *Enable Service Configuration & Activation* to undertake the required corrective actions to improve the service class KQIs.
4. *Enable Service Configuration & Activation* requests changes in the infrastructure from *Enable Resource Provisioning*.
5. *Enable Resource Provisioning* takes corrective action to ensure that resources meet the service class KQIs.

6. *Enable Resource Provisioning* generates updates for *Manage Resource Inventory*.
7. *Enable Resource Provisioning* reports details of its actions to *Enable Service Configuration & Activation*.
8. *Enable Service Configuration & Activation* generates updates for *Manage Service Inventory*.
9. Notifications and performance data are collected from the service-providing infrastructure by *Resource Data Collection & Processing*.
10. *Resource Data Collection & Processing* sends performance data to *Resource Performance Management* for further analysis.
11. *Resource Performance Management* sends resource performance reports to *Service Quality Management* for QoS calculations and averaging to maintain statistical data on the supplied service instances.
12. *Service Quality Management* analyzes the resource performance reports received and sends overall service quality reports to *Customer QoS/SLA Management* so that it can monitor and report aggregate technology and service performance.
13. *Service Quality Management* sends service quality reports to *Enable Service Quality Management* for trend analysis where it is established that the service being provided is now meeting the required levels on an average basis.
14. *Customer QoS/SLA Management* sends SLA reports to *Enable Customer Quality Management* for trend analysis where it is established that given SLAs are now consistent with SLA requirements.

14. Administrative Appendix

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

14.1. About this document

This document is an Application Note, aiming to document an approach based on industry experience that can be used by a company and adapted to its business needs.

14.2. Document History

14.2.1. Version History

| Version Number | Date Modified | Modified by: | Description of changes |
|----------------|---------------|-----------------------------|--|
| 7.5 | May/June 2008 | Mike Kelly | Updated section headings in Section 3 |
| 7.6 | July 2008 | Tina O'Sullivan | Minor corrections prior to posting. |
| 7.7 | June 2009 | Alicja Kawecki | TM Forum Approved |
| 11.1 | Oct 2011 | Mike Kelly | Inclusion of Assurance Quick Start material, and repositioning of existing content as "Historical" appendix |
| 12.0 | June 2012 | Mike Kelly | Inclusion of GB959 Fulfillment Quick Start material |
| 12.1 | October 2012 | Oscar Duenas (& Mike Kelly) | Added Multi-Actor section 12 |
| 12.2 | October 2012 | Alicja Kawecki | Aligned release history with document history, minor cosmetic corrections prior to posting and Member Evaluation |
| 12.3 | July 2013 | Alicja Kawecki | Updated to reflect TM Approved status in R12.5 |
| 12.3.1 | Nov 2014 | Alicja Kawecki | Applied rebranding, updated cover to R12.5.0 to align with filename, corrected TM Forum name in Notice |

14.2.2. Release History

| Release Number | Date Modified | Modified by: | Description of changes |
|----------------|---------------|--------------|--|
| 7.5 | May 2008 | Mike Kelly | Inclusion of new SDF and other flows as Section 3, document format |

| | | | |
|--------|--------------|-----------------------------|---|
| | | | updated to current standard |
| 11.5 | Oct 2011 | Mike Kelly | Inclusion of GB957 Assurance Quick Start material, and repositioning of existing content as “Historical” appendix |
| 12.0 | June 2012 | Mike Kelly | Inclusion of GB959 Fulfillment Quick Start material |
| 12.5.0 | October 2012 | Oscar Duenas (& Mike Kelly) | Added Multi-Actor section 12 |
| | | | |
| | | | |

14.3. Acknowledgments

This document was prepared by the members of the TM Forum Business Process Framework (eTOM) team.

A wide variety of individuals and companies have been involved in the eTOM/ITIL work that is represented here, through both TM Forum and itSMF.

For new content around multi-actor scenarios, thanks to Oscar Lorenzo Duenas Rugnón of Telefonica Digital for source material and for editing this section.

Particular thanks to John Wilmes of Progress Software, who as the Co-Chair of the Business Process Framework team steered this work within the team, and who also contributed directly, as document editor, and as content developer for much of the Fulfillment material here, and also with the translation through to BPMN for the process flows that were involved.

Further, in terms of the content in this document, particularly around Assurance, special thanks to Jay Selva and Walter Lee of Huawei, who contributed source process flow material, as well as related methodology concepts. Their support in working this through several Team Action Week sessions and many team calls is much appreciated.

As a final note, some of this work is being applied as part of catalyst-related activities in which Huawei and Progress Software are also involved, with other catalyst participants.