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Telecommunications management network

Enhanced Telecom Operations Map (eTOM) – The business process framework

ITU-T Recommendation M.3050.1

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation M.3050.1

Enhanced Telecom Operations Map (eTOM) –
The business process framework

Summary

ITU-T Recommendations M.3050.x series contain a reference framework for categorizing the business activities that a service provider will use. The Enhanced Telecom Operations Map® (or eTOM for short), which has been developed by the TeleManagement Forum, describes the enterprise processes required by a service provider and analyses them to different levels of detail according to their significance and priority for the business. This business process approach has built on the concepts of management services and functions in order to develop a framework for categorizing all the business activities.

This Recommendation contains the main body of the eTOM business process framework.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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Introduction

The Enhanced Telecom Operations Map® is an ongoing TM Forum initiative to deliver a business process model or framework for use by service providers and others within the telecommunication industry. The TM Forum Enhanced Telecom Operations Map (or eTOM for short) describes all the enterprise processes required by a service provider and analyses them to different levels of detail according to their significance and priority for the business. For such companies, it serves as the blueprint for process direction and provides a neutral reference point for internal process re-engineering needs, partnerships, alliances and general working agreements with other providers. For suppliers, eTOM outlines potential boundaries of software components to align with the customers' needs and highlights the required functions, inputs and outputs that must be supported by products.

A particular strength of eTOM as a business process framework is that it is part of the TM Forum NGOSS (New Generation Operations Systems and Software) program and links with other work under way in NGOSS.

The eTOM work has built on and enhanced the previous TM Forum Telecom Operations Map, and eTOM sets a vision for the industry to enable it to compete successfully through the implementation of business-process driven approaches to managing the enterprise. This includes ensuring integration of all vital enterprise support systems concerned with service delivery and support. The focus of the eTOM framework is on the business processes used by service providers, the linkages between these processes, the identification of interfaces, and the use of customer, service, resource, supplier/partner and other information by multiple processes.

From the highest enterprise-wide level, the eTOM framework defines a business process framework using hierarchical decomposition to structure the business processes. The process descriptions, and their relationship, as well as other key elements are defined. The eTOM framework represents the whole of a service provider's enterprise environment and is defined as generically as possible so that it is organization-, technology- and service-independent.

The eTOM business process framework can be used as a tool for analysing an organization's existing processes and for developing new processes. Different processes delivering the same business functionality can be identified, duplication eliminated, gaps revealed, new process design speeded up, and variance reduced. Using the eTOM framework, the value, cost and performance of individual processes within an organization can be assessed.

Relationships with suppliers and partners can be facilitated by identifying and categorizing the processes used in interactions. In a similar manner, the all-important customer relationship processes can be identified and an evaluation made on whether they are functioning as required to meet customers' expectations.

This version of the eTOM business process framework (GB921 Release 7.0), extends the previous GB921 Release 6.0 with new process detail (in GB921D), and new material on Guidelines for eTOM Users (GB921U), and examples of Real World Case Studies in applying eTOM (GB921R). It also includes some updates on the Addendum for B2B working (GB921B).

ITU-T Recommendation M.3050.1

Enhanced Telecom Operations Map (eTOM) – The business process framework

1   Scope

The Enhanced Telecom Operations Map® (eTOM) [b-TMF GB921] has been developed by the TeleManagement Forum as a reference framework for categorizing all the business activities that a service provider will use.

This Recommendation is part of a series of ITU-T texts dealing with eTOM (Release 7), which has the following structure:

M.3050.0	eTOM – Introduction.
M.3050.1	eTOM – The business process framework. (TMF GB921 Release 7.0.)
M.3050.2	eTOM – Process decompositions and descriptions. (TMF GB921 Addendum D – Release 7.0.)
M.3050.3	eTOM – Representative process flows. (TMF GB921 Addendum F – Release 4.5.)
M.3050.4	eTOM – B2B integration: Using B2B inter-enterprise integration with the eTOM. (TMF GB921 Addendum B – Release 6.1.)
M.3050 Supplement 1	eTOM – An Interim View of and Interpreter's Guide for eTOM and ITIL Practitioners. (TMF GB921 Application Note V – Release 6.0.)
M.3050 Supplement 2	eTOM – Public B2B Business Operations Map (BOM). (TMF GB921 Addendum C – Release 4.)
M.3050 Supplement 3	eTOM to M.3400 mapping.
M.3050 Supplement 4	eTOM – An eTOM Primer (TMF GB921 Addendum P – Release 4.5).

Additional parts will be published as material becomes available.

This series of ITU-T Recs M.3050.x build on the management services approach described in [ITU-T M.3010] and [ITU-T M.3200] by developing a business process framework.

This Recommendation contains the main body of the eTOM business process framework. The eTOM business process framework is a reference framework for categorizing all the business activities that a service provider will use. This is done through definition of each area of business activity, in the form of process components or process elements that can be decomposed to expose progressive detail. These process elements can then be positioned within a model to show organizational, functional and other relationships, and can be combined within process flows that trace activity paths through the business.

2   References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T M.3010]   ITU-T Recommendation M.3010 (2000), *Principles for a telecommunications management network.*

[ITU-T M.3200]   ITU-T Recommendation M.3200 (1997), *TMN management services and telecommunications managed areas*: *overview.*

[ITU-T M.3400]   ITU-T Recommendation M.3400 (2000), *TMN management functions.*

3 Definitions

This Recommendation defines the following terms:

3.1 complementary provider: The complementary provider provides additional products and services to extend the attractiveness of an enterprise's products and services and the scope of its value network. Frequently, these products and services are co-branded.

3.2 customer: The customer buys products and services from the enterprise or receives free offers or services. A customer may be a person or a business.

3.3 customer operations process: A customer operations process is an end-to-end process that focuses totally on directly supporting customer needs, i.e., fulfilment, assurance or billing. It may be initiated by the customer or be initiated by the service provider.

3.4 e-business: e-business includes the Internet presence and buy and sell transactions over digital media of e-commerce. It also includes the integration of front- and back-office processes and applications to provide support and bill for the product or service. For the eTOM framework it is even more expansive. e-business is the integration of traditional business models and approaches with e-business opportunities.

3.5 e-commerce: e-commerce is Internet presence and business buying and selling transactions over digital media.

3.6 end-to-end process flow: End-to-end process flow includes all sub-processes and activities and the sequence required to accomplish the goals of the process. Note that the top-level views of the eTOM framework do NOT show end-to-end process flow since there is no indication of sequence. The eTOM framework shows end-to-end process groupings (see definition below).

The end-to-end customer processes recognized in the eTOM framework are generic sequences of activities that need to occur in the enterprise to achieve desired results (i.e., they are not specific to a particular ICSP business, product, channel or technology).

The eTOM framework does not direct or constrain the way end-to-end processes can be implemented, rather it only guides the definition of standardized process elements to be used within the enterprise. In this way, process elements can be assembled for a specific service provider's end-to-end process requirement. The eTOM framework does not mandate a single way in which the process elements should be organized or sequenced to create end-to-end processes.

3.7 end-to-end process grouping: The top-level view of the eTOM framework shows end-to-end process groupings. At this level of the process framework, flow is not appropriate. However, these groupings represent processes that have end-to-end results that are key measures for the enterprise.

Also termed as vertical process grouping(s).

3.8 end user: The end user is the actual user of the products or services offered by the enterprise. The end user consumes the product or service. See also subscriber definition below.

3.9   enterprise: Enterprise is used to refer to the overall business, corporation or firm, which is using the eTOM framework for modelling its business processes. The enterprise is responsible for delivering products and services to the customer. It is assumed that the enterprise is an information and communications service provider (see ICSP definition below).

3.10   enterprise management process grouping: This process grouping involves the knowledge of enterprise-level actions and needs, and encompasses all business management functionalities necessary to support the operational processes, which are critical to run a business in a competitive market. These are sometimes thought of as corporate processes and support. Some functions, such as enterprise risk management (e.g., security and fraud management), have to be more tailored to information and communications service providers, but most (e.g., financial management, public relations) are not significantly different for the ICSP industry.

3.11   entity: Entity is used to mean a person, business, technology, etc., with which a process interacts. The customer is the most important entity. The enterprise management processes interact with government, regulators, competitors, media, shareholders, the public, unions and lobby groups. The supplier and partner management processes interact with dealers, retailers, partners, brokers, third-party providers, complementary providers, financial providers, service suppliers and material suppliers.

3.12   flow-through: Flow-through is automation across an interface or set of interfaces within an end-to-end process flow. For the eTOM fulfilment, assurance and billing processes, process flow-through is between the customer and the resource elements.

3.13   functional process groupings: The functional process groupings (e.g., customer relationship management, service management and operations, etc.) aggregate processes involving similar knowledge. The eTOM functional process groupings are the highest level decomposition of the enterprise. Functional process groupings are shown horizontally in eTOM.

These functional process groupings are not hierarchical with respect to each other and are not built one above the other (i.e., one is not a decomposition of the one above), e.g., "service management and operations" is NOT a decomposition of "customer relationship management".

Also termed as horizontal process grouping(s).

3.14   hierarchical process decomposition: Hierarchical process decomposition is the systematic approach to modelling processes above the level suitable to process flow. The hierarchical process decomposition approach allows processes to be developed more modularly. See levels definition below.

3.15   information and communications service provider (ICSP): A service provider enterprise that sells information and/or communications services to other parties.

3.16   intermediary: Within the value network, the intermediary performs a function on behalf of the enterprise that is a part of the enterprise's operational requirements. Intermediaries provide products and services that the enterprise either cannot provide itself or choose not to due to cost and quality considerations. There are typically three categories of intermediaries: sales, fulfilment and information and communication.

3.17   levels: The best way to structure a large amount of content and detail, while still allowing the higher-level views to present a summary view, is to structure the information in multiple levels, where each level is decomposed into greater detail at the next lower level. This is hierarchical decomposition.

By having the eTOM framework structured into multiple levels, it enables users of the framework to align their enterprise framework or their process implementations with the eTOM framework at different levels, e.g., align at levels 1 and 2 or align at levels 1, 2 and 3.

To summarize how levels are used in the eTOM framework:

- The whole-of-enterprise view (i.e., all of the eTOM framework) is level 0.
- Each vertical (end-to-end) process grouping is level 1.
- Each horizontal (functional) process grouping is also level 1.
- All the process elements, e.g., order handling (which appear in the end-to-end process and the functional process groupings) are level 2.
- Level 2 process elements may be decomposed into level 3 process elements.
- Level 3 process elements may be decomposed into level 4 process elements.

For the eTOM framework, all subsequent levels of process decomposition are level 4, since decomposition level does not necessarily mean the same level of detail from one process decomposition to another. The number of levels of decomposition required has more to do with the complexity of the process and the level at which process flow makes sense.

3.18   offer: An offer is an aggregation or bundling of products or services for sale to a customer.

3.19   outsourcing: Outsourcing is when an enterprise contracts out one or more of its internal processes and/or functions to an outside company. Outsourcing moves enterprise resources to an outside enterprise and keeping a retained capability to manage the relationship with the outsourced processes.

3.20   out-tasking: Out-tasking is when an enterprise contracts with an outside enterprise to provide a process, function or capability without transfer of resource. The enterprise begins using the other enterprise's capabilities directly and electronically.

3.21   partner: A partner has a stronger profit and risk-sharing component in their business agreement with the enterprise than a supplier would have. A partner generally is more visible to the enterprise's customer than a supplier would be. A partner might be part of an alliance, a joint service offering, etc.

3.22   process: A process describes a systematic, sequenced set of functional activities that deliver a specified result. In other words, a process is a sequence of related activities or tasks required to deliver results or outputs.

3.23   product: Product is what an entity (supplier) offers or provides to another entity (customer). Product may include service, processed material, software or hardware, or any combination thereof. A product may be tangible (e.g., goods) or intangible (e.g., concepts) or a combination thereof. However, a product ALWAYS includes a service component.

3.24   process element: Process elements can also be considered as the building blocks or components that are used to "assemble" end-to-end business processes. Therefore, a process element is the highest level of the constructs within the eTOM framework that can be used directly by the enterprise. Process elements first become visible when either a functional process grouping or an end-to-end process grouping is decomposed into the second level, e.g., order handling.

Process elements are modular for potential re-use and independent update and/or replacement.

3.25   resource: Resources represent physical and non-physical components used to construct services. They are drawn from the application, computing and network domains and include, for example, network elements, software, IT systems and technology components.

3.26   service: Services are developed by a service provider for sale within products. The same service may be included in multiple products, packaged differently, with different pricing, etc.

3.27   service provider (SP): See under information and communications service provider (ICSP). Throughout this Recommendation, the terms "service provider" and "ICSP" are synonymous.

3.28   subscriber: The subscriber is responsible for concluding contracts for the services subscribed to and for paying for these services.

3.29   supplier: Suppliers interact with the enterprise in providing goods and services, which are assembled by the enterprise in order to deliver its products and services to the customer.

3.30   supply chain: Supply chain refers to entities and processes (including those external to the enterprise) that are used to supply goods and services needed to deliver products and services to customers.

3.31   swim lane: A way of depicting process flow in two dimensions by showing sequence horizontally and different actors or process types vertically. Using swim lanes to depict process flow allows for better process design in better end-to-end flow, better flow-through and better visibility of customer interactions in the process.

3.32   third-party service provider: The third-party service provider provides services to the enterprise for integration or bundling as an offer from the enterprise to the customer. Third-party service providers are part of an enterprise's seamless offer. In contrast, a complementary service provider is visible in the offer to the enterprise's customer, including having customer interaction.

3.33   telecommunications   management   network   (TMN):   The   telecommunications management network model was developed to support the management requirements of PTOs (public telecommunication operators) to plan, provision, install, maintain, operate and administer telecommunication networks and services. As the communications industry has evolved, use of TMN also evolved and it has influenced the way to think logically about how the business of a service provider is managed. The TMN layered model comprises horizontal business, service, and network management layers over network hardware and software resources, and vertical overlapping layers of fault, configuration, accounting, performance and security (FCAPS) management functional areas. The latter should not be considered as strictly divided "silos" of management functions, but interrelated areas of functionality needed to manage networks and services. Indeed, [ITU-T M.3200] and [ITU-T M.3400] define a matrix of management services and management function sets (groups of management functions), which in turn are used to define more detailed Recommendations on specific management functions.

3.34   TOM: The Telecom Operations Map, GB910 Version 2.1, published by the TeleManagement Forum.

3.35   total enterprise process view: The total enterprise process view includes all business processes within the enterprise. In the eTOM framework, the total enterprise process view is also referred to as level 0, since it includes all level 1 process groupings.

3.36   user: See end user above.

3.37   value network: The enterprise as the hub of a value network is a key concept of e-business. The value network is the collaboration of the enterprise, its suppliers, complementary providers and intermediaries with the customer to deliver value to the customer and provide benefit to all the players in the value network. e-business success and, therefore, part of the definition of a value network, is that the value network works almost as a vertically integrated enterprise to serve the customer.

3.38   vendor: Synonymous with supplier above.

4   Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ADSL   Asymmetric Digital Subscriber Line

ASP   Application Service Provider

ATM	Asynchronous Transfer Mode
B2B	Business-to-Business
BM&A	Brand management, Market research and Advertising
BOM	Business Operations Map
BPSS	Business Process Specification Schema
BSS	Business Support System
BTA	Business Transaction Activity
CAM	Content Assembly Mechanism
CBL	Commerce one Business Library
COTS	Commercial Off-The-Shelf
CRM	Customer Relationship Management
DRS&F	Disaster Recovery, Security and Fraud management
DSL	Digital Subscriber Line
DTD	Document Type Definition
DWDM	Dense Wavelength Division Multiplexing
E2E	End-to-End
ebXML	electronic business Extensible Markup Language
EDI	Electronic Data Interchange
EM	Enterprise Management
EQPIA	Enterprise Quality management, Process and IT planning and architecture
eTOM	enhanced Telecom Operations Map
F&AM	Financial and Asset Management
FAB	Fulfilment, Assurance and Billing
GTDD	Global Telecommunications Data Dictionary
HDSL	High bit-rate Digital Subscriber Line
HR	Human Resources
HTML	HyperText Markup Language
ICSP	Information and Communications Service Provider
ICT	Information and Communications Technology
ILM	Infrastructure Lifecycle Management
IP	Internet Protocol
ISP	Internet Service Provider
KPI	Key Performance Indicator
KQI	Key Quality Indicator
M&OM	Marketing and Offer Management
NGOSS	Next Generation Operations Systems and Software
NMF	Network Management Forum (predecessor of TM Forum)

OAGIS	Open Applications Group Integration Specification
OASIS	Organization for the Advancement of Structured Information Standards
OPS	Operations
ORT	Operations Readiness Testing
OSR	Operations Support and Readiness
OSS	Operations Support System
PIP	Partner Interface Process
PLM	Product Lifecycle Management
QoS	Quality of Service
R&DTA	Resource and Development, Technology Acquisition
RD&M	Resource Development and Management
RFP	Request For Proposal
RM&O	Resource Management and Operations
RNIF	RosettaNet Implementation Framework
S&EP	Strategic and Enterprise Planning
S&ER	Stakeholder and External Relations
S/P	Supplier/Partner
S/PRM	Supplier/Partner Relationship Management
SC	Strategy and Commit
SCD&M	Supply Chain Development and Management
SD&M	Service Development and Management
SDH	Synchronous Digital Hierarchy
SID	Shared Information and Data Model
SIP	Strategy, Infrastructure and Product
SLA	Service Level Agreement
SM&O	Service Management and Operations
SOAP	Simple Object Access Protocol
SONET	Synchronous Optical Network
SP	Service Provider (see also ICSP)
tML	telecommunications Markup Language
TMN	Telecommunications Management Network
TOM	Telecom Operations Map
UML	Unified Modelling Language
VC-MC	Value Chain Market Centre
XML	eXtensible Markup Language

5 Introduction

5.1 Purpose of the business process framework

Traditionally in the telecommunication industry, service providers delivered end-to-end services to their customers. As such, the entire value chain was controlled by a single enterprise, if necessary via interconnection arrangements with other service providers. However, in a liberalized marketplace, service providers have to respond both to the customer's increased demands for superior customer service and to stiffer competition. They have therefore been expanding their markets beyond their self-contained boundaries and broadening their business relationships.

Service Providers face very different regulatory environments and their business strategies and approaches to competition are quite distinct, nevertheless they share several common characteristics:

• Heavily dependent upon effective management of information and communications networks to stay competitive.

• Adopting a service management approach to the way they run their business and their networks.

• Moving to more of an end-to-end process management approach developed from the customer's point of view.

• Automating their customer care, service and network management processes.

• Need to integrate new BSSs/OSSs with legacy systems.

• Focusing on data services offerings.

• Focusing on total service performance, including customer satisfaction.

• Integrating with current technology (e.g., SDH/SONET and ATM) and new technologies (e.g., IP, DWDM).

• Emphasizing more of a "buy" rather than "build" approach that integrates systems from multiple suppliers.

Some service providers choose to operate their own network and/or information technology infrastructure, while others choose to outsource this segment of their business. The effective exploitation of this information technology and network infrastructure, whether directly operated or outsourced, is an integral part of the service delivery chain and directly influences the service quality and cost perceived by the end customer. Service providers will need to become skilled at assessing outsourcing opportunities whether in information technology and/or network infrastructure areas or other areas and, then, be skilled at integrating and managing any outsourcing arrangements.

To meet both existing and new demands, service providers still urgently require well-automated operations processes whether they are incumbent providers or new entrants, and whether they are communications service providers, application service providers, Internet service providers, etc. Some service providers are struggling with high growth from a start-up phase, others with the commoditization of key cash-cow services, and yet others with the move from a manual-intensive, inconsistent, inflexible environment to one that provides significant improvement in customer focus, service quality, unit cost and time to market. Service providers have to pervasively do business electronically with trading partners, suppliers and wholesale and retail customers. For the growing mobile/wireless and IP services markets, these service providers are focused on quickly provisioning new customers and supporting service quality issues, while continually reducing development and operating costs. For all service providers, there is an intense drive to introduce both new value-added services and dramatic improvements in customer support. There is also an increasing need for service providers to manage the integration required in mergers and acquisitions activity due to the consolidation trend the industry is now experiencing.

For the full range of service providers and network operators, the leading focus of the TM Forum's mission is to enable end-to-end process automation of the business and operations processes that deliver information and communications services. The eTOM business process framework is the framework for accomplishing this mission.

The purpose of the eTOM framework is to continue to set a vision for the industry to compete successfully through the implementation of business-process driven approaches to managing the enterprise. This includes ensuring integration among all vital enterprise support systems concerned with service delivery and support. The focus of the eTOM framework is on the business processes used by service providers, the linkages between these processes, the identification of interfaces, and the use of customer, service, resource, supplier/partner and other information by multiple processes. Exploitation of information from every corner of the business will be essential to success in the future. In an e-business environment, automation to gain productivity enhancement, increased revenue and better customer relationships is vital. Perhaps at no other time has process automation been so critical to success in the marketplace. The over-arching objective of the eTOM framework is to continue to build on TM Forum's success in establishing:

- An "industry standard" business process framework.

- Common definitions to describe process elements of a service provider.

- Agreement on the basic information required to perform each process element within a business activity, and use of this within the overall NGOSS program for business requirements and information model development that can guide industry agreement on contract interfaces, shared data model elements, and supporting system infrastructure and products.

- A process framework for identifying which processes and interfaces are in most need of integration and automation, and most dependent on industry agreement.

This Recommendation, the eTOM business process framework, and the associated business process modelling, describes for an enterprise the process elements and their relationships that are involved in information and communications services and technologies management. Additionally, the points of interconnection that make up the end-to-end, customer operations process flows for fulfilment, assurance, billing within operations, and for strategy, infrastructure and product are addressed.

Note that, although eTOM framework has been focused on information and communications services and technologies management, this work is also proving to be of interest in other business areas.

Service providers need this common framework of processes to enable them to do business efficiently and effectively with other entities and to enable the development and use of third-party software without the need for major customization. In an e-business environment, this common understanding of process is critical to managing the more complex business relationships of today's information and communications services marketplace. e-business integration among enterprises seems to be most successful through strong process integration. Recent industry fallout, particularly in relation to dotcoms, does not reduce the pressure for e-business automation – it strengthens the need to capitalize on e-business opportunities to be successful.

However, the eTOM framework is not just an e-commerce or e-business process framework, it supports traditional business processes with the integration of e-business.

5.2   What is the eTOM?

The eTOM is a business process framework, i.e., a reference framework or model for categorizing all the business activities that a service provider will use. It is NOT a service provider business model. In other words, it does not address the strategic issues or questions of who a service provider's target customers should be, what market segments should the service provider serve,

what are a service provider's vision, mission, etc. A business process framework is one part of the strategic business model and plan for a service provider.

The eTOM framework is better regarded as a business process framework, rather than a business process model, since its aim is to categorize the process elements and business activities so that these can then be combined in many different ways, to implement end-to-end business processes (e.g., fulfilment, assurance, billing) which deliver value for the customer and the service provider. Key concepts that form the basis for the eTOM framework are outlined in Annex A and readers that are not familiar with the eTOM framework may wish to gain an initial view of these concepts, to provide context before reading the ITU-T Recommendations M.3050.x series.

Previous eTOM releases have established the eTOM business process framework as TM Forum member-approved, with global agreement from the highest conceptual level downwards and has gone on to take account of real-world experience in applying the eTOM framework, and to incorporate new detail in process decompositions, flows and business-to-business interaction. Beyond this, the eTOM work has potential to develop further in areas such as further lower-level process decompositions and flows, applications in specific areas of business, guidelines and assistance in using the eTOM framework, cost and performance issues associated with the processes, etc. In addition, ongoing feedback from the industry, together with its linkage with the wider NGOSS programme, can be used to guide future priorities for continuing work. It should be noted that the development of a full process framework is a significant undertaking, and the work must be phased over time based on member process priorities and member resource availability. This effect is visible in eTOM's history, from the early work on a business process map that carried through to the eTOM framework itself, broadening along the way to a total enterprise framework and the current release.

A great many service providers, as well as system integrators, ASPs and vendors, are working already with the eTOM framework. They need an industry standard framework for procuring software and equipment, as well as to interface with other service providers in an increasingly complex network of business relationships. Many service providers have contributed their own process models because they recognize the need to have a broader industry framework that does not just address operations or traditional business processes.

The TM Forum initially identified business processes as a consensus tool for discussion and agreement among service providers and network operators. This encouraged convergence and general support for a broad common base in this area, which has been built on and extended with the eTOM framework, to enable:

- Focused work to be carried out in TM Forum teams to define detailed business requirements, information agreements, business application contracts and shared data model specifications (exchanges between applications or systems) and to review these outputs for consistency.

- Relating business needs to available or required standards.

- A common process view for equipment suppliers, applications builders and integrators to build management systems by combining third party and in-house developments.

The anticipated result is that the products purchased by service providers and network operators for business and operational management of their networks, information technologies and services will integrate better into their environment, enabling the cost benefits of end-to-end automation. Furthermore, a common industry view on processes and information facilitates operator-to-operator, operator-to-customer and operator-to-supplier/partner process interconnection, which is essential for rapid service provisioning and problem handling in a competitive global environment. This process interconnection is the key to e-business supply chain management in particular.

The eTOM work also provides the definition of common terms concerning enterprise processes, sub-processes and the activities performed within each. Common terminology makes it easier for service providers to negotiate with customers, third-party suppliers and other service providers. Clauses 3 and 4 contain definitions of eTOM acronyms and terminology.

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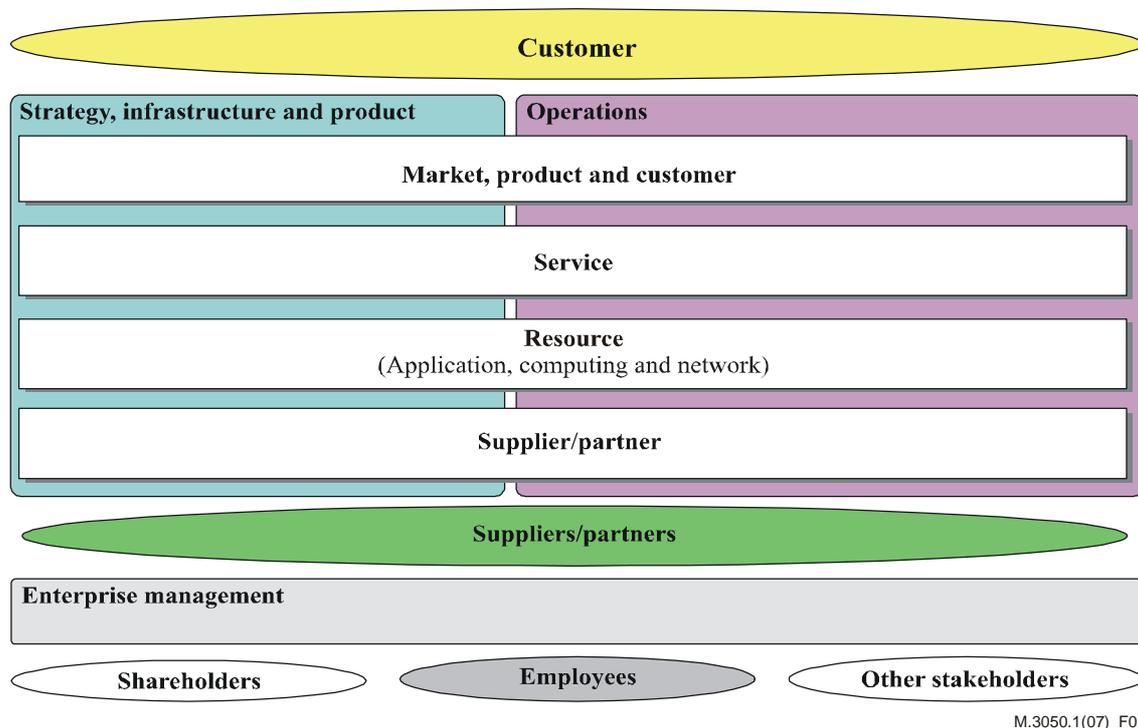
Figure 1 – eTOM business process framework – Level 0 processes

Figure 1 shows the highest conceptual view of the eTOM framework. This view provides an overall context that differentiates strategy and lifecycle processes from the operations processes in two large process areas, seen as the two major boxes in the upper part of the diagram. It also differentiates the key functional areas as horizontal layers across these process areas. The third major process area, concerned with management of the enterprise itself, is shown as a separate box in the lower part of the diagram. In addition, Figure 1 also shows the internal and external entities that interact with the enterprise (as ovals).

Figure 2 shows how the three major process areas, designated as level 0 processes of the eTOM business process framework, are decomposed into their constituent level 1 process groupings. This view thus provides the level 1 decomposition of the level 0 processes and gives an overall view of the eTOM framework. However, in practice it is the next level, the level 2 decomposition of the level 1 processes, at which users tend to work, as this degree of detail is needed in analysing their businesses. This view is presented later in this Recommendation in a series of diagrams examining each area of the eTOM framework.

Figure 2 also shows seven end-to-end vertical process groupings, which are the end-to-end processes that are required to support customers and to manage the business. Amongst these end-to-end vertical process groupings, the focal point of the eTOM framework is on the core customer operations processes of fulfilment, assurance and billing (FAB). Operations support and readiness (OSR) is differentiated from FAB real-time processes to highlight the focus on enabling support and automation in FAB, i.e., online and immediate support of customers, with OSR ensuring that the operational environment is in place to let the FAB processes do their job. Outside of the operations process area, in the strategy, infrastructure and product (SIP) process area, the strategy and commit vertical, as well as the two lifecycle management verticals, are differentiated. These are distinct

because, unlike operations, they do not directly support the customer, are intrinsically different from the operations processes and work on different business time cycles.
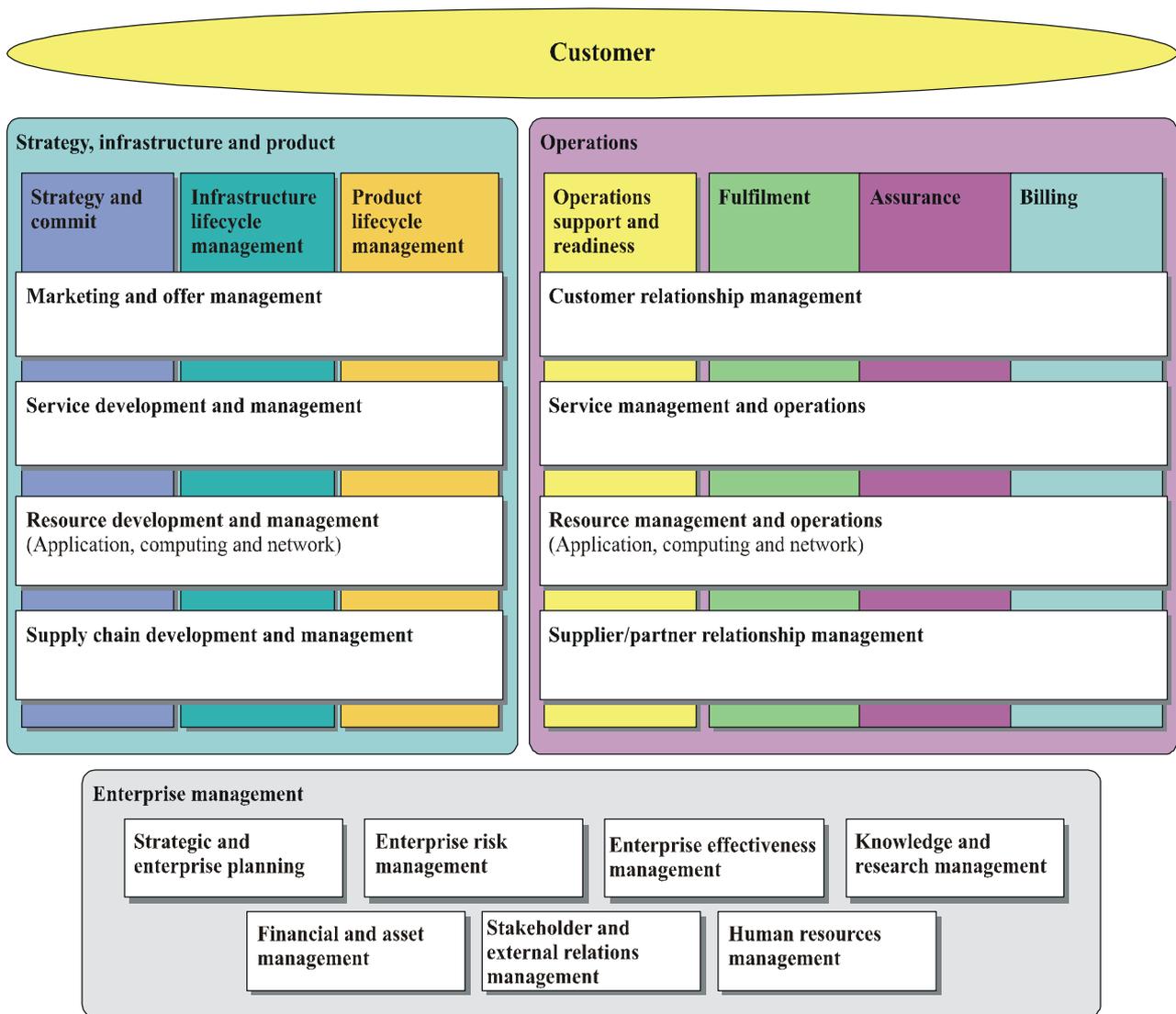
Figure 2 – eTOM business process framework – Level 1 processes

The horizontal functional process groupings in Figure 2 distinguish functional operations processes and other types of business functional processes, e.g., marketing versus selling, service development versus service configuration, etc. Amongst these horizontal functional process groupings, those on the left (that cross the strategy and commit, infrastructure lifecycle management and product lifecycle management vertical process groupings) enable, support and direct the work in the operations process area.

As can be seen in Figure 2, the eTOM framework provides the following benefits:

- It develops a scope addressing all enterprise processes.
- It distinctly identifies marketing processes to reflect their heightened importance in an e-business world.
- It distinctly identifies enterprise management processes, so that everyone in the enterprise is able to identify their critical processes, thereby enabling process framework acceptance across the enterprise.

- It brings fulfilment, assurance and billing (FAB) onto the high-level framework view to emphasize the customer priority processes as the focus of the enterprise.

- It defines an operations support and readiness vertical process grouping, that relates to all the operations functional layers. In integrating e-business and making customer self-management a reality, the enterprise has to understand the processes it needs to enable for direct and (more and more) online customer operations support and customer self-management.

- It recognizes three process groupings within the enterprise that are distinctly different from operations processes by identifying the SIP processes, i.e., strategy and commit, infrastructure lifecycle management and product lifecycle management.

- It recognizes the different cycle times of the strategy and lifecycle management processes and the need to separate these processes from the customer priority operations processes where automation is most critical. This is done by decoupling the strategy and commit and the two lifecycle management processes from the day-to-day, minute-to-minute cycle times of the customer operations processes.

- It moves from the older customer care or service orientation to a customer relationship management orientation that emphasizes customer self-management and control, increasing the value customers contribute to the enterprise and the use of information to customize and personalize to the individual customer. It adds more elements to this customer operations functional layer to represent better the selling processes and to integrate marketing fulfilment within customer relationship management. note that customer relationship management within the eTOM framework is very broadly defined and larger in scope than some definitions of CRM.

- It acknowledges the need to manage resources across technologies, (i.e., application, computing and network), by integrating the network and systems management functional process into resource management and operations. It also moves the management of IT into this functional layer as opposed to having a separate process grouping.

- It recognizes that the enterprise interacts with external parties, and that the enterprise may need to interact with process flows defined by external parties, as in e-business interactions.

5.3   eTOM is more than one document

It is intended that the eTOM business process framework will become a collection of documents and models. The current document set is described earlier in this Recommendation. In addition, a separate interactive eTOM business process framework model provides a version of the eTOM framework, processes and flows intended for automated processing by modelling tools, etc. This is intended to be available in several formats:

- Tool-based (e.g., XML for import into a general process analysis environment, specific tool formats where available).

- Browsable (e.g., HTML).

- To assist import/use (e.g., Excel).

5.4   Using this Recommendation

A service provider's specific process architecture and organization structure are highly specific and critical aspects of a provider's competitiveness. The eTOM framework provides a common view of service provider enterprise process elements or business activities that can easily translate to an individual provider's internal approaches. This Recommendation is *not* intended to be prescriptive about how the tasks are carried out, how a provider or operator is organized, or how the tasks are identified in any one organization. It is also not prescriptive about the sequence of process elements that are combined to implement end-to-end business process flows.

The eTOM framework provides a starting point for detailed work coordinated through TM Forum that leads to an integrated set of specifications that will provide real benefit to both suppliers and procurers in enhancing industry service provider enterprise process management capability. The eTOM framework is not a specification in the sense that vendors or operators must comply directly. However, it does represent an industry-wide standard way of naming, describing and categorizing process elements. It will enable unambiguous communication and facilitate the development of standard solutions and reuse of business processes. It is not intended to incorporate all the details of eventual process implementation, but is more a guiding reference for the industry.

One of the strengths of the eTOM framework is that it can be adopted at a variety of levels, in whole or in part, depending upon service providers' needs. The eTOM framework can also act as a translator by allowing a service provider to map their distinct processes to the industry framework. As the process examples are developed, service providers can use and adapt these examples to their own business environment.

The eTOM framework can be used as a tool for analysing organizations' existing processes and for developing new processes. Different processes delivering the same business functionality can be identified, duplication eliminated, gaps revealed, new process design speeded up, and variance reduced. Using the eTOM framework, it is possible to assess the value, cost and performance of individual processes within an organization.

Relationships with suppliers and partners can also be facilitated by identifying and categorizing the processes used in interactions with them. In a similar manner, it is possible to identify the all-important customer relationship processes and evaluate whether they are functioning as required to meet customers' expectations.

5.5   Intended audience

The eTOM aims at a wide audience of professionals in the information and communications technology (ICT) industry, an area that has evolved to focus more and more on services, and hence could now be referred to as information and communications services. For experienced telecommunications professionals, the eTOM framework has proven itself to be intuitive, and a strong, common framework of service provider enterprise processes. Through TM Forum Catalyst projects and other work, it has been verified that the eTOM framework has strong applicability in many applications and throughout many companies.

More information on use of eTOM within the industry is available at the TM Forum website http://www.tmforum.org.

The eTOM framework is aimed at service provider and network operator decision makers who need to know and input to the common business process framework used to enable enterprise automation in a cost efficient way. It is also an important framework for specialists across the industry working on business and operations automation. The document or framework supports, and is consistent with, many efforts under way in the industry supporting the need to accelerate business and operations automation in the information and communications services marketplace.

The eTOM framework will continue to give providers and suppliers a common basis for discussing complex business needs in a complex industry with complex technologies. For both service providers and network operators, additional complexities arise from:

- Moving away from developing their own business and operations systems software, to a more procurement and systems integration approach.
- New business relationships between service providers and network operators.

The creation of new business relationships and the move away from developing internally are a reaction to market forces. These market forces require service providers and network operators to increase the range of services they offer, reduce time to market for new services, increase speed of service, as well as to drive down systems and operational costs.

The eTOM framework is also aimed at service provider and network operator employees involved in business process re-engineering, operations, procurement and other activities for:

- Understanding the common business process framework being used to drive integration and automation.
- Becoming involved in providing processes, inputs, priorities and requirements.

The eTOM framework is also aimed at designers and integrators of business and operational management systems software and equipment suppliers. They can benefit from understanding how management processes and applications need to work together to deliver business benefit to service providers and network operators.

An equally important and related audience is suppliers of management applications, management systems, and networking equipment, who need to understand the deployment environment for their products and solutions.

The eTOM framework provides a common reference useful in supporting the significant amount of merger and acquisition activity. Common process understanding and a common process framework can greatly improve integration performance for mergers and acquisitions. The eTOM framework is applicable for an established service provider or a new entrant "green field" provider. It is important to note that not all areas defined in the eTOM framework are necessarily used by all providers. As mentioned earlier, the framework is flexible so that the process elements that the specific service providers require can be selected on a modular basis and at the appropriate level of detail for their needs.

5.6   Benefits of using the eTOM framework

- It makes available a standard structure, terminology and classification scheme for describing business processes and their constituent building blocks.
- It supplies a foundation for applying enterprise-wide discipline to the development of business processes.
- It provides a basis for understanding and managing portfolios of IT applications in terms of business process requirements.
- Its use enables consistent and high-quality end-to-end process flows to be created, with opportunities for cost and performance improvement, and for reuse of existing processes and systems.
- Its use across the industry will increase the likelihood that off-the-shelf applications will be readily integrated into the enterprise, at a lower cost than custom-built applications.

6   The eTOM business process framework

The main purpose of this clause is to introduce a formal description of the eTOM business process framework.

It should be noted that this framework was originally developed from the perspective of the single enterprise, but recognized that internal processes extend across the enterprise boundary to allow for interactions with external parties (customers and suppliers/partners).

In some cases these external interactions can be defined and controlled by the enterprise, and the existing eTOM framework has assumed that the currently identified process elements would form part of the end-to-end inter-enterprise or enterprise-to-customer process interaction in these cases.

However, with the rise of e-business, several industries have developed inter-enterprise business process frameworks which specify the structure and flow of process interactions between multiple enterprises. As yet no complete formal B2B inter-enterprise process framework exists for the ICT industry, although aspects of frameworks such as ebXML and RosettaNet are re-useable.

To facilitate the development of a formalized inter-enterprise B2B process framework for the ICT industry, the eTOM team is developing a separate inter-enterprise eTOM B2B Business Operations Map. This work is initially published in [b-TMF GB921B] and [b-TMF GB921C] (which form part of this b-TMF document set – see earlier). This work leverages elements of existing industry frameworks, as well as the relevant areas of the existing eTOM framework itself, where possible.

This clause describes the eTOM framework that forms the core structure supporting the single enterprise view as discussed above, and touches only briefly on the inter-enterprise view (where there is some further background in clause 7). A more formal description of the inter-enterprise framework and the eTOM B2B Business Operations Map can be found in [b-TMF GB921B] and [b-TMF GB921C].

6.1 Core eTOM single enterprise viewpoint

The eTOM business process framework considers the service provider's (SP's) enterprise and positions this within its overall business context: i.e., the business interactions and relationships, which allow the SP to carry on its business with other organizations.

This clause introduces the eTOM framework and explains its structure and the significance of each of the process areas within it. It also shows how the eTOM framework structure is decomposed to lower-level process elements. This explanation is useful for those who decide where and how an enterprise will use the eTOM framework, and those who may be modifying it for use in their enterprise.

To assist the reader in locating the process area concerned within the eTOM framework, a graphical icon of the eTOM structure, alongside the text, is provided to draw attention to the relevant framework area. This is shaded in red to indicate the focus of the associated text or discussion.

6.1.1 eTOM framework conceptual view (level 0)
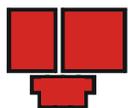
The eTOM business process framework represents the whole of a service provider's enterprise environment. At the overall conceptual level, the eTOM framework can be viewed as having three major process areas, as shown in Figure 3.

- Strategy, infrastructure and product – Covering planning and lifecycle management (associated with development and delivery).
- Operations – Covering the core of operational management.
- Enterprise management – Covering corporate or business support management.
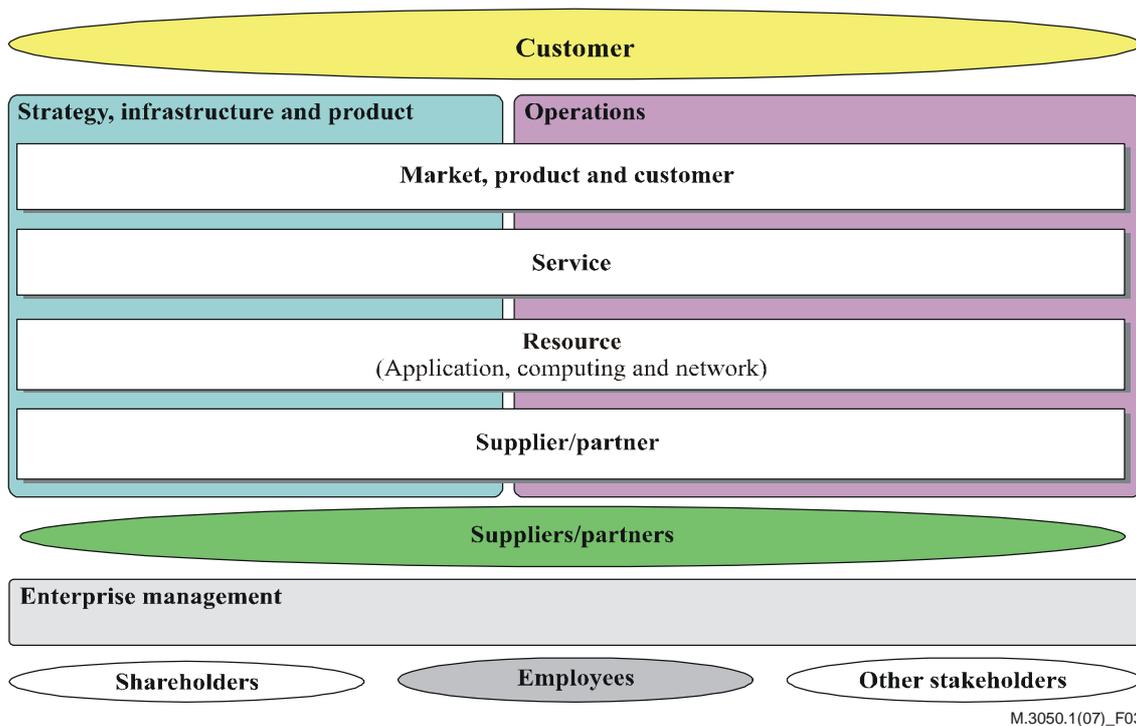
Figure 3 – eTOM business process framework conceptual structure

The conceptual structure view provides an overall context that differentiates strategy and lifecycle processes from operations processes in two large process areas, seen as the two large boxes towards the top of the diagram, together with a third area beneath which is concerned with enterprise management. It also identifies the key functional process structures in four horizontal blocks across the two upper process areas. In addition, Figure 3 shows the internal and external entities (as ovals) that interact with the enterprise.

At this highest conceptual level, the three basic process areas are outlined below.
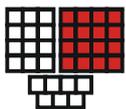
- The operations process area is the traditional heart of the SP enterprise, and of the eTOM framework. It includes all operations processes that support the customer (and network) operations and management, as well as those that enable direct customer operations with the customer. These processes include both day-to-day and operations support and readiness processes. The eTOM framework view of operations also includes sales management and supplier/partner relationship management.
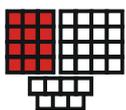
- The strategy, infrastructure and product process area includes processes that develop strategies, and commitment to them, within the enterprise; that plan, develop and manage the delivery and enhancement of infrastructures and products; and that develop and manage the supply chain. In the eTOM framework, infrastructure refers to more than just the resource (IT and network) infrastructure that directly supports products and services. It also includes the operational and organizational infrastructure required to support marketing, sales, service and supply chain processes, e.g., customer relationship management (CRM). These processes direct and enable processes within the operations process area.
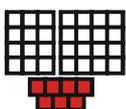
- The enterprise management process area includes those basic business processes that are required to run and manage any large business. These generic processes focus on both the setting and achieving of strategic corporate goals and

objectives, as well as providing those support services that are required throughout an enterprise. These processes are sometimes considered to be the corporate functions and/or processes, e.g., financial management, human resources management processes, etc. Since enterprise management processes are aimed at general support within the enterprise, they may interface as needed with almost every other process in the enterprise, be they operational, strategy, infrastructure or product processes.

The conceptual view of the eTOM business process framework addresses both the major process areas as above and, just as importantly, the supporting functional process structures, depicted as horizontal blocks in Figure 3. The functional process blocks reflect the major expertise and areas of focus required to pursue the business. The four functional process blocks are described below:

- The market, product and customer processes include those dealing with sales and channel management, marketing management and product and offer management, as well as operational processes such as managing the customer interface, ordering, problem handling, SLA management and billing.
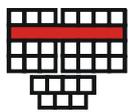
- The service processes include those dealing with service development and delivery of service capability, service configuration, service problem management, quality analysis and rating.
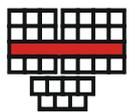
- The resource processes include those dealing with development and delivery of resource (network and IT) infrastructure, and its operational management including aspects such as provisioning, trouble management and performance management. Resource infrastructure supports products and services, as well as supporting the enterprise itself.
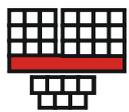
- The supplier/partner processes include those dealing with the enterprise's interaction with its suppliers and partners. This involves both processes that develop and manage the supply chain that underpins product and infrastructure, as well as those that support the operational interface with its suppliers and partners.

Additionally, in Figure 3, the major entities with which the enterprise interacts are shown. These are:

- Customers, to whom products are sold by the enterprise: the focus of the business!

- Suppliers, who provide resources or other capabilities, bought and used by the enterprise directly or indirectly to support its business.

- Partners, with whom the enterprise cooperates in a shared area of business.

- Employees, who work for the enterprise to pursue its business goals.

- Shareholders, who have invested in the enterprise and thus own stock.

- Stakeholders, who have a commitment to the enterprise other than through stock ownership.

6.1.2   eTOM business process framework CxO level view (level 1)

Below the conceptual level, the eTOM business process framework is decomposed into a set of level 1 process groupings, which provide a first level of detail at which the entire enterprise can be viewed (see Figure 4). These process groupings are considered from the perspective of the CEO, CIO, CTO, etc., in that the performance of these processes determines the success of the enterprise.
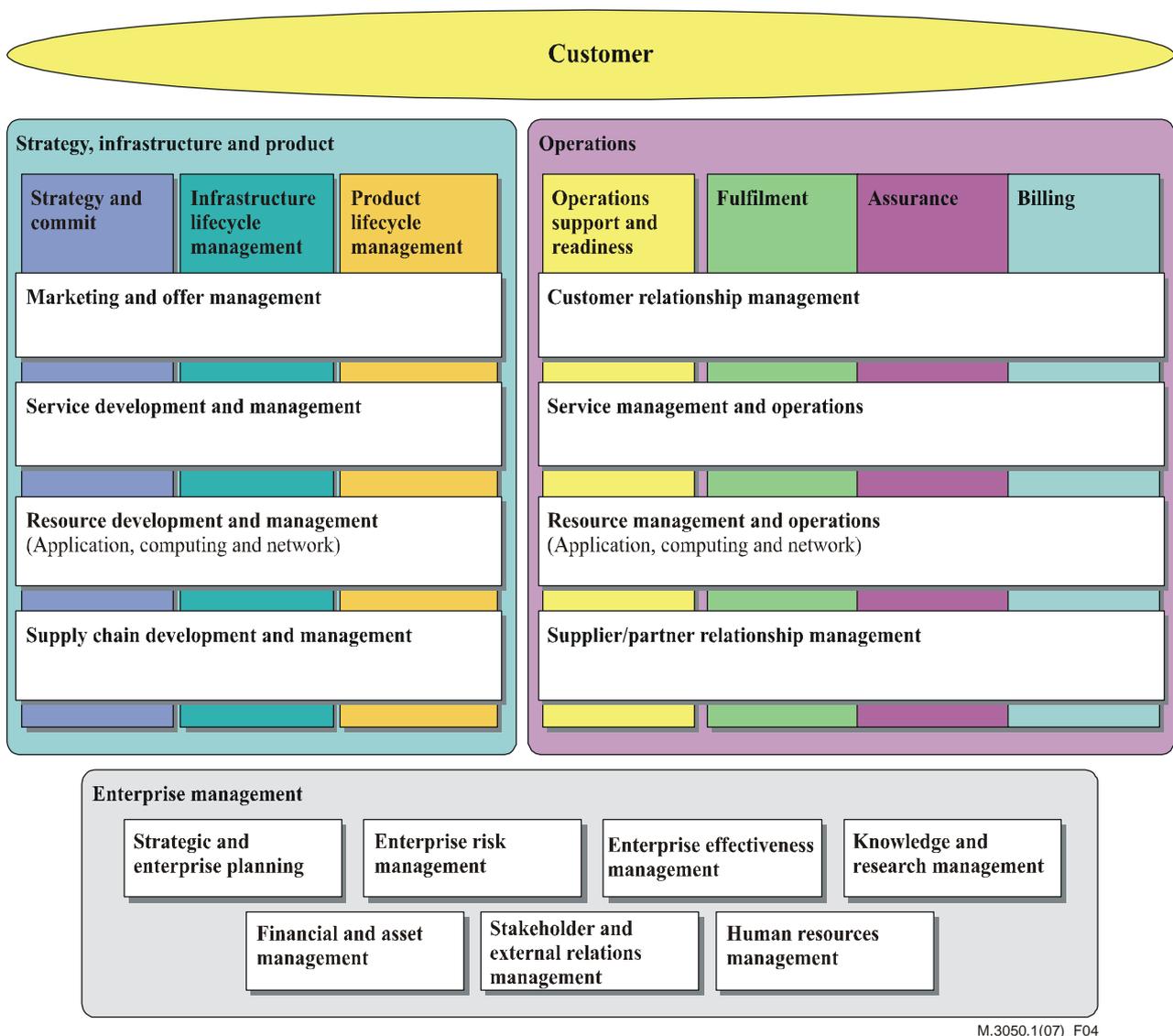
Figure 4 – eTOM level 0 view of level 1 process groupings

The eTOM framework is defined as generically as possible so that it is independent of organization, technology and service. The eTOM is basically intuitive, business driven and customer focused. To reflect the way businesses look at their processes, the eTOM supports two different perspectives on the grouping of the detailed process elements.
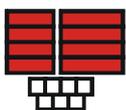
Horizontal level 1 process groupings, which represent a view of functionally-related processes within the business, such as those involved in managing contact with the customer or in managing the supply chain. This structuring by horizontal functional process groupings is useful to those who are responsible for creating the capability that enables, supports or automates the processes. The horizontal functional process groupings can therefore often represent the CIO's view of the eTOM framework. The IT teams will look at groups of IT functions which tend to be implemented together, e.g., the front-of-house applications in the customer relationship management process grouping; back-of-house applications in the service management and operations process grouping which focus on managing information about the services that are packaged for sale to customers; or the network management applications in the resource management and operations process grouping which focus on the technology which delivers the services. Typical organization workgroups also tend to align with

these horizontal functional process groupings as the required knowledge and skills tend to be contained in these functional processes, e.g., the front-of-house workgroups in the customer relationship management process grouping, back-of-house workgroups customers in the service management and operations process grouping, which focus on managing information about the services that are packaged for sale to customers; or the network management workgroups services in the resource management and operations process grouping which focus on the technology which delivers the services.
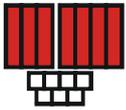
Vertical level 1 process groupings, which represent a view of end-to-end processes within the business, such as those involved in the overall billing flows to customers. This end-to-end view is important to those people who are responsible for changing, operating and managing the end-to-end processes. These processes tend to span organization boundaries, and so the end-to-end effectiveness of these processes is an area of concern to senior management and particularly the CEO. The end-to-end vertical process groupings can therefore often represent the CEO's view of the eTOM framework. These people are more interested in the outcomes of the process and how they effectively support customer needs in total, rather than worrying about the IT or the specific workgroups that need to work together to deliver the result.

The eTOM business process framework was developed to help build and implement the processes for a service provider. It has been developed as a structured catalogue or hierarchical taxonomy of process elements which can be viewed in more and more detail. Since in any taxonomy each element must be unique, it was decided from the start that the primary top-level hierarchy of process elements would be the functional (horizontal) groupings. The end-to-end process (vertical) groupings are arranged as an overlay on the horizontal groupings.
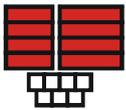
When viewed in terms of the horizontal functional process groupings, the eTOM business process framework follows a strict hierarchy where every element is only associated with or parented to a single element at the next higher hierarchical level. In a taxonomy, any element must be unique, i.e., it must be listed only once. Figure 4 shows the level 1 horizontal functional process groupings into which the eTOM framework is decomposed.

Additionally, the eTOM framework is intended to help service providers manage their end-to-end business processes. With this in mind, the eTOM shows how process elements have a strong association with one (or several) end-to-end vertical business processes (e.g., fulfilment, assurance, billing, product lifecycle management, etc., which are introduced later in this clause). These vertical end-to-end process groupings are essentially overlays onto the hierarchical top-level horizontal groupings because, in a hierarchical taxonomy, an element cannot be associated with or parented to more than one element at the next higher level.
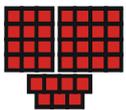
The overlay of the horizontal functional process groupings and the vertical end-to-end process groupings forms the inherent matrix structure of the eTOM framework. This matrix structure is the core of one of the innovations and fundamental benefits of the eTOM framework. It offers for the first time a standard language and structure for the process elements that can be understood and used by both the people specifying and operating the end-to-end business, and also those people who are responsible for creating the capability that enables the processes (whether automated by IT or implemented manually by workgroups).

The integration of all these processes provides the enterprise-level process framework for the information and communications service provider, and Figure 4 reveals the process detail to level 1. As process decomposition proceeds, each level is decomposed into a set of constituent process elements at the level below. Thus, level 0 is decomposed into level 1 processes, level 1 into level 2, and so on.
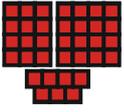
Thus, the enterprise level 0 conceptual view decomposes into seven level 1 vertical end-to-end process groupings, as well as eight level 1 horizontal functional process groupings in four layers. These vertical and horizontal process groupings represent alternative views relevant to different concerns about the way that processes should be associated. Note that we will see that these alternatives have been selected to yield a single common view of the level 2 processes defined at the next level of decomposition, and hence do not represent a divergence in the modelling.

In addition, there are seven additional enabling and support level 1 process groupings within enterprise management. This full view of the level 1 processes is shown in Figure 4.

6.1.3 Operations process area level 1 process groupings

To be useful to a service provider, the eTOM framework must help the service provider to develop and operate their business processes. This clause shows how the matrix structure of the eTOM framework offers for the first time a standard language and structure for the process elements that are understood and used by the people both specifying and operating the end-to-end business, and also those people who are responsible for creating the capability that enables the processes (whether automated by IT or implemented manually by workgroups).

6.1.3.1 Operations vertical process groupings
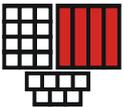
The operations (OPS) process area contains the direct operations vertical end-to-end process groupings of fulfilment, assurance and billing (the FAB process groupings), together with the operations support and readiness process grouping (see Figure 5). The FAB process groupings are sometimes referred to as customer operations processes.
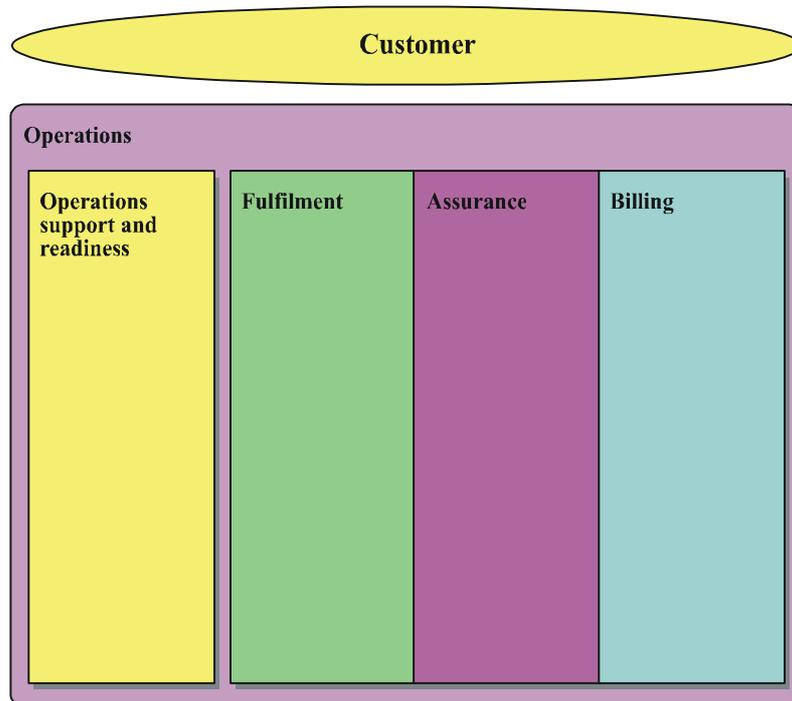
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Figure 5 – eTOM OPS vertical process groupings
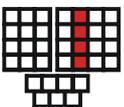
Fulfilment: This vertical end-to-end process grouping is responsible for providing customers with their requested products in a timely and correct manner. It translates the customer's business or personal need into a solution, which can be delivered using the specific products in the enterprise's portfolio. This process informs the customers of the

status of their purchase order, ensures completion on time, as well as ensuring a delighted customer.

Assurance: This vertical end-to-end process grouping is responsible for the execution of proactive and reactive maintenance activities to ensure that services provided to customers are continuously available and performing to SLA or QoS performance levels. It performs continuous resource status and performance monitoring to proactively detect possible failures. It collects performance data and analyses them to ide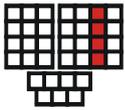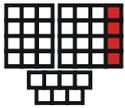ntify potential problems and resolve them without impact to the customer. This process manages the SLAs and reports service performance to the customer. It receives trouble reports from the customer, informs the customer of the trouble status, and ensures restoration and repair, as well as ensuring a delighted customer.

Billing: This vertical end-to-end process grouping is responsible for the collection of appropriate usage records; production of timely and accurate bills; providing pre-bill use information and billing to customers; processing their payments; and performing payment collections. In addition, it handles customer inquiries about bills, provides billing inquiry status and is responsible for resolving billing problems to the customer's satisfaction in a timely manner. This process grouping also supports prepayment for services.

For a high-level view of how the eTOM framework can be used to create fulfilment, assurance and billing process flows, see [b-TMF GB921F].

In addition to these FAB process groupings, the OPS process area of the eTOM framework contains a new, fourth vertical end-to-end process grouping: operations support and readiness (see Figure 5).
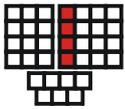
Operations support and readiness: This vertical end-to-end process grouping is responsible for providing management, logistics and administrative support to the FAB process groupings and for ensuring operational readiness in the fulfilment, assurance and billing areas. In general, end-to-end processes in this grouping are concerned with activities that are less "real-time" than those in FAB, and which are typically concerned less with individual customers and services and more with ensuring the FAB vertical end-to-end processes run effectively. A clear example of these types of processes are the staffing capacity management processes which are used to ensure efficient operation of call centres. They reflect a need in some enterprises to divide their processes between the immediate customer-facing and real-time operations of FAB and other operations processes which act as a "second-line" or "operations management back-room". Not all enterprises will choose to employ this split, or to position the division in exactly the same place, so it is recognized that in applying the eTOM framework in particular scenarios, the processes in operations support and readiness and in FAB may be merged for day-to-day operation. Nevertheless, it is felt important to acknowledge this separation to reflect a real-world division that is present or emerging in many enterprises. The separation, definition and execution of the operations support and readiness processes can be critical in taking advantage of e-business opportunities and is particularly important for successful implementation of customer self-management.

6.1.3.2   Operations horizontal functional process groupings
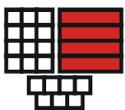
In the OPS process area of the eTOM framework, there are four OPS functional process groupings that support the operations processes discussed above, and also the management of operations to support customer, service, resource and supplier/partner interactions (see Figure 6).

Note that the ITU-T TMN logical layered architecture with business, service, and network layers was originally used to help organize the core business processes, as this facilitated mapping of the

management functions defined in TMN to the processes. This loose coupling has been maintained in the evolution of the eTOM framework since the TMN layering approach is still relevant. More widely, the TM Forum is working with ITU-T to harmonize the eTOM and TMN models. See References for further information on ITU-T TMN.

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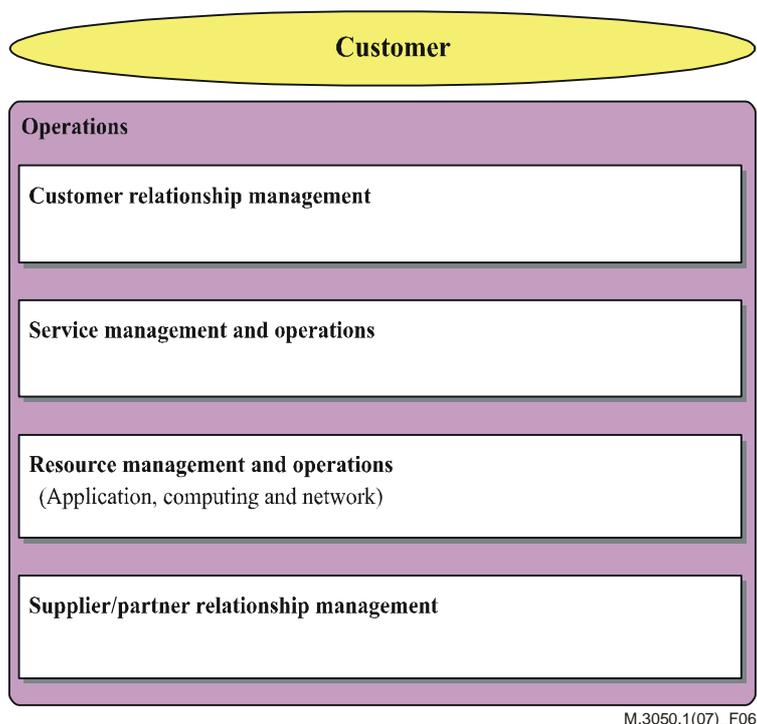
Figure 6 – eTOM operations horizontal functional process groupings

Customer relationship management (CRM): This horizontal functional process grouping considers the fundamental knowledge of customer needs and includes all functionalities necessary for the acquisition, enhancement and retention of a relationship with a customer. It is about customer service and support, whether storefront, telephone, web or field service. It is also about retention management, cross-selling, up-selling and direct marketing for the purpose of selling to customers. CRM also includes the collection of customer information and its application to personalize, customize and integrate delivery of service to a customer, as well as to identify opportunities for increasing the value of the customer to the enterprise.

CRM applies to both conventional retail customer interactions, as well as to wholesale interactions, such as when an enterprise is selling to another enterprise that is acting as the "retailer".

CRM makes no distinction between manual or automated interactions with customers, nor whether interactions are by paper, telephone, web-based transactions or some other alternative arrangement.
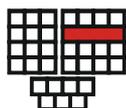
Service management and operations (SM&O): This horizontal functional process grouping focuses on the knowledge of services (access, connectivity, content, etc.) and includes all functionalities necessary for the management and operations of communications and information services required by or proposed to customers. The focus is on service delivery and management as opposed to the management of the underlying network and information technology. Some of the functions involve short-term service capacity planning for a service instance; the application of a service design to specific customers; or managing service improvement initiatives. These functions are closely connected with the day-to-day customer experience.

The processes in this horizontal functional process grouping are accountable to meet, at a minimum, targets set for service quality, including process performance and customer satisfaction at a service level, as well as service cost.

The eTOM framework differentiates day-to-day operations and support from planning and development and other strategy and lifecycle processes. This better depicts the structure of an enterprise, especially in an e-business era.
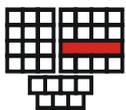
Resource management and operations (RM&O): This horizontal functional process grouping maintains knowledge of resources (application, computing and network infrastructures) and is responsible for managing all these resources (e.g., networks, IT systems, servers, routers, etc.) utilized to deliver and support services required by or proposed to customers. It also includes all functionalities responsible for the direct management of all such resources (network elements, computers, servers, etc.) utilized within the enterprise. These processes are responsible for ensuring that the network and information technologies infrastructure supports the end-to-end delivery of the required services. The purpose of these processes is to ensure that infrastructure runs smoothly, is accessible to services and employees, is maintained and is responsive to the needs, whether directly or indirectly, of services, customers and employees. RM&O also has the basic function to assemble information about the resources (e.g., from network elements and/or element management systems), and then integrate, correlate and, in many cases, summarize that data to pass on the relevant information to Service management systems or to take action in the appropriate resource.

In an e-business world, application and computing management are as important as management of the network resources. Moreover, network, computing and applications resources must increasingly be managed in a joint and integrated fashion. To cope with these needs, the eTOM framework includes the resource management and operations process grouping (together with the corresponding resource development and management grouping within SIP) to provide integrated management across these three sets of resources: applications, computing and network. These areas also encompass processes involved with traditional network element management since these processes are actually critical components of any resource management process as opposed to a separate process layer.

The RM&O processes thus manage the complete service provider network and sub-network and information technology infrastructures.

The eTOM framework differentiates day-to-day operations and support from planning and development, and other strategy and lifecycle processes. This better depicts the structure of an enterprise, especially in an e-business era.
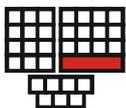
Supplier/partner relationship management (S/PRM): This horizontal functional process grouping supports the core operational processes, both the customer instance processes of fulfilment, assurance and billing, and the functional operations processes. Supplier/partner relationship management (S/PRM) processes align closely with suppliers' or partners' customer relationship management processes. The inclusion of distinct supplier/partner relationship management processes in the eTOM framework enables the direct interface with the appropriate lifecycle, end-to-end customer operations, or functional processes with suppliers and/or partners. The processes include issuing requisitions and tracking them through to delivery, mediation of requisitions as required to conform to external processes, handling problems, validating billing and authorizing payment, as well as quality management of suppliers and partners.

It is important to note that when the enterprise sells its products to a partner or supplier, this is done through the enterprise CRM processes, which act on behalf of the supplier or the enterprise in such cases. Supplier/partner processes only cover the buying of services by the enterprise.

6.1.4   Strategy, infrastructure and product process area level 1 process groupings

6.1.4.1   SIP vertical end-to-end process groupings
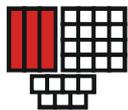
The strategy and commit, infrastructure lifecycle management and product lifecycle management process groupings are shown as three vertical end-to-end process groupings (see Figure 7). The strategy and commit vertical end-to-end process grouping provides the focus within the enterprise for generating specific business strategy and gaining buy-in within the business for this. Product lifecycle management vertical end-to-end process grouping drives and supports the provision of products to customers, while the infrastructure lifecycle management vertical end-to-end process grouping delivers new or enhanced infrastructure on which the products are based. Their focus is on meeting customer expectations whether as product offerings, the infrastructure that supports the operations functions and products, or the suppliers and partners involved in the enterprise's offering to customers.
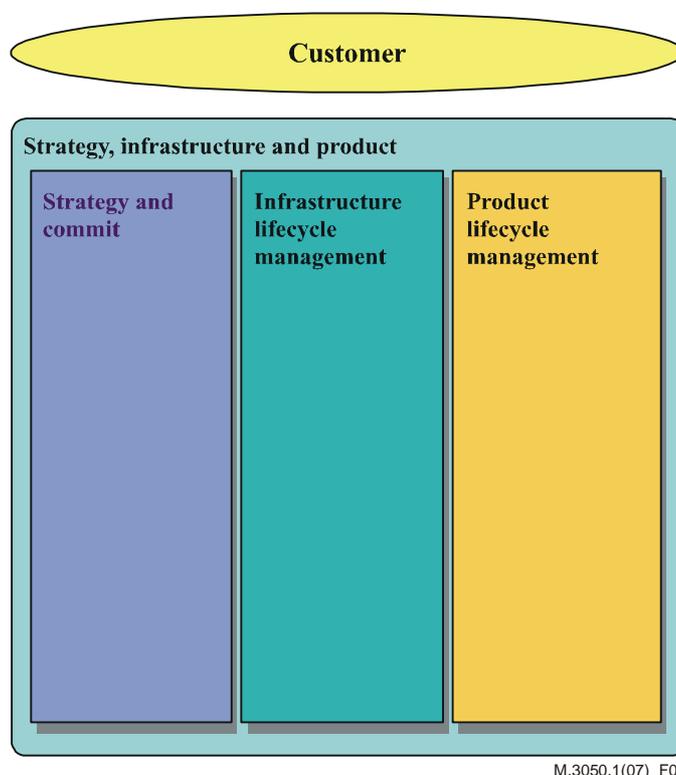
Figure 7 – eTOM SIP vertical end-to-end process groupings
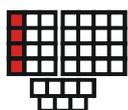
Strategy and commit: This vertical end-to-end process grouping is responsible for the generation of strategies in support of the infrastructure and product lifecycle processes. It is also responsible for establishing business commitment within the enterprise to support these strategies. This embraces all levels of operation from market, customer and products, through the services and the resources on which these depend, to the involvement of suppliers and partners in meeting these needs. Strategy and commit processes are heavily focused on analysis and commitment management. These processes provide the focus within the enterprise for generating specific business strategy and gaining buy-in within the business to implement this strategy. Strategy and

commit processes also track the success and effectiveness of the strategies and make adjustments as required.
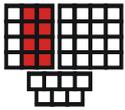
Lifecycle management: These vertical end-to-end process groupings drive and enable core operations and customer processes to meet market demand and customer expectations. Performance of lifecycle processes are viewed at the highest levels of the enterprise, due to their impact on customer retention and competitiveness. There are two end-to-end lifecycle management processes introduced in the eTOM framework, i.e., infrastructure and product. Both end-to-end processes have a development and deployment nature, in terms of introducing new infrastructure or a new product. Infrastructure lifecycle management deals with development and deployment of new infrastructure, assessing performance of the infrastructure and taking action to meet performance commitments. Product lifecycle management deals with introducing new products in the form of services delivered to customers and assessing and taking action on product performance.

The eTOM framework consciously decouples the lifecycle management processes from day-to-day operations processes represented by the operations processes (operations support and readiness, fulfilment, assurance and billing). In the past, some of these processes were not distinguished from the core operations framework and this sometimes resulted in some confusion and lack of guidance for designing processes. Lifecycle management vertical end-to-end processes have different business cycle times, different types of objectives for the enterprise and are inherently different processes than operations processes, i.e., enabling processes rather than operations processes. Mixing these processes with the customer operational processes diminishes focus on the lifecycle management vertical end-to-end processes. In addition, lifecycle management processes need to be designed to meet cycle time and other performance characteristics critical to the success of the enterprise, e.g., new product time to market and infrastructure unit cost. The lifecycle management end-to-end processes interact with each other. For example, the product lifecycle management vertical end-to-end process drives the majority of the direction for the infrastructure lifecycle management vertical end-to-end processes either directly or indirectly. However, infrastructure lifecycle management vertical end-to-end processes are also driven by decisions within the strategy and commit vertical end-to-end processes to deploy new infrastructure in support of new business directions. These processes prepare the customer and functional operations processes to support customer interaction for products, providing the infrastructure for the products to use and providing the supplier and partner interface structure for the enterprise offers. To enable and support customer and functional operations, these processes often have to synchronize for on-time and quality delivery.
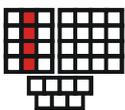
Infrastructure lifecycle management: This vertical end-to-end process grouping is responsible for the definition, planning and implementation of all necessary infrastructures (application, computing and network), as well as all other support infrastructures and business capabilities (operations centres, architectures, etc.). This applies in connection with the resource layer or any other functional layer, e.g., CRM voice response units, required to provide information and communications products to the customer and to support the business. These vertical end-to-end processes identify new requirements, new capabilities and design and develop new or enhanced infrastructure to support products. Infrastructure lifecycle management vertical end-to-end processes respond to the needs of the product lifecycle management vertical end-to-end processes, whether they are unit cost reductions, product quality improvements, new products, etc.
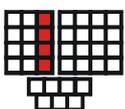
Product lifecycle management: This vertical end-to-end process grouping is responsible for the definition, planning, design and implementation of all products in the enterprise's portfolio. The product lifecycle management vertical end-to-end processes manage products to required profit and loss margins, customer satisfaction

and quality commitments, as well as delivering new products to the market. These lifecycle processes understand the market across all key functional areas, the business environment, customer requirements and competitive offerings in order to design and manage products that succeed in their specific markets. Product management processes and the product development process are two distinct process types. Product development is predominantly a project-oriented process that develops and delivers new products to customers as well as new features and enhancements for existing products and services.

6.1.4.2   SIP horizontal functional process groupings
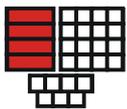
Corresponding to the operations horizontal functional process groupings (see above), there are also four horizontal functional process groupings in the strategy infrastructure and product process area (see Figure 8). These support the SIP vertical end-to-end processes described above and the management of operations to support marketing and offer, service, resource and supply chain interactions.

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Figure 8 – eTOM SIP horizontal functional process groupings

Marketing and offer management: This horizontal functional process grouping focuses on the knowledge of running and developing the core business for an information and communications service provider enterprise. It includes functionalities necessary for defining strategies, developing new products, managing existing products and implementing marketing and offering strategies especially suitable for information and communications products and services.

Marketing and offer management are well-known business processes especially in the more competitive e-business environment where the rate of innovation and brand recognition determine success. Although most companies carry out all these activities, depending upon the size of the company, they are combined in a variety of ways. These processes are enabling processes, but also the key processes that are accountable for commitment to the enterprise for revenue, overall product results and profit and loss. These processes deal with the creation of product, markets and channels;

they manage market and product strategies, pricing, sales, channels, new product development (and retirement), marketing communications and promotion.
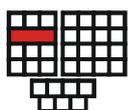
Service development and management: This horizontal functional process grouping focuses on planning, developing and delivering services to the operations domain. It includes processes necessary for defining the strategies for service creation and design, managing existing services and ensuring that capabilities are in place to meet future service demand.
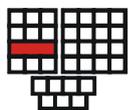
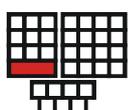**Resource development and management**: This horizontal functional process grouping focuses on planning, developing and delivering the resources needed to support services and products to the operations domain. It includes processes necessary for defining the strategies for development of the network and other physical and non-physical resources, introduction of new technologies and interworking with existing ones, managing existing resources and ensuring that capabilities are in place to meet future service needs.

Supply chain development and management: This horizontal functional process grouping focuses on the interactions required by the enterprise with suppliers and partners who are involved in maintaining the supply chain. The supply chain is a complex network of relationships that a service provider manages to source and deliver products. In the e-business world, companies are increasingly working together with suppliers and partners (synergistic clusters, coalitions and business ecosystems) in order to broaden the products they offer and improve their productivity. These processes ensure that the best suppliers and partners are chosen as part of the enterprise supply chain. They help to support sourcing decisions made by the enterprise and ensure that the capabilities are in place for interaction between the enterprise and its suppliers and partners. They ensure that the contribution of suppliers and partners to the supply chain is timely and delivers the required support and that their overall contribution is as good or better than that for vertically integrated enterprises. These processes include establishing and maintaining all the information flows, managing any mediation required, and financial flows between the provider and supplier.

6.1.5   Enterprise management process area level 1 process groupings
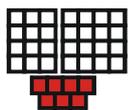
This process area includes those processes that manage enterprise-wide activities and needs or have application within the enterprise as a whole. They encompass all business management processes that:

- are necessary to support the whole of the enterprise, including processes for financial management, legal management, regulatory management, process, cost and quality management, etc.;

- are responsible for setting corporate policies, strategies and directions and for providing guidelines and targets for the whole of the business, including strategy development and planning, for areas such as enterprise architecture that are integral to the direction and development of the business;

- occur throughout the enterprise, including processes for project management, performance assessments, cost assessments, etc.
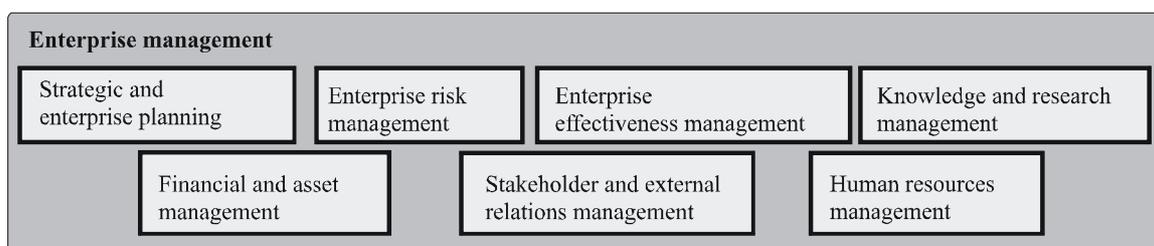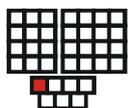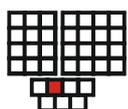
Figure 9 – eTOM enterprise management process groupings

Many process groupings within enterprise management (see Figure 9) will contain elements that relate to both policy setting and support of the enterprise. For example, human resources management is concerned with both strategy and direction as well as supporting the management of human resources throughout the enterprise[1].

These processes are sometimes collectively considered as the "corporate" functions and/or processes.

Strategic and enterprise planning: This enterprise management process grouping focuses on the processes required to develop the strategies and plans for the service provider enterprise. This process grouping includes the discipline of strategic planning that determines the business and focus of the enterprise, including which markets the enterprise will address, what financial requirements must be met, what acquisitions may enhance the enterprise's financial or market position, etc. Enterprise planning develops and coordinates the overall plan for the business working with all key units of the enterprise. These processes drive the mission and vision of the enterprise. Enterprise architecture management is also a key process within this process grouping. This also directs IT across the enterprise, provides IT guidelines and policies, funding approval, etc. (note that IT development and management processes are managed within the resource development and management horizontal functional process grouping).

Enterprise risk management: This enterprise management process grouping focuses on assuring that risks and threats to the enterprise value and/or reputation are identified, and appropriate controls are in place to minimize or eliminate the identified risks. The identified risks may be physical or logical/virtual. Successful risk management ensures that the enterprise can support its mission-critical operations, processes, applications, communications in the face of serious incidents from security threats/violations, and fraud attempts.
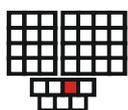
Enterprise effectiveness management: This enterprise management process grouping focuses on defining and providing the tools, methodologies and training to ensure that the enterprise operational processes and activities are managed and run efficiently and effectively. These processes ensure that the enterprise's operational processes evolve as required over time; that program and project management processes are effective; and that quality and performance management processes are effective.

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[1] Note that functionality associated with a process grouping that is not required throughout the enterprise will not normally be located within enterprise management (for example, human resource management issues specific to call centres are likely to be associated with the processes in operations directly involved in this area).
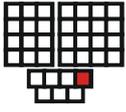
Knowledge and research management: This enterprise management process grouping focuses on knowledge management, technology research within the enterprise and evaluation of potential technology acquisitions.
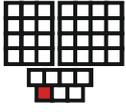
Financial and asset management: This enterprise management process grouping focuses on managing the finances and assets of the enterprise. Financial management processes include accounts payable, accounts receivable, expense reporting, revenue assurance, payroll, book closings, tax planning and payment, etc. The financial management processes collect data, report on and analyse the results of the enterprise. They are accountable for overall management of the enterprise income statement. Asset management processes set asset policies, track assets and manage the overall corporate balance sheet.

Stakeholder and external relations management: This enterprise management process grouping focuses on managing the enterprise's relationship with stakeholders and outside entities. Stakeholders include shareholders, employee organizations, etc. Outside entities include regulators, local community, and unions. Some of the processes within this grouping are shareholder relations, external affairs, labour relations and public relations.
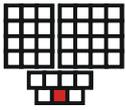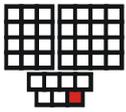
Human resources management: This enterprise management process grouping focuses on the processes necessary for the people resources that the enterprise uses to fulfil its objectives. For example, human resources management processes provide salary structures by level, coordinate performance appraisal and compensation guidelines, set policies in relation to people management, employee benefit programs, labour relations, including union contract negotiations, safety programme development and communication, employee review policies, training programmes, employee acquisition and release processes, retirement processes, resource planning and workplace operating policies. Moreover, it defines the organization of the enterprise and coordinates its reorganizations.

Note that human resources management processes are concerned with preparing people to carry out their assigned tasks (e.g., organizing training, remuneration, recruiting, etc.). The actual assignment of specific tasks is the responsibility of work force management processes.

6.2   External interactions

The eTOM business process framework recognizes that any single organization interacts with external parties. The major parties recognized by the eTOM framework are customers, suppliers/partners, employees, shareholders and other stakeholders.

External interactions from/to a service provider to other parties can be achieved by a variety of mechanisms including:

•   Exchange of e-mails or faxes.

•   Call centres.

•   Web portals.

•   Business-to-business (B2B) automated transactions.

•   Other means.

In order to show how the eTOM framework accommodates processes and transactions amongst a service provider and the external parties (that may be trading partners), it is useful to visualize the eTOM framework against this external environment, and Figure 10 tries to illustrate this.

In Figure 10, the external environment is shown diagrammatically by:

• **two horizontal "bars"**, the first one positioned above SIP and the operations process areas (the *sell* side), and the second one positioned under the SIP and the operations process areas (the *buy* side). These represent the two aspects of trading interactions in the external environment;

• **one vertical bar**, representing the external environment and all the external parties with links to the two horizontal bars which represent the majority of the interactions that occur.
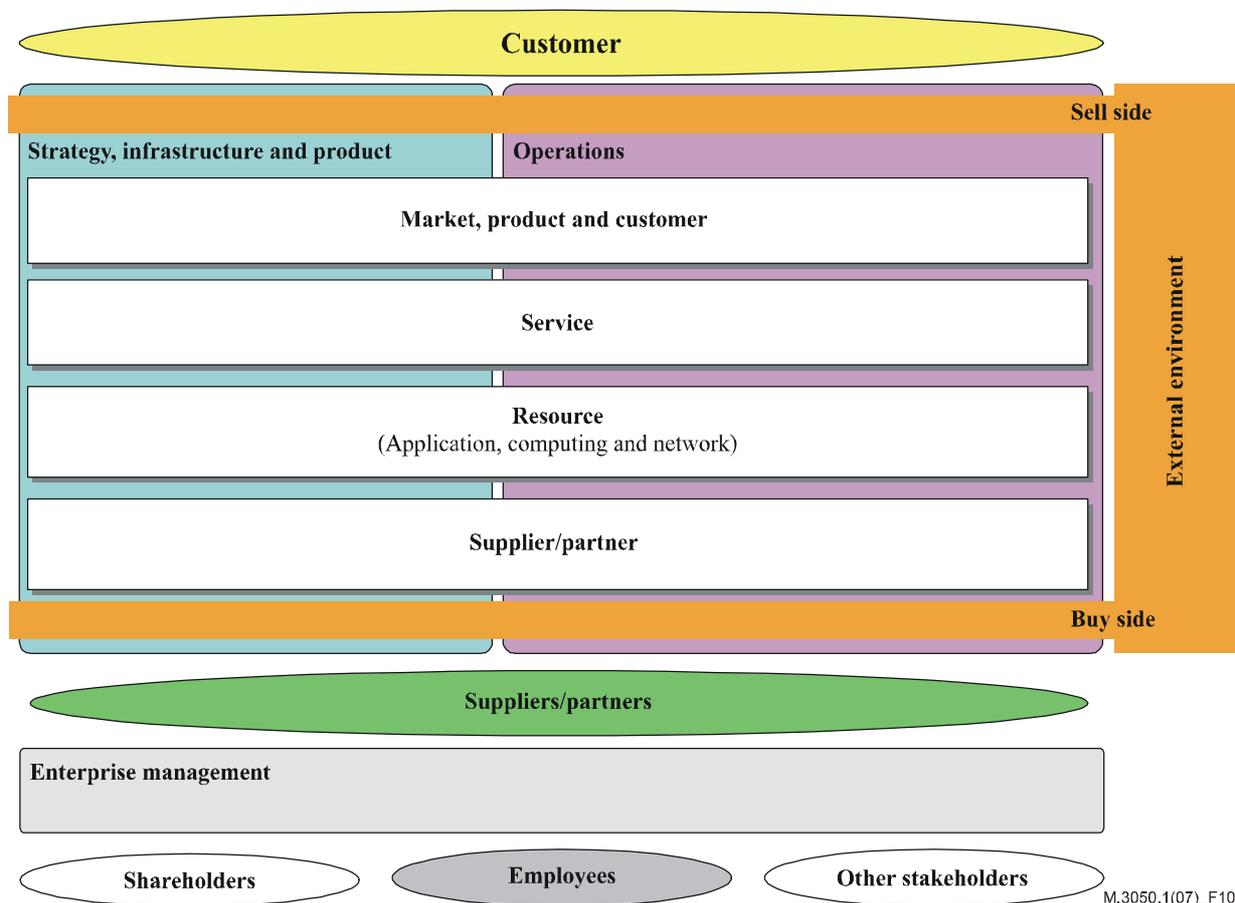
Figure 10 – The eTOM framework and the external environment

When the interaction with the external environment is by way of B2B trading processes, the nature and approach of these external interactions is often defined by organizations which are separate to the single enterprise. The process interactions must then be based on the concept of shared public processes, which synchronize the internal processes amongst trading partners. These shared processes have a defined "buy" and a "sell" side, which interact in a trade between a service provider and its suppliers/partners. Complex interactions of this kind can then be considered to consist of an appropriate set of "buy" and "sell" interactions/transactions.

B2B process interactions, and potentially other electronic interactions with customers or suppliers/partners, have specific externally-specified interaction requirements. This requires that the eTOM business process framework recognizes that a degree of mediation may be required as part of the process flow between the single enterprise and external parties.

When the enterprise is trading externally, involving the use of application-to-application integration based on public processes, these are modelled by the added "bars". They represent the agreed industry processes to support trading with customer and partners. Some of these trading relationship

with partners may involve third parties such as marketplaces, agents, trust providers, etc., which also form part of this external environment.

Further detail of the process components that support this form of external interaction is provided in [b-TMF GB921B] and [b-TMF GB921C]. Some further information is provided in clause 7.

6.3 Process flow modelling approach

A basic process flow modelling methodology has been used to show how the eTOM process elements should be used to design process flows consistent with the eTOM framework. The methodology is available in an outline form at this time and will be updated based on what proves to work well for the activity. This outline business process modelling methodology is documented separately in [b-TMF GB921F].

A top-down approach was adopted in the framework development phase. This enabled the definition of the business process framework at the enterprise level in a series of level 1 process groupings. These level 1 processes are split into vertical (i.e., "end-to-end") and horizontal (i.e., functional) groupings, with the dependant level 2 processes positioned within the vertical and the horizontal grouping appropriate to the process concerned. As described in the process methodology, the eTOM framework uses hierarchical decomposition to structure the business processes.

Through hierarchical decomposition, complex entities can be structured and understood by means of the formalization of their components. Hierarchical decomposition enables detail to be defined in a structured way. Hierarchical decomposition also allows the framework to be adopted at varying levels and/or for different processes.

For the eTOM framework, each process element has a detailed description that can include (as appropriate) the process purpose, its basic inputs and outputs, its interfaces, high-level information requirements and business rules.

The eTOM process flow modelling depicts process flows in a swim-lane approach that drives end-to-end process and process flow-through between the customer and the supporting services, resources and supplier/partners.

Based on the above-described process modelling approach, the eTOM framework process work starts at level 0, the enterprise level, and shows the component level 1 processes (see Figure 4). Each level 1 process is then decomposed into its level 2 component processes, etc.

Some examples of business process flows are presented in [b-TMF GB921F].

6.4 Summary

The eTOM business process framework is an enterprise process framework for service providers. The processes of the enterprise fall into four major categories with twelve enterprise level process groupings in all.

The main strengths of the eTOM framework are that it:

- provides an enterprise-wide total business process framework for the service provider;
- addresses not only operations and maintenance aspects, but covers all significant enterprise process areas;
- supports e-business, introducing concepts such as retention and loyalty, a new business relationship context model, supplier/partner relationship management, etc.;
- covers not only the area of network management, but enlarges its scope to application and computing management and the management integration beginning to be required;
- decouples lifecycle management, including development processes, from operations and day-to-day processes;

- can represent both the framework (static) and be used for the process flow (dynamic) view, including high-level information requirements and business rules for strong linkage to automation solutions;

- provides a process framework reflecting the most current thinking in designing and documenting processes;

- provides a sound reference process framework for the ICT industry in the e-business era.

The eTOM already has this standing, not only because it builds on and enhances previous business process analysis and modelling and analysis, but because its continuing development has extensive service provider involvement, including adoption by many service providers, vendors, integrators and process tool developers.

7 The emergence of e-business within the ICT market

The application of the latest technologies is transforming access to information, which in turn is revolutionizing the ways companies can share the information and can use it to interact with their customers. This process is resetting customer expectations and as they experience and adapt to this new way of conducting business, with its improvements in both service and levels of control, they are becoming increasingly intolerant of organizations that are incapable of delivering to these new standards.

In this new paradigm, the distinction between products and services often blurs. Success depends on creating new "product offerings and experiences" in which customers see value. Value is now defined in terms of the whole customer experience. Customers value one-stop shopping, selection choices, personalization of service and the empowerment gained from self-service. The common denominator is making life easier and simpler for the customer.

To meet and deliver against these new customer expectations, information-centric business designs have to be developed and investment in technology is required to support their implementation. Priorities include the need to integrate and share data with partners to give both a better integration of the supply chain and a unified approach to order entry, fulfilment and delivery.

This clause introduces e-business, what it is and the impact its emergence is having on service providers. A simple model is then presented that helps clarify the main concepts that relate to e-business and some of the standardization related activities that have emerged in response to this phenomenon are introduced.

7.1 What is e-business?

In general e-business is understood as the interaction amongst business partners with the help of information technologies. It refers not only to buying and selling over the Internet (or other computer network), but also to servicing customers and collaborating with business partners.

The term e-business has often been interchanged with the term e-commerce. However, it is becoming increasingly accepted that the use of e-commerce should be restricted to referring to just those web transactions (mainly business-to-consumer) which are used while buying and selling services and goods over the Internet.

An e-business enterprise is, then, an enterprise that utilizes Internet and related technologies to compete effectively in its business space. The technologies enable it to act more efficiently and effectively by facilitating better customer interactions, streamlining interfaces with partners and suppliers and, in general, improving the quality and competitiveness of their offerings.

e-businesses can be characterized as communities of complementary organizations linked together to create unique business entities that are easy to reconfigure in response to evolving customer needs. The central theme of e-business becomes the delivery of "value" by creating and utilizing end-to-end value streams that are based on an integrated and customer-centric technological

foundation. Communities of complementary organizations are tied by these streams and form an extended enterprise that is transparent to the customer. These communities are effectively in competition with each other and not just the fronting companies.

A core focus for e-business is therefore on relationships between organizations, partly because relationships that were previously not possible are now feasible; but also because it also makes possible the streamlining and automation of the existing value network, resulting in significant productivity gains for all parties.

7.2   Implications of e-business for service providers

As new technologies and markets emerge, enterprises have to adapt or die. Technologies affect customer needs while customer needs influence business designs. As business designs emerge, they affect processes and processes influence both customer expectation and the next generation of technology.

In response to this new paradigm, it is imperative that enterprises integrate business, technology and processes. They must redefine the way in which they operate by using new technology-based business designs, creating new inter-enterprise processes and integrating operations to support changing customer requirements. A service provider's business management team has to understand what can be enabled by the application of technology to their business and then realize a strategy that can underpin the transition. Failure to do so will result in an inability to meet changing customer demands, offerings that lack in quality and ever increasing costs. Competition from more agile and efficient rivals will lead to the organization's demise.

The three principal reasons why service providers must integrate e-business and traditional business processes are, therefore:

•   Customer expectations and the need to move to an approach that focuses on the management of customer relationships and the importance of improving customer retention and increasing the value customers contribute to the enterprise.

•   Productivity gains and the need to ensure that these can continue to be obtained.

•   Provision of a broader range of products and services to customers – this, for the information and communications technology industry (more than almost any other industry), requires a focus on better collaboration between and integration of processes.

The processes required in an e-business environment are fundamentally different from those in a traditional business environment. An enterprise that is to transition successfully to e-business must determine the processes they implement based on criteria such as:

•   their relevance to their customers' needs;

•   the contribution they make to providing an integrated and unique identity for the enterprise;

•   how critical they are to the enterprise's operational performance.

Other considerations that should influence process design include:

•   Exceptions should be handled excellently. In other words, process problems are identified in real time and actions to support the customer are taken in real time.

•   Business rules should be easily configured and applied automatically.

•   The ability to treat a process as an asset that can be assessed, replaced, outsourced, as appropriate to improve the operation of the business.

7.2.1 How can a service provider migrate towards e-business?

There are several alternative approaches to implementing e-business. Some companies are treating e-business (and e-commerce) as separate units. Some are overlaying e-business on traditional business operation. Yet other businesses are approaching e-business as a replacement of traditional business channels. The most successful e-business enterprises integrate e-business and traditional business channels where cost, quality and profit can be best rationalized. This is much more than just throwing together a set of webpages to front an organization, although integrating storefront and web operations is clearly a key part of the model for some businesses.

The integration of e-business and traditional business channels is the model that is most applicable to information and communications service providers. Undertaking such an integration is typically a substantial exercise. The use of systematic business process frameworks as a basis for structuring the existing business and to help understand and guide the integration of e-business into an existing business can have major benefits.

The TM Forum mission of business process automation based on standards and common frameworks/models with plug-and-play flexibility has never been more relevant. eTOM addresses the total business process framework required for a service provider enterprise operating in the ICT industry. It recognizes the need to integrate traditional business and e-business processes. And it provides a basis for understanding how to migrate from a current to a desired organizational structure.

The use of systematic business process frameworks, like the eTOM, also makes it easier to evaluate and improve the processes themselves. Employing business process modelling techniques contributes to the goals and profitability of service providers. Using consistent modelling techniques for business development and information systems development brings noticeable efficiency improvements and removes barriers within those enterprises and across cooperative, inter-corporation projects.

Service providers that use systematic business process modelling to manage and improve their businesses have a much greater chance of migrating their existing organizational structure to encompass new challenges, the current of which is fully embracing the e-business paradigm.

7.3 An e-business reference model

e-business involves increasingly complex networks of relationships to operate. Figure 11 depicts the sets of relationship groupings involved in a value network in the ICT industry. The value network must operate with the efficiency of a self-contained enterprise, which requires managing the network on a process rather than an organizational basis. The model explicitly shows the use of the eTOM business process framework by the service provider at its core. It is only shown here to simplify the figure and its presence is not intended to imply that its use by the service provider is prescribed, just that the service provider would probably benefit from its use. Likewise, it is not intended to preclude the use of eTOM by the other entities shown within the value network. These entities may or may not make use of the eTOM business process framework.
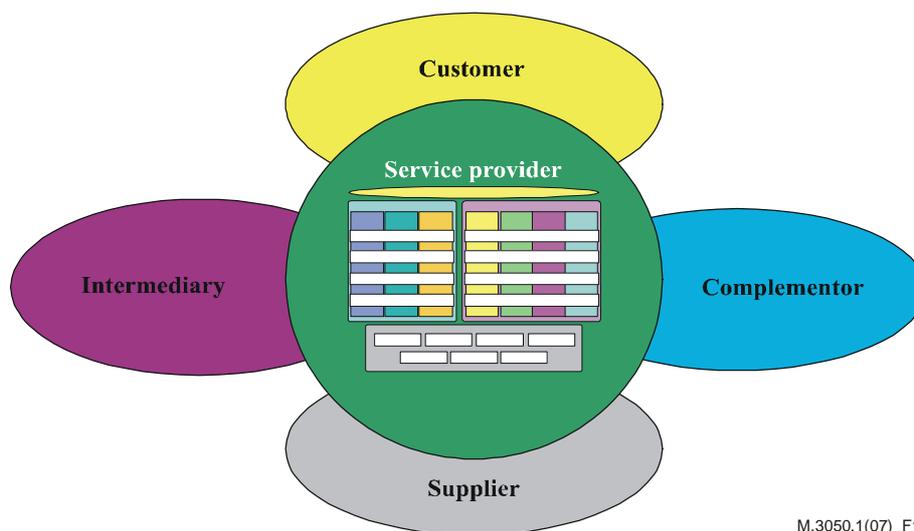
Figure 11 – The e-business reference model[2]

The roles of the entities in the value network shown in Figure 11 are described below.

7.3.1 Customer

The customer is responsible for ordering, using and (usually) paying for the service provider's products. The customer may represent an end customer, where the product provided by the value network is consumed, or a wholesale customer that resells the product provided, generally with some added value. Depending on the customer's activities, there may be a further refinement of this role as follows:

- The subscriber role is responsible for concluding contracts for the service provider's products subscribed to and for paying for these products.

- The end user role makes use of the products.

7.3.2 Service provider

The service provider presents an integrated view of service products to the customer. It is responsible for the contractual interface with the customer to sell products to the customer, provide the customer with contact and support, and bill the customer for the products supplied. The service provider can deliver some or all of a service product to the customer itself, or it might subcontract out provision of parts, or even all, of the product to other service providers while maintaining the customer-facing role of the one-stop shop. The service provider is responsible for acting on behalf of the value network it represents in relationships with intermediaries as well as with the customer.

7.3.3 Complementary provider

The complementary provider extends the product provided by the service provider and offers additional capability that the service provider is not itself offering to the customer, i.e., it complements the product being provided by the service provider and adds value to it, but is not essential for provision of the product itself. It could act, for instance, as a specialist content provider to a service provider that is operating a mobile phone service. The complementary provider is in a partnership with the service provider and can enhance the service provider's product to the customer with its own products, thus making interactions with the service provider more attractive and convenient for the customer. A business relationship between the complementary provider and the

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[2] Based on KEEN (P.), McDONALD (M.), The e-Process Edge, Creating Customer Value and Business in the Internet Era, *McGraw-Hill*, 2000.

customer may exist depending on the nature of the product being provided and possibly on the business culture of the environment. Frequently, products offered by a complementary provider are co-branded.

7.3.4 Intermediary

The intermediary supplies a service for a fee. For example, a localized selling function in a market where the service provider has a limited presence and/or understanding, is a typical service provided by an intermediary. The service provided could be an information service enabling customers to locate service providers most appropriate to their specific needs, or the provision of an environment in which providers can make their products known to customers in an electronic marketplace or trading exchange (infomediary).

At a time of Internet globalization, an intermediary can play an important role as it can promote market transparency by overcoming the geographic constraints that used to limit knowledge about the products available. Functional intermediaries provide a specific function, such as selling, electronic payment or authentication.

7.3.5 Supplier

The supplier interacts with the service provider in providing hardware, software, solutions and services which are assembled by the service provider in order to deliver its solutions or services to the customer. The service provider is bounded by its suppliers' ability to deliver.

Note that individual enterprises can adopt multiple roles in different value networks. For example, a service provider may be the customer-facing service provider in one value network while, in another, may complement or act as an intermediary for another SP. In today's fast-moving marketplace, these relationships can be very short-lived compared with the more static relationships of the traditional telecommunications market.

The implications of e-business developments, and how these are supported by eTOM, are discussed in a separate application note [b-TMF TR128].

Annex A

eTOM concepts

(This annex forms an integral part of this Recommendation)

A.1   Overview

So that the eTOM business process framework can be understood and used effectively, it is essential to review the key concepts that were the basis for creating and evolving the eTOM framework. These concepts were used to make the eTOM framework highly effective for the integration of e-business process design and assessment with traditional business processes.

These concepts make use of terminology and ideas explained in more detail later; for example, references to "levels" of decomposition.

To assist the reader in understanding the process area within the eTOM framework that relate to a particular paragraph or clause, a graphical icon of the eTOM framework is provided alongside text to draw attention to the relevant area. This is shaded in red to indicate the focus of the following text or discussion.

A.2   Business concepts
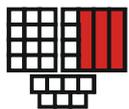
1) The eTOM framework focus is on the customer and the processes that directly support the customer. In the level 0 view of the eTOM framework, the three end-to-end (vertical) process groupings of fulfilment, assurance and billing are depicted. These processes are also referred to as customer operations. These processes directly interface and support the customer and are the priority focus of the enterprise.
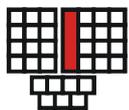

2) The eTOM framework has an operations support and readiness end-to-end (vertical) grouping that includes those processes needed to ensure that customer operations processes can respond with what the customer requires, in a time-frame and cost the customer requires, including delighting the customer with delivery and support. The fulfilment, assurance and billing (FAB) vertical end-to-end processes, supported by the horizontal functional processes, need to be enabled and supported to function for the customer on an online and immediate basis. To support FAB end-to-end processes, operations support and readiness processes prepare information, products, services and resources, as well as suppliers and partners to deliver and support individual customer service instances.
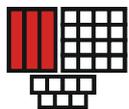

3) Processes which are essential to drive and support the customer operations and operations support and readiness groupings are referred to as strategy, infrastructure and product (SIP). This grouping consists of three level 1 end-to-end (vertical) process groupings, i.e., strategy and commit; infrastructure lifecycle management and product lifecycle management. The end-to-end processes in these groupings are separated from operations because they are characteristically different than operations processes as listed below:

- These end-to-end process groupings do not focus on direct interface with the customer.

- These end-to-end process groupings address business activities which are critical to the enterprise, understanding its markets and developing what is required to enable delivery to customer expectations.

- Each of these end-to-end process groupings in strategy, infrastructure and product (SIP) have different business time cycles, i.e., as you move from

right to left, generally the time cycle becomes longer. For example, strategies change less often than infrastructures, which change less often than products, which change less often than operations support processes, which change less often than customer fulfilment, assurance or billing requests. The business time cycles in strategy, infrastructure and product (SIP) are quite different to those of the operations processes.

- Each of the end-to-end process groupings in strategy, infrastructure and product (SIP) have process similarities among them, but they are very different compared with the operations end-to-end processes.
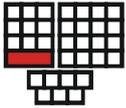
4) The eTOM framework focuses on e-business opportunities and therefore integrates the processes occurring within the enterprise with those of partners and suppliers. The eTOM framework supports both traditional business processes and those that are e-business enabled. e-business requires a heightened focus on supply chain management. The supplier/partner process grouping consists of supplier/partner relationship management and supply chain development and management. Supplier/partner relationship management provides the operational interface and support between the enterprise and its suppliers and partners. Supply chain development and management processes include the developing of relationships and managing the service provider's supply chains.
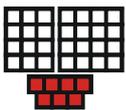
5) The eTOM framework includes an enterprise management process area so that all service provider processes are included. Service providers consistently employ enterprise or corporate level processes to manage and support their businesses. These process groupings have significant importance for service providers and have unique or custom requirements for information and communications service providers.

## A.2.1 eTOM framework and process implementation concepts
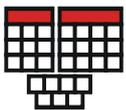
6) The eTOM framework uses both the terms "product" and "service" and these terms focus on specific parts of the eTOM framework. The product view focuses on what the service provider offers to its customers. The horizontal functional processes that determine the customer's needs and match these to the offerings from the service provider are placed in the market, product and customer functional (horizontal) grouping. The service view focuses on the hardware and the information necessary to support and deliver a product to the customer. The horizontal functional processes that determine these details and enable these items are placed in the service and the resource functional (horizontal) groupings. For a full definition of "product" and "service" as they are used in the eTOM framework, see clause 3.
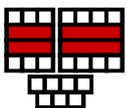
7) The eTOM framework is organized with both end-to-end (vertical) and functional (horizontal) process groupings. Below the very conceptual level, there are seven end-to-end (vertical) processes that deliver for the enterprise. At level 1 of the framework, there are fifteen functional (horizontal) process groupings which support the execution of the vertical processes. The eTOM framework level 1 end-to-end (vertical) processes are:

- Strategy and commit.
- Infrastructure lifecycle management.
- Product lifecycle management.
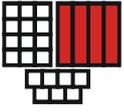
- Operations support and readiness.
- Fulfilment.
- Assurance.
- Billing.
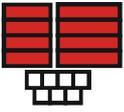
- The level 1 functional (horizontal) process groupings are:
    - Marketing and offer management.
    - Customer relationship management.
    - Service development and management.
    - Service management and operations.
    - Resource development and management.
    - Resource management and operations.
    - Supply chain development and management.
    - Supplier/partner relationship management.

    - Strategic and enterprise planning.
    - Enterprise risk management.
    - Enterprise effectiveness management.
    - Financial and asset management.
    - Knowledge and research management.
    - Stakeholder and external relations management.
   - Human resources management.
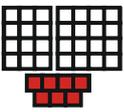
8) Service providers interact with many external and internal entities. The eTOM framework groups these into five entity groupings:
- Customers (the SP sells to them).
- Suppliers/partners (the SP buys from them or cooperates with them).
- Shareholders (the SP obtains financial resources from them).
- Employees (the SP obtains their services to execute the processes of the enterprise).
- Other stakeholders (include regulators, media, local community, government, labour unions, competitors, etc.).

9) Business to business application of the eTOM business process framework is supported within the framework. The eTOM business process framework recognizes that some process interactions may be defined by parties external to the enterprise, and that mediation process may be required to join the internally and externally defined processes.
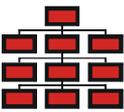
10) The eTOM framework is structured in hierarchical decomposition of all processes in the enterprise. For all process elements, the eTOM framework generally decomposes the process elements into three levels below the very high conceptual view of the framework. This allows the framework to be adopted at varying levels by service providers and suppliers.

11) The process elements in the eTOM framework include every process element or activity used by the enterprise. All areas of the enterprise must be able to unambiguously identify where their key activities would be mapped. This is essential to having the framework accepted by all units in the enterprise.

12) The eTOM framework clearly defines each process element. Each process element in the framework is a category that allows actual activities in the enterprise to be unambiguously assigned to a category. This modularized approach makes it easier for processes to be reused, updated or replaced independently. The solutions based on this framework can then be built by using commercial-off-the-shelf (COTS) products since solution vendors will increasingly structure and describe their offerings consistently with the eTOM framework.
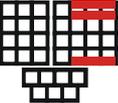
13) Process elements can be included in more than one end-to-end process grouping, where it is necessary to deliver consistency across several end-to-end processes. Processes that appear in more than one end-to-end process grouping may provide the same functionality in several groupings or may provide somewhat different functionality to support each specific process grouping. For example, customer interface management processes are used in fulfilment, assurance and billing, with the content of the interaction being different but, overall, the interface must have a consistent look and feel.

14) The eTOM framework process elements are defined as generically as possible to support all products, services and channels that are used within the enterprise. The eTOM business process framework is technology-, organization- and service-independent.

15) Each service provider will choose to implement their reference process flows differently according to their business vision and mission, their target markets and strategies, etc. A methodology for building reference process flows using the eTOM framework process elements as building blocks is described in [b-TMF GB921F]. There is no intent to make reference process flows prescriptive as there will be numerous different implementations of flows. What is essential to ensure clear communications between service providers is that each one builds up their reference using the industry-standard eTOM framework process elements as building blocks.

16) The eTOM framework process flows and decompositions are designed to link input, process elements and output, and to provide a high-level definition of information requirements and business rules. This level of process information and discipline creates the opportunity for better linkage to the system's work.

A.3 End-to-end process flow concepts

The eTOM framework includes a considerable amount of process flow modelling to support and apply the process decompositions. This modelling will continue to be developed for the process areas of the eTOM framework which have a high priority for member organizations. Process flow modelling, definition of high level information requirements and business rules are essential elements in linking to systems analysis and design for development and delivery of automation solutions. The process decomposition and flow modelling are also critical linkages to the NGOSS systems initiatives.

This clause addresses end-to-end process flow concepts in relation to the eTOM framework. It first gives some general information on how the process flow work is done using the eTOM framework and then looks at the operations processes separately from the strategy, infrastructure and product processes.

A.3.1   eTOM business process framework process flows

Process flow modelling using the eTOM framework follows the hierarchical process decomposition and description of each process element in the hierarchies. There are two types of process flow in the eTOM framework. First, there are the process flows for an individual process that has been decomposed to a level where it is convenient for a process "thread" to be developed, e.g., credit authorization. In this context, thread is used to encompass the local process flow concerning the individual process concerned. The second type of process flow has a larger scope, and is more of a picture that connects the most important elements of several process threads to provide an "end-to-end" process flow, e.g., service request. This type of process flow typically represents an area of business solution, and will begin to be added to the eTOM framework in subsequent releases.

Whether a process thread or an end-to-end process flow, each process involved is initiated by an event(s), e.g., a customer inquiry, and ends with a result(s), e.g., credit approved. The sequence of process steps to achieve the required overall result(s) is shown with an association made to the high level information involved as inputs or outputs. In early input/output diagrams, each high level process showed its high level input and output, but the inputs and outputs were not defined and were not tied to a specific process activity. This deficiency is addressed in process flow modelling with the eTOM framework, which will provide this information as more and more process flow modelling is completed.

Current process modelling methodologies use a swim-lane approach to process flow diagramming, and so does the eTOM framework. For the most part, the swim lanes are the functional layers of the eTOM framework, e.g., CRM, SM&O, RM&O, S/PRM within the operations area. Swim lanes are the horizontal layers into which the process elements and their flows are mapped. The top swim lane represents the customer. Using a swim-lane approach to process flow modelling enables better:

- end-to-end process flow design, e.g., from customer request to correctly provided service;
- process flow through design, e.g., from customer to resource element;
- customer contact and interface process design, due to better visibility of the interfaces with the customer and the gaps between them;
- value-added process element focus in process design;
- visibility of too many hand-offs, too much specialization, etc.

A.3.2   Operations processes

Figure A.1 shows the operations portion of the eTOM framework decomposed into the operations support and readiness vertical end-to-end process grouping plus the three customer operations vertical end-to-end process groupings of fulfilment, assurance and billing. The purpose is to show in more detail the predominant processes that need to be involved – integrated and automated – to support the vertical end-to-end, customer operations processes of fulfilment, assurance and billing as well as the operations support and readiness processes.
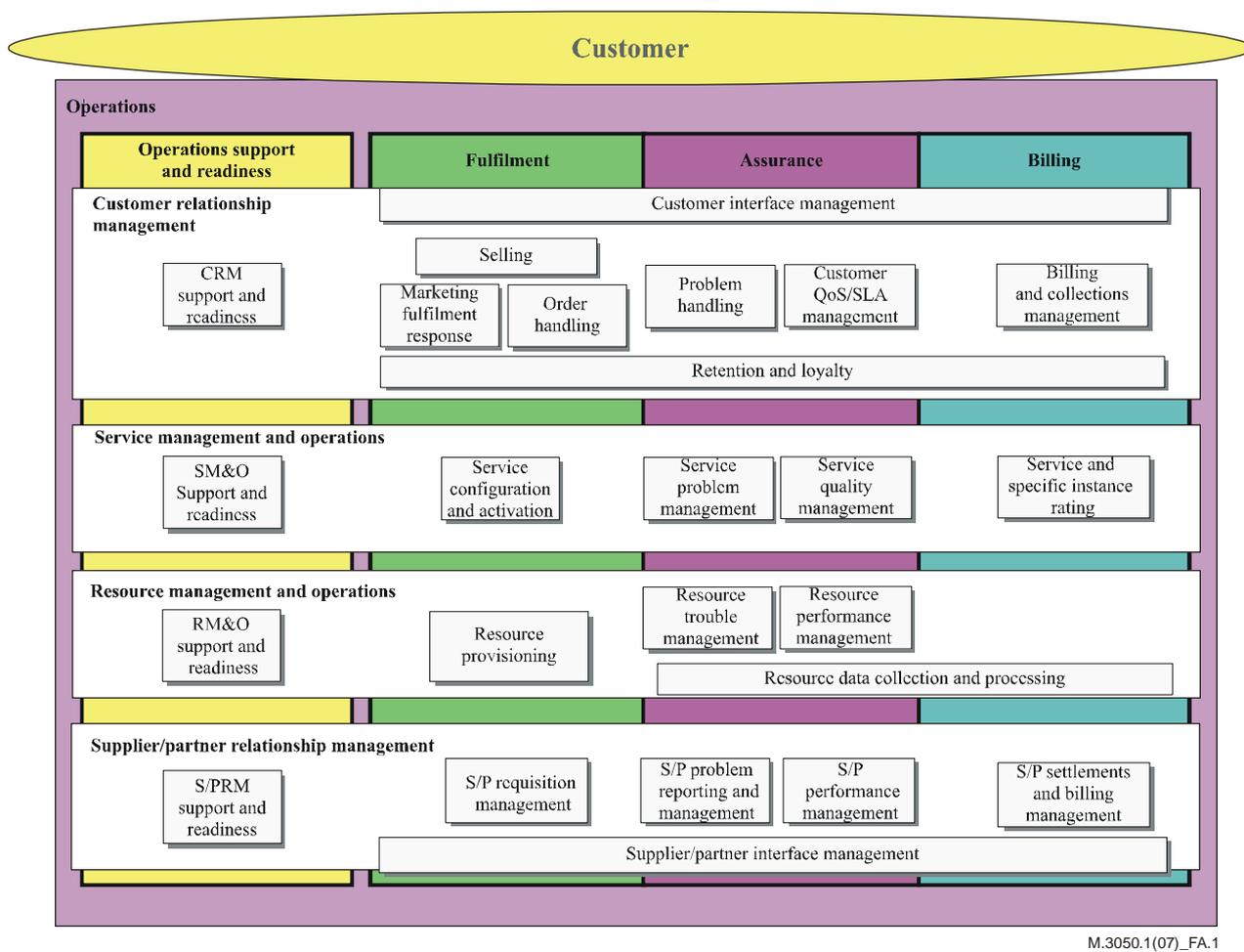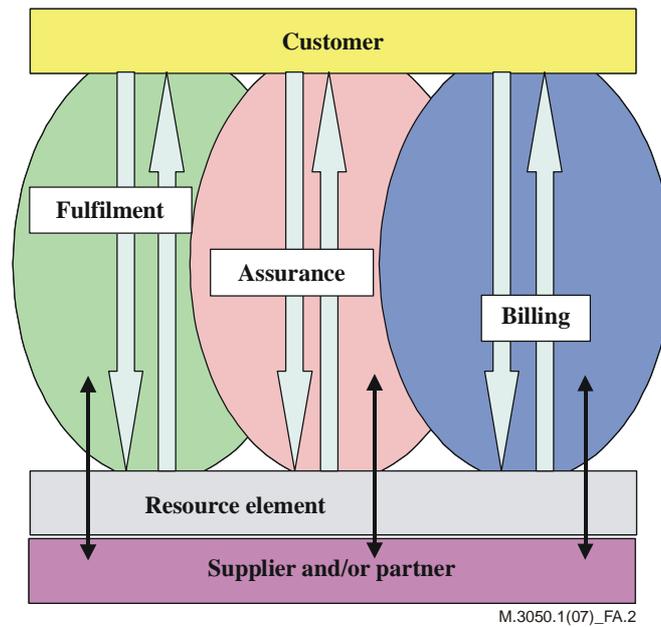
Figure A.1 – The operations end-to-end process breakdown

Even though the end-to-end process breakdown in Figure A.1 provides a sound image of which component process belongs to which end-to-end process, it does not get across the dynamic, *end-to-end process flow* required to support, for example, the customer operations end-to-end processes of fulfilment, assurance and billing. Figure A.2 shows the three essential flow elements:

• between the customer interface and support in a resource element and/or supplier/partner;

• from selling through billing;

• between other providers and network operators.

The vertical arrows represent the process interactions between the customer interface and the resource elements, i.e., *process flow through*. The overlapping balloons indicate that fulfilment, assurance and billing predominantly include specific processes from the framework. However, all three end-to-end processes have interactions among many processes across the framework. The directionality of the white vertical arrows shows end-to-end flow. The customer predominantly initiates the fulfilment process. The assurance process can be triggered by the customer or resource elements, and the billing flow is predominantly from data collection in the resource elements to bills presented to the customer. The black arrows show the process flow interfaces required with other providers and operators. All three flow elements are required for integration and automation.

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Figure A.2 – FAB end-to-end and flow-through process flows

The end-to-end process flow for operations support and readiness will be shown in a subsequent release of the eTOM framework.

A.3.3   Strategy, infrastructure and product processes

To be developed for a subsequent release of the eTOM framework.

Appendix I

TM Forum NGOSS and eTOM

(This appendix does not form an integral part of this Recommendation)

NGOSS is the TM Forum's New Generation Operations Systems and Software programme, which delivers a toolkit to guide the definition, development, procurement and deployment of OSS/BSS solutions while also defining a strategic direction for a more standardized OSS marketplace.

NGOSS uses a common business process map, systems descriptions and information models, and couples them with predefined integration interfaces, architectural principles and compliance criteria. NGOSS's end-to-end approach enables service providers to redesign their key business processes in line with industry best practices while allowing suppliers to cost-effectively develop OSS software that can easily fit into a service provider's IT environment.

Figure I.1 provides a representation of the NGOSS framework and the vital role of the eTOM framework within this. The eTOM framework provides the business process map for NGOSS. Moving around the NGOSS "wheel", the eTOM framework feeds requirements to the information model and thence to the integration framework and compliance criteria.
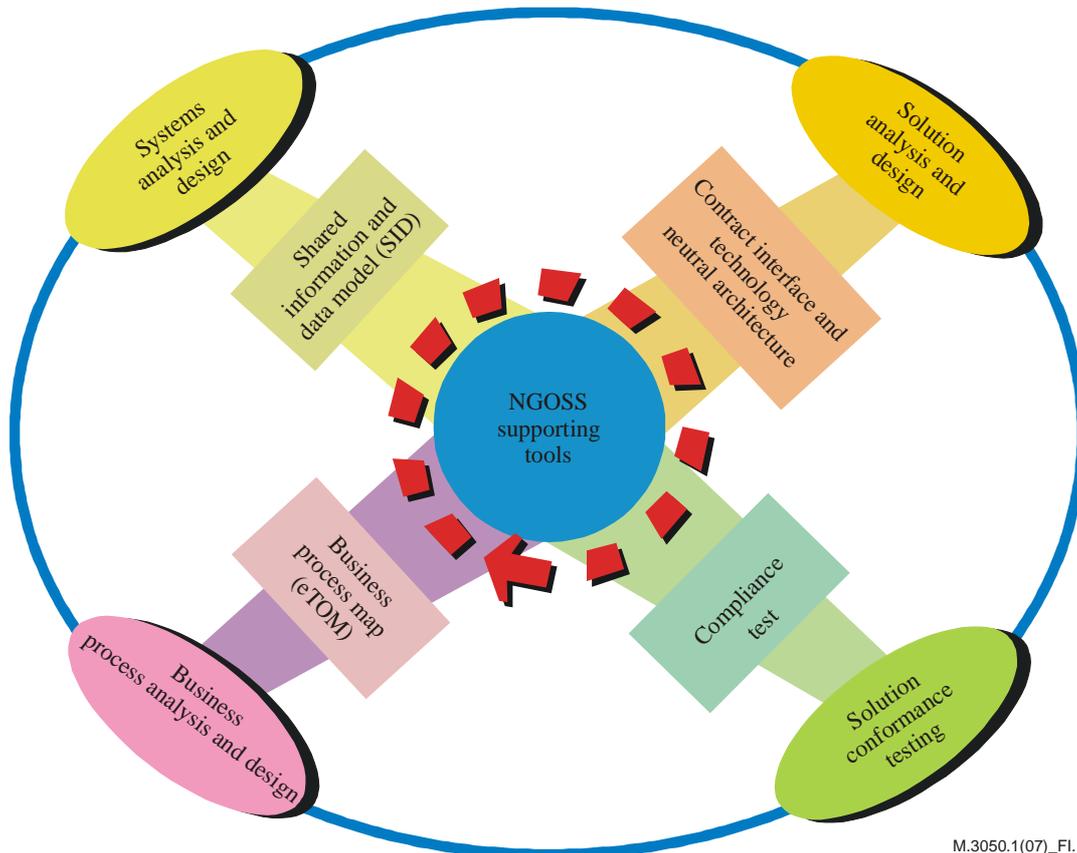

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Figure I.1 – TM Forum NGOSS framework

More information on NGOSS is available through the TM Forum website www.tmforum.org.

NOTE – Relationship to standardization activities:

Many of the management infrastructures upon which systems will be built are expected to be based on standard interfaces. Relating business needs to available, or necessary, standards is a primary goal of the TM Forum in promoting a standards-based approach to information and communications services management. Where applicable, the TM Forum uses industry standards in its work to promote the acceptance of standards and to minimize redundant work. People active in management standardization (in the broadest sense) will find the eTOM framework useful in setting a top-down, enterprise-level, customer-centric context of how management specifications need to work together.

TM Forum uses existing standards as much as possible. As a result of implementation experience through Catalyst projects, TM Forum provides feedback to appropriate standards bodies.

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[b-TMF GB921F]	TMF GB921F: *e-TOM – Process Flow Examples*.
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