

Title: Order Fulfilment Core Processes & Pain areas

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Abstract *This paper discusses the end-to-end processes involved in fulfilling a customer order in real service provider operations. The implied objective of this paper is to highlight the series of process steps and related pain areas to be addressed in Order Management and Provisioning system implementations. It begins with mapping of OM/provisioning activities onto eTOM business processes down to individual sub-processes. The level of details in this paper will help the key stakeholders to gain clear understanding of sub-processes and the associated pain areas. In addition, it provides the importance of process identification and documentation with sufficient details to reap the real benefit of OSS system implementations. The order fulfilment functionalities are represented as Order Management and provisioning (OM/Provisioning) in this paper.*

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1 OM/Provisioning

1.1 Introduction

In service provider environment, the order management and provisioning functions comprises of critical set of activities to fulfil customer orders. It captures customer order details – service details, desired activation dates, address, contact and billing information. Once orders are validated and submitted, the series of activities spawned across various provisioning teams to fulfil the order. The provisioning team performs wiring, switches and equipment configuration, network inventory updates, most importantly, working with field staff and contractors. So the complex set of interrelated order management and provisioning activities demands the need of unambiguous business process. Most importantly, the real implementations are not meeting the stated objectives like firm order-to-activation cycle time reduction and error-free provisioning in real life situation due to insufficient understanding of associated business process.

This paper discusses the generic business process for order management and provisioning. It helps to understand and define unambiguous business process. It begins with mapping OM/provisioning activities onto eTOM business processes down to individual sub-processes. Each sub-processes description, pain areas, input criteria are in sync with today's realities.

The cross reference with the published eTOM documents - *eTOM – The Business Process Framework (GB921 v3.0)* are made wherever appropriate. Please note further work has been underway within TMF to develop the detailed process which may differ from the sub process discussed in this paper.

2 OM/Provisioning views in eTOM framework

The intention of this section is to understand the OM/provisioning *functional area* presence in eTOM framework. *Figure 1* shows the *eTOM business process framework*. The eTOM framework discussed in this section is with reference to the document *eTOM – The Business Process Framework – TM Forum Approved/Version 3.0* released on June 2002

To reflect the way businesses look at their processes, the eTOM supports two different perspectives on the grouping of the detailed process elements:

Vertical process groups: It represents the view of end-to-end processes within the processes, such as those involved in overall service fulfilment flows to customers. Operations support & readiness, fulfilment, assurance and billing are vertical processes of Operations process area. The operations process area is the heart of eTOM whereas the OM/Provisioning is heart of operations process itself.

Horizontal process groups: It represents the view of functionality related processes. Customer relationship management, service management & operations, resource management & operations and supplier/partner relationship management are vertical processes of operational process area.

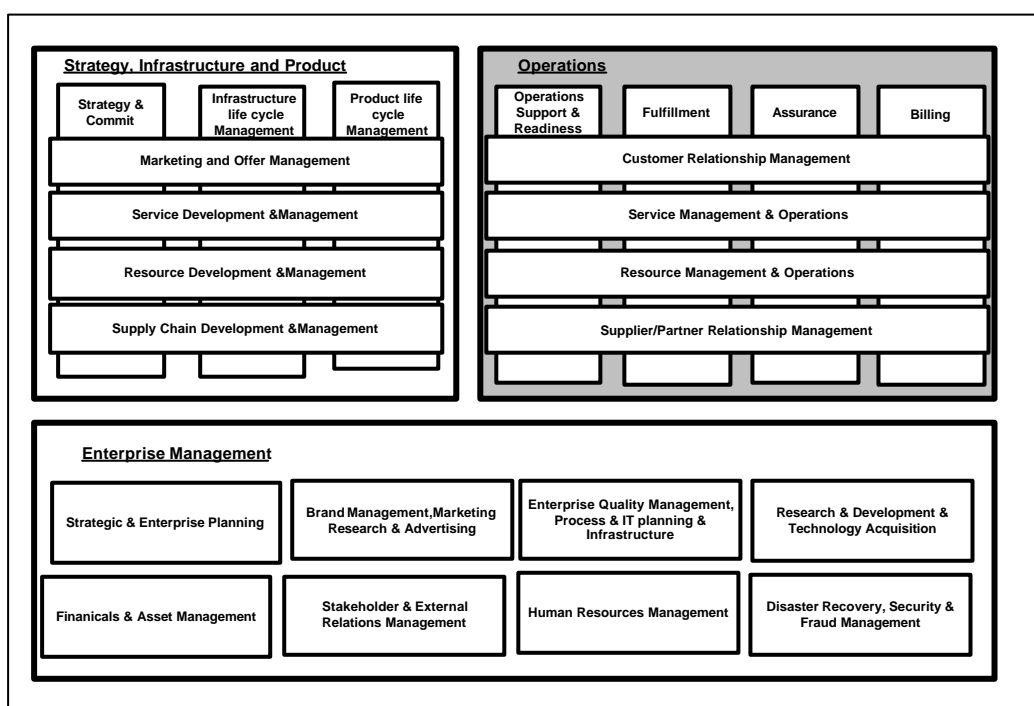


Figure 1. eTOM Business Process Framework – Level 1 Processes

Important Note: To understand the eTOM framework completely, read eTOM Business Process Framework – TM Forum Approved Version 3.0. The files are downloadable from www.tmforum.org

2.1 OM/Provisioning role in e-TOM Operations process

The Operations (OPS) processes contain the direct operations *vertical process groupings* of Fulfilment, Assurance, Billing and Operations support and readiness.

As shown in *figure 2*, OM/Provisioning functional area covers major portion of *fulfilment* vertical process.

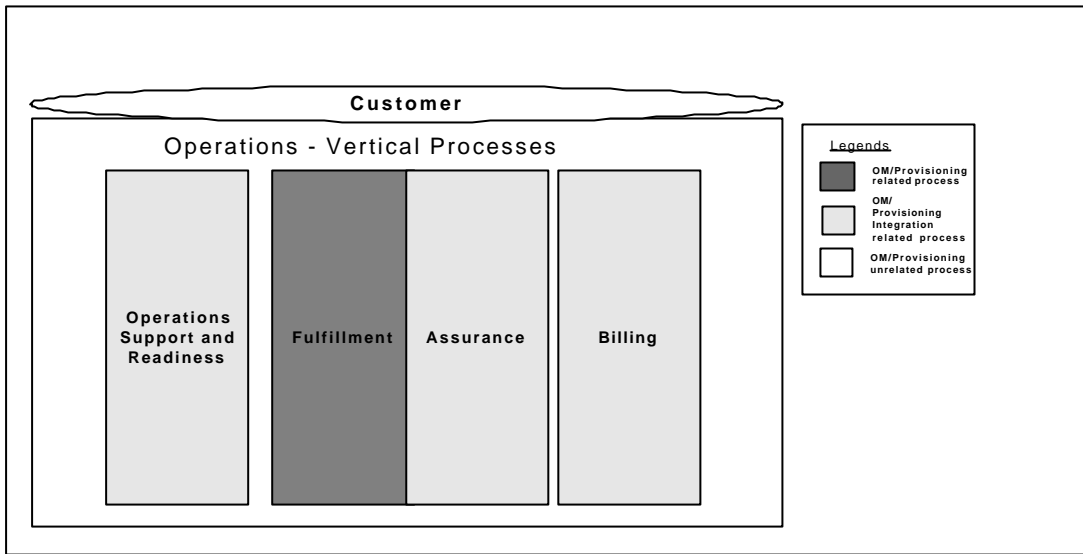


Figure 2. eTOM OPERATIONS Vertical Process Groupings

The Operations (OPS) processes contains horizontal process groups of

- Customer relationship management
- Service management & operations
- Resource Management & Operations
- Supplier/Partner relationship management

As shown in *figure 3*, OM/Provisioning functional area covers major portion of *Service Management & Operations* horizontal process.

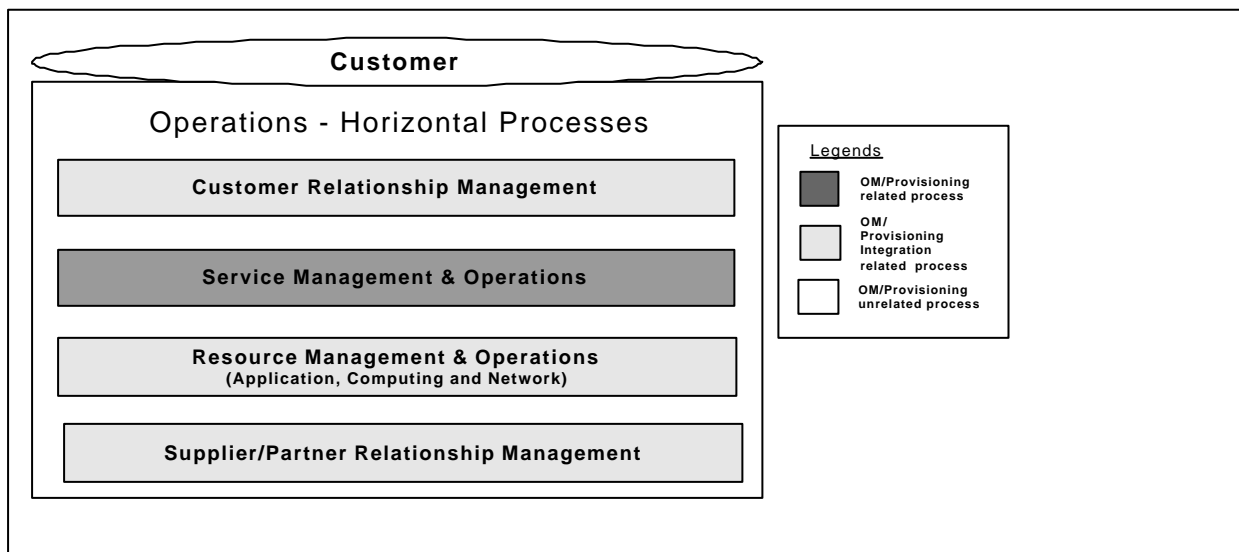


Figure 3. eTOM OPERATIONS Horizontal Process Groupings

2.1.1 Fulfilment Processes

The *Fulfilment, Assurance & Billing (FAB)* processes are sometimes referred to as *Customer Operations processes*.

The following fulfilment level 2 processes are related to OM/Provisioning functional areas

- Order Handling
- Service Configuration & Activation
- Resource Provisioning & Allocation to Service Instance
- Supplier/Partner (S/P) Purchase Order Management
- Supplier/Partner (S/P) Interface Management

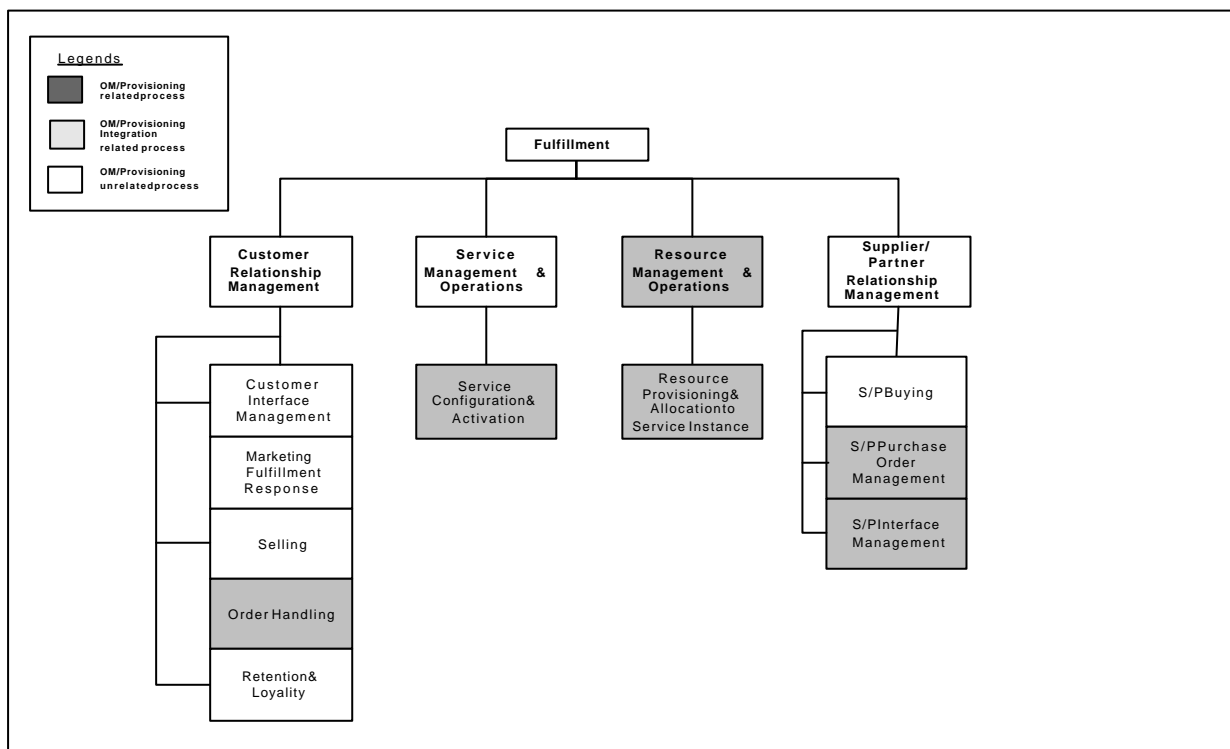


Figure 4. eTOM Fulfilment Level 2 Processes

Order handling

These processes are responsible for accepting and issuing orders. The activities involved are performing order entry, validation and submission. Sometimes decomposition (unbundling) of order is required to separate out service-oriented sub-orders. Such activity is called order decomposition.

Resource Management & Operations

These processes ensure that resources such as network, computing and application are able to support the required provisioning and maintenance of resources to provide service processes. The activities involved are inventory verification, procurement and commissioning.

Resource provisioning & allocation to service instance

These processes encompass the configuration of resources and logical resource provisioning for individual customer instances. The major activity involved is assigning circuits to customers.

3 Illustrated Customer Order fulfilment flow

The *figure 5* shows the order fulfilment activities flow as well as the corresponding sub-processes. After order entry, validation and submission, the decomposition of order begins in case service process business permits. Subsequently, circuit designs of decomposed (unbundled) order are performed. Based on Internal work requirement, work orders are initiated and then execution of plant work begins on completion of inventory verification and procurement. Upon fulfilling the internal work order, the inventory, verification and procurement occurs to fulfil customer specific order. Then the designed circuits are activated for customer requested service. The different levels of testing are performed prior to customer acceptance.

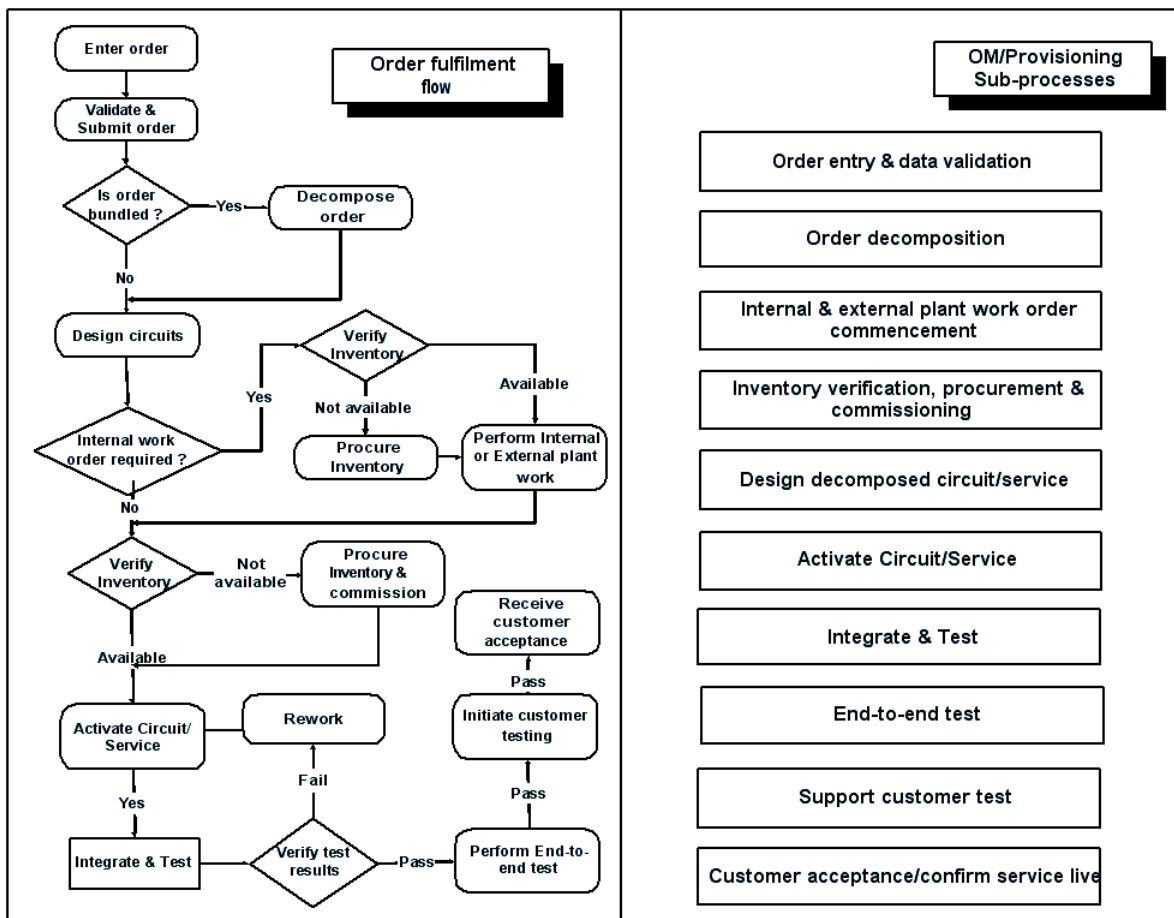


Figure 5. Order fulfilment workflow and sub-processes

The flow involves series of communications, design work, document flows, hand-offs and field work across key stake holders.

Important Note: Latest releases of TMF have sub processes detail which are not included in this paper. The sub processes defined here focuses on service provider area of critical concern.

The sub processes mentioned in *figure 5* could be mapped to eTOM processes as ticked (v) in the table below.

eTOM Sub Processes	Order Handling	Service Configuration & Activation	Resource Management & operations	Resource provisioning & Allocation	Supplier Purchase order Management	Supplier Interface management
Order entry & data validation	v				v	v
Order decomposition	v					
Internal & external plant work order commencement			v	v	v	v
Inventory verification, procurement & commissioning			v	v	v	v
Design decomposed circuit/service		v				
Activate Circuit/Service		v				

The testing sub-processes are applied across the eTOM framework.

Each of the sub processes, set of critical activities and pain areas are discussed in subsequent sections

3.1 Order Entry and Data Validation

Purpose	Passing the customer firm order to Order Management and Service provisioning system
Detailed Description	<p>The order entry captures the customer firm order information. The order information includes customer name, customer installation and billing address, locations, type of service, agreed SLA, delivery details, package and plans. The type of orders are: <i>New, Move, Add, Change, Suspend, Restore or Disconnect</i></p> <p>Data validation is checking and validating the data entry of the firm order. Critical data input of technical information, service-offering details, etc., which is very different from conventional order entry system, are captured in this process. Hence data validation is considered to be an important step in OM/provisioning.</p> <p>In many real-life situations, the customer order information directly</p>

	<p>passed from order entry system of external application like CRM. In such cases, the OM/provisioning system performs the job of data validations and pass the status back to the external application.</p> <p>Primary sources of data are CRM system, direct data entry from Customer representative. The advanced OM/provisioning system supports data inputs from Internet based order entry system, (possibly a customer), third party agents, suppliers and partners.</p>
Mode of input	<p>Passed as inputs from CRM application</p> <p>Through Rich client by an order entry staff</p> <p>Through Web based client for remote users</p> <p>Secured access to suppliers/agents/partners</p>
Pain areas	<p>Web based order entry and validation is the issues with OM/Provisioning implementation. In case of Commercial off-the-self (COTS) products based implementation, extensive customisation work requires to develop web interfaces. In addition impacts due to COTS product and web platform upgrades are to be determined.</p>

3.2 Order Decomposition

Purpose	Unbundling of orders based on service types and quantity
Detailed Description	<p>A single customer order may translates into set of service requests, which is necessarily to be unfolded for an end-to-end order fulfilment. This type of unfolding an order into service request is commonly called as order decomposition or unbundling.</p> <p>The reason for a single customer order gets translated into multiple service request are:</p> <ul style="list-style-type: none"> - Single order may require set of internal or external plant work order (service request) requirement and hence results in spawning of set of work orders (service request). - Multiple service requests are bundled as single order. For instance, an order consists of requisition of services more than two locations results in more than one leased line request. - Multiple technology services requested from a single order. For instance, an customer order requires services of ATM/FR and Fast Ethernet service to connect two or more office premises <p>In real life situation, the complete automation of order decomposition and order status/progress updates are requirement of organizations that provide varied service offerings. But the complexity involved in defining the order decomposition processes and defining the business rules into the supporting OSS system varies customer by customer.</p>
Mode of input (if	- System performs the decomposition based on the order entry

applicable)	<p>inputs</p> <ul style="list-style-type: none"> - Manual decomposition of orders into service requests
Pain areas	<p>Semi-automated or manual process of decomposition is not unusual in service providers operations before feeding into OM/Provisioning system. The reason for this approach is:</p> <ul style="list-style-type: none"> - Existing application (or COTS product) doesn't support decomposition - Difficulty in reporting the correct order status/progress back to external systems (like CRM) <p>Necessity of manual intervention to perform operations like field verifications & approval or portion of order to be feed to partners or suppliers systems</p> <p>Detail analysis and level of decomposition rules are to be pre-determined to identify activities to be automated and retained as manual with some level of system control.</p>

3.3 Design decomposed Circuit/Service

Purpose	Design the service/circuit for each of the requested services
Detailed Description	<p>Design circuit includes:</p> <ul style="list-style-type: none"> - Preparation & Approval of drawings - Identification of network locations and preparation of circuit layout records - Interacting with network capacity/ planning team and systems to determine the network/circuit availability <p>The approved design work items are the inputs for internal and external work order activities.</p>
Mode of input (if applicable)	<p>Through Rich client by a design engineer</p> <p>Separate drawing applications are used to design circuit/service</p>
Pain areas	Proper control of design work items and standardizing effective design (or drawing) applications and tools across the organization to reduce cycle time as well as rework

3.4 Internal & external plant work order commencement

Purpose	Work authorization raised across organization to meet customer order requirement or enhancing the existing infrastructure
Detailed Description	The external plant work for building access construction are:

	<ul style="list-style-type: none"> - Building own conduit - Leasing conduit from a leasing company <p>Subsequent to the availability of conduits, in-building cabling begins. It constitutes</p> <ul style="list-style-type: none"> - Laying own cable to customer building - Laying own fibre to customer floor - Leasing fibre from leasing company - Laying leasing fibre to shared equipment - Pulling cables <p>In combination with inventory verification, procurement and commissioning process, these activities interacts with network inventory management process.</p>
Mode of input (if applicable)	-
External Processes/System Interfaces	Field operations and inventory management process
Pain areas	Effective system to automate and co-ordinate workforces are the problem areas

3.5 Inventory verification, procurement & commissioning

Purpose	Based on service request, verify available inventory, determine and initiate procurement & commissioning needs.
Detailed description	<p>In real life situation, for <i>new, move, add</i> and <i>change</i> orders, reservation of equipments and ports activities happen upon successful inventory verification. The verification process involves interaction between network inventory system and OM/Provisioning process. The status of verification determines the subsequent activities of procurement and commissioning. The procurement involves interaction with enterprise resource planning or network asset management processes whereas commissioning involves field operations processes to install, check and update availability status.</p> <p>For disconnect orders, changing the status of equipments and ports as <i>available</i> is a notable activity.</p> <p>OM/Provisioning system interacts closely with Network Inventory management process to provide actual inventory availability and procurement/commissioning status.</p>
Mode of input (if applicable)	<p>Backend verification status are notified or updated into OM/Provisioning automatically</p> <p>Procurements inputs are handled between network inventory</p>

	management processes and enterprise resource planning or network asset management system
Pain area	<p>Before receiving a firm order, the OSS/BSS system should be capable of determining the possibility of meeting the deadline committed by sales to the customers. The wrong committed date of service availability might result in cancellation of orders or not meeting the SLA pertains to delivery.</p> <p>Efficient network inventory system is required to search for equipment and to verify it capacity. In addition, efficient inventory system should have highly-accurate data.</p> <p>Verification of physical inventory is an easy task compared to ensuring the availability of required capacity. The provisioning system and Element Management System (EMS) at each CPE location should be capable of providing correct data to provisioning team.</p>

3.6 Activate Service/Circuit

Purpose	Provisioning and activation of designed customer services
Detailed description	<p>The activation use either automatic or manual methods. The network elements or equipment consists of vendor- supplied proprietary software to perform activation.</p> <p>Now-a-days systems are available that make use of vendor-supplied proprietary software to enable flow-through or zero-touch provisioning and service activation of network elements.</p>
Mode of input (if applicable)	<p>Inputs from OM/provisioning automatically activate services.</p> <p>Paper copy outputs from OM/Provisioning system used for field engineers for manual activation</p> <p>Simple services are activated (especially renewal, reactivations after suspension) by customer web self care systems</p>
Pain area	<p>Suitable circuit design module or service activation system should be available in OM/Provisioning system to design and assign associated equipments and ports.</p> <p>In case of multi-technology provisioning no single activation tool or interface available but solution provider should deploy a single interfaces to multiple activation tool access to overcome the problem.</p>

3.7 Integrate & Test

Purpose	Integrate and test the circuits and related services
Detailed Description	All the component or modules of services are integrated and tested before proceed to end-to-end testing (service provider premises to customer end)

Mode of input (if applicable)	Field engineer web based systems User interfaces of equipment and network element specific applications
Pain area	Upon designing circuit, co-ordination with contractors to install, configure and activate all CPE equipment as well as to perform integration testing are pain areas since it involves extensive coordination between internal staff and external agencies. The provisioning guidelines, procedures and supporting documents like drawings, design layout record will greatly help reduce the difficulty in this area.

3.8 End-to-end Test

Purpose	Performing end-to-end service testing
Detailed Description	Upon completion of the integration testing, field operations are notified to perform end-to-end service. The field operations team work with contractors, if necessary, to perform successful end-to-end testing. Some service provider's use craft access systems for the benefit of field technician's access to their internal systems through a hand held terminal. The hand held terminal helps them to access loop testing system and to view the complete test summary from remote locations.
Mode of input (if applicable)	Manual
Pain area	Similar to the pain area highlighted in integration testing sub-processes

3.9 Support Customer Test

Purpose	Supporting customer testing for service acceptance
Detailed Description	Field operations team work with customers to perform testing
Mode of input (if applicable)	Manual
Pain area	It varies by customer to customer.

3.10 Customer Acceptance

Purpose	Formal customer acceptance and closure of service fulfilment
Detailed	Upon formal customer acceptance to move to billing and customer

Description	care processes
Mode of input (if applicable)	Manual
Pain area	Meeting the service delivery SLA

4 Conclusion

Sub-processes discussed in this paper provide clarity to service providers to articulate “to-be” systems. The pain areas highlighted are effectively addressed by approaching integrated workflow based solution and web enabling field intensive/third party provisioning related system activities. Most of the OM/Provisioning Commercial off-the-shelf products (COTS) products available in the market have workflow features and open APIs to develop web interfaces. But it is the job of service providers to ensure that their internal staff and system integrators are working together to identify and document the business process with sufficient level of details. This will lead to exploit the COTS product workflow features in addition to web-enabling the relevant modules for extended access and control. It definitely helps to meet the stated objective of firm order-to-activation cycle time reduction and error-free provisioning.