Enhanced Telecom Operations Map® (eTOM)

The Business Process Framework

For The Information and Communications Services Industry

Application Note U:

User Guidelines for eTOM

GB921 U

Version 1.1 *February 2007*

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Table of Contents

Notice **2**

Table of Contents **3**

Executive Summary **5**

Introduction **6**
- Audience 6
- Plan of document 6
- Principles and Guidelines 7

Principles and positions of the eTOM model **8**
- Introduction 8
- A note on the status of the eTOM documentation 8
- Nature of the eTOM model 8
- Process model types 9
  - Activity-based process modeling 9
  - Communication-based Process Modeling 10
  - Artifact-based Process Modeling 10
  - Hybrid approach to Process Modeling 10
- Characteristics of a Business Process 10
- Decomposition 11
- Traceability 12
- Process dependency through information 12
- Grouping / organisation within eTOM 13
- Flows 13
- Dynamic aspects of Process Modeling 14
- Naming conventions 14
- Layer References and Responsibilities 15
- Data Responsibility 15

Process Patterns **17**
- Introduction 17
- Level 3 patterns 17
  - Example 1 – Problem Reports and their resolution 17
  - Example 2 – Strategic view and Business Plan 18
  - Example 3 – Order Lifecycle 18
  - Example 4 – Product Lifecycle 18
- Level 4 Patterns 19

Organisational Context for eTOM **20**
- Introduction 20
- Use of eTOM within an organisation 20
  - Level 0 – Business Activities 21
  - Level 1 – Process Groupings 21
  - Level 2 –Core Processes 22
  - Level 3 – Business Process Flows 22
  - Level 4 – Operational Process Flows 22
  - Level 5 – Detailed Process Flows 23
- The eTOM and the Process Hierarchy 23

Guidance for extending and using the eTOM **24**
Process Hierarchy: Decomposition Principles 24
Process Hierarchy: Implementation Principles 25
Process Hierarchy: Hierarchies 26
Process Hierarchy: Process View 27

Audit Checklist **28**

Outstanding issues **30**

Administrative Appendix **31**
About this document 31
Document Life Cycle 31
Document History 31
Version History 31
Release History 32
Acknowledgments 32
About TeleManagement Forum 32

Executive Summary

This document stands as an Application Note attached to the "Enhanced Telecom Operations Map® (eTOM) The Business Process Framework for the Information and Communications Services Industry", GB921. It is intended to provide users of eTOM with guidelines and information to assist them in applying eTOM within their businesses.

Ay this stage, this document is a work in progress, but is being released as is to provide information where available, to invite comments and suggestions for further development, and to attract interest and support for the ongoing work on adding to the content.

This release addresses one area of, and audience for, guidelines, that concerned with Practitioners and Process Architects using eTOM. It is hoped that other aspects and audiences will also be addressed in future releases.

Introduction

This document explains the design decisions of the eTOM and sets out the principles for its application and extension in the form of Guidelines. These Guidelines are of use in two particular cases. First, for the practitioner or process architect who wants to apply the eTOM in a consistent way to specific situations. Second, for assurance of auditing and traceability, in order to produce repeatable application of the eTOM within an organization and to demonstrate this externally for audit purposes.

It also provides a basis for contributors to the eTOM and the evaluation of contributions by the eTOM team.

It is intended that the guidance in this document will be augmented through user experience and feedback. A list of outstanding issues is included.

Audience

The intended audience for the Guidelines is practitioners, process architects, and process auditors. The material here is advanced material - it is not introductory (as that information is available elsewhere in the eTOM set).

Plan of document

The document is set out as follows:

- The principles and positions of the eTOM model
- Process patterns
- Relationship of the eTOM to NGOSS and the NGOSS elements
- eTOM and an organization's own processes
- Guidance for extending and using the eTOM
- Audit checklist

Principles and Guidelines

The Principles are shown in the following format. Optionally, a Best Practice Guideline is indicated where a recommendation is made about the way in which the eTOM should be applied. Requirements for auditing purposes are also shown in this format.

Principle eTOM.nn eTOM is ...

Principles and positions of the eTOM model

Introduction

This section sets out to position the eTOM as a process framework and to make explicit the modelling and design choices which have been followed in its development.

A note on the status of the eTOM documentation

The eTOM consists of both normative and non-normative material. The normative material is the Standard; the non-normative material is included for information and guidance. In general, GB921, with its Annexes and Addenda is normative material; Appendices and Application Notes are non-normative. Thus, the Process Descriptions in Addendum D, Process Flow Examples in Addendum F, and public B2B processes in Addendum B are all part of the Standard; Application Note C on the Public B2B Business Operations Map is non-normative. Other TMF documents, such as GB939 (NGOSS Contract Examples), which include eTOM material, are non-normative.

There is, however, an important distinction between the Process Elements (PEs), presented in Addendum D, and the Process Flows, presented in Addendum F. Both are normative, i.e. part of the Standard, but the Process Elements are comprehensive in scope while the Process Flows are examples.

Nature of the eTOM model

The eTOM is a set of Process Elements, which are organised into a hierarchical framework The Process Elements are activity-based and the eTOM is thus an activity-based process decomposition model.

Principle eTOM.01 eTOM is an activity-based process decomposition model.

The Process Elements in eTOM are intended as an exhaustive list; they are comprehensive in scope. It is the intent that all business activities in the Enterprise can be supported by (i.e. are able to fit within) the eTOM Process Elements. Each Process Element has a detailed description that can include the purpose, inputs, outputs, interfaces, high level information requirements and business rules.

Principle eTOM.02 eTOM Process Elements are comprehensive for a Service Provider.

Note:

The eTOM is a process model, not a state model. It contains processes, not states. For example, it contains processes for the processes of Order Handling but does not model the different states of an Order.

Process model types

In general, there are 3 approaches to the modeling of business processes. It is also possible to use a hybrid of these approaches. The general approaches are:

- activity-based process modeling
- communication-based process modeling
- artifact-based process modeling

Activity-based process modeling

Here the overall process is decomposed into tasks that are ordered based on the dependencies among them. The fundamental entity of a business process for the Activity-based approach is the unit of work and a business process is considered to be a succession of activities, or units of work, following a specific control flow.

Definition: Activity

An activity represents a unit of work performed by a party or system. Activities transform inputs into outputs and are associated with triggers and outcomes (pre and post conditions).

Principle eTOM.03 An eTOM Process Element is a succession of activities with a control flow.

Communication-based Process Modeling

In this approach, an action in a process flow is represented by the communication between a consumer and a provider). In the communication-based approach the communication is the message. So a business process can be expressed as an exchange of messages, or transaction, between two or more roles and every state change within a company can be associated with the processing of a message.

Artifact-based Process Modeling

In the artifact-based approach objects, or artifacts, are created, modified and used during the process and thus the model is based on work products and their paths through a series of workflow activities.

Hybrid approach to Process Modeling

The hybrid approach uses a combination of these general approaches to produce a set of models for an organization's processes. Typical models might be based on an information flow model (from the communication-based approach), a capabilities model (from the artifact-based approach) and a process-model (activity-based approach).

Characteristics of a Business Process

In general, a Business Process will have the following characteristics:

- It has a goal
- It has specific inputs
- It has specific outputs
- It transforms inputs into outputs
- It uses resources
- It has a number of activities that are performed in some order
- It creates value of some kind for the customer. The customer may be internal or external.

In addition:

- It may affect more than one organizational unit - "Horizontal organizational impact"
- Its effects on information entities can be analysed via CRUD (Create / Read / Update / Delete)

- It may have a responsibility model for the roles associated with the process, expressable as RACI Characteristics (Responsible / Accountable / Consulted / Informed)

For an eTOM Process Element:

- Goal is stated.
- Inputs may be defined.
- Outputs may be defined.
- Resources consumed may be defined.
- Activities may be specified within description
- Value should be stated.
- Affect on organisational use may be stated
- CRUD analysis may be available
- RACI analysis may be available

Principle eTOM.04 (Best Practice): an eTOM Process Element has a goal, value proposition, inputs, outputs. It consists of activities and uses resources. It has a CRUD and RACI model.

Decomposition

Definition: Decomposition

Decomposition is the breaking-down of a process into simpler activities.

The eTOM is a decomposition model from a notional Level 0 through to Level 3. In order to keep the eTOM to a level which is generally useful it is not intended to decompose the eTOM to further levels beyond Level 3. It is asserted that the further a decomposition is taken, the more difficult it is to prove the uniqueness of lower level processes.

Note:

The relationship and mapping of these eTOM Levels to an organization's own processes and procedures is addressed in a later section "Organizational Context for eTOM".

Principle eTOM.05 eTOM is decomposed from notional Level 0 to a maximum of 3 levels – Levels 1, 2 and 3.

Principle eTOM.06
It is not the purpose of the eTOM to address the detailed processes and procedures of an enterprise.

Principle eTOM.07
Enterprise Management is decomposed to Level 2 only.

Traceability

Because the eTOM is a decomposition model, the lower levels of the decomposition can be traced back to the higher levels.

Principle eTOM.08
The goals, inputs, outputs, and activities of decomposed Process Elements at a lower level are consistent with the higher level Process Element. In particular, the input of the first lower level Process Element is the same as the input of the higher level PE; the output from the last lower level PE is the same as the output of the higher level PE; the detailed goals of the lower level Process Elements taken together should match the goal of the higher level PE; the activities of the lower level Process Elements taken together should match the activity of the higher level PE.

Process dependency through information

Business processes do not exist in isolation. Processes require information from other processes, and they in turn provide information to other processes. Dependencies (or associations) between processes occur when an activity requires information from another activity. Process dependencies are related to the entities and attributes required by the business area. The importance of analyzing and modelling dependencies is to provide further understanding of the interaction between processes and data.

Note:

An exercise is underway to identify the SID ABEs (Aggregate Business Entities) which are associated with eTOM Process Elements.

Principle eTOM.09
(Best Practice): each eTOM Process Element should identify its associated SID ABEs.

Grouping / organisation within eTOM

The eTOM is a classification or taxonomy of Process Elements. At Level 0 the elements are classified into Operations, SIP and Enterprise Management. Lower Levels are formed by decomposition with each Process Element occurring once only.

Principle eTOM.10
A particular Process Element will occur only once in the eTOM; there is no replication.

Flows

There are three fundamental flows which exist in any company, namely the information flow, the material flow and the control flow.

- The information flow concerns the flow of data or information e.g. the information on an order as it is progressed; these can also be message flows.
- The material flow concerns the actual physical items e.g. the items which constitute the order.
- The control flow (or workflow) defines the logic of business processes i.e. the enterprise behaviour in terms of a sequence or order in which enterprise activities must be performed to achieve business objectives.

The definition of the eTOM Process Elements themselves does not address these types of flow. However the eTOM does include in Addendum F sample process flows and depictions of process interaction in swimlanes. These are examples of control flow.

Principle eTOM.11
Process flow examples in eTOM are control flows, defining the sequence in which activities are performed.

Note:

Traceability also applies to swimlanes in eTOM process flows. (See Principle eTOM.08)

Principle eTOM.12
The swimlanes in a process flow are consistent within themselves and with respect to lower level decompositions.

Dynamic aspects of Process Modeling

The eTOM Process Elements and example process flows are a process view of the enterprise behaviour, based on sequences of activity. However, there are also dynamic aspects pertaining to the processes and their interaction. These are considered below.

- Temporal aspects
  - There may be time-based requirements in the triggering of processes, triggering frequencies and possible delays between process steps. Process step durations (minimum, maximum, average durations) can also be indicated
- Co-operative activities
  - In practice, it is common that two or more activities of two different processes must work co-operatively, e.g. to exchange messages or objects. Methods include message passing and patterns.
- Process communication
  - In the case where processes must communicate, this means that some activities of one process must interact with activities of other processes. The previous mechanisms for co-operative activities can be used.
- Process synchronisation
  - Process synchronisation can happen in three different forms: (1) synchronisation by events, (2) synchronisation by messages and (3) synchronisation by object flows.
- Exception handling mechanisms
  - Process models often only model the ideal structure of a business process. Real-world situations mostly consist of dealing with exceptions. Exceptions can either be predictable or unpredictable.

Principle eTOM.13 eTOM models success scenarios. Error conditions are not in scope.

Principle eTOM.14 Dynamic aspects of process modeling are outside the scope of the eTOM.

Naming conventions

The preferred convention for naming Level 3 Process Elements is <Verb Noun> e.g. “Configure & Activate Resource”, “Determine pre-order feasibility”, “Close Probem”.

The preferred convention for naming events is <Noun Verb> e.g. “Work Orders Executed”, “Resource Allocation & Configuration Done”.

Note: Level 1 and Level 2 Process Names are of the form <Noun> e.g. “Supplier / Partner Relationship Management”, “Order Handling”.

Principle eTOM.15
Terminology and naming conventions are <Noun> for Level 1 & 2 Process Names, <Verb Noun> for Level 3 Process Names, <Noun Verb> for events

.

Layer References and Responsibilities

A layered approach to the handling of responsibilities and information is taken in the eTOM. Responsibility for association / translation between layers is generally positioned at the lower layer. For example, the Customer Relationship Management (CRM) layer manages Customer Problems and the Service Management & Operations (SM&O) layer manages the Service Problems that may be associated, but it is the responsibility of the SM&O processes to map between these Service Problems.

Thus CRM provides the Customer Problem (or some appropriate information from this) to SM&O, which must then associate the one (or more) Service Problems that derive from this Customer Problem. Any ongoing intercation between Customer and Service layers is therefore in terms of Customer Problems (or information based on these) and not Service Problems, which are managed wholly within the Service layer.

Principle eTOM.16
Responsibility for association / translation between layers is generally positioned at the lower layer.

Data Responsibility

The process which is managing data creation, update etc has a prime responsibility for ensuring that the results of data which it is manipulating via the process are appropriately stored.

Principle eTOM.17
A process has prime responsibility for ensuring that the results of data manipulation are stored appropriately.

Consequently, the Manage Resource Inventory processes have no processes to create or update the data elements maintained in the repository.

Principle eTOM.18
The Manage Resource Inventory processes have no processes to create or update the data elements maintained in the repository.

The only exception to this Principle is the aspect associated with data quality. In the inventory processes there are processes associated with discovery i.e. looking at

comparing what is maintained in the inventory with what actually exists on the ground. The results of any inventory differences found would be in the form of some form of report, which could be used by process quality processes to review and fix any processes which are leading to bad data in the inventory. Note: there is no need for any “informing” of the original process as to data change.

Process Patterns

Introduction

In this section are presented examples of decomposition patterns in the eTOM. These patterns serve as templates for process modeling in the particular process area. Patterns are identified at Level 3 for:

- Problem Reports and their resolution
- Strategic view and Business Plan
- Order Lifecycle
- Product Lifecycle

Note:

All Patterns should have associated Use Cases. Use Cases will be added in a later version of the document.

Level 3 patterns

Example 1 – Problem Reports and their resolution

Applicable to ASSURANCE: Problem Handling / Service Problem Management / Resource Trouble Management.

This pattern consists of 4 process steps and 2 continuous processes. The process steps are:

- "Create". E.g. Problem Report, Trouble Report, Resource Trouble.
- "Analyse". Diagnose root cause.
- "Fix". Correct & Recover through recovery activities.
- "Close". Problem resolved, close report.

With 2 proceses running continuously:

- "Track & Manage recovery activities"

- "Report"

Pre-condition / Inputs to this pattern are: a reported problem or an alarm or event at resource or service level.

Post-condition / Output is: resolved problem, restoration of normal operation.

Associated Use Case:

Example 2 – Strategic view and Business Plan

Applicable to STRATEGY & COMMIT: Service Strategy & Planning / Resource Strategy & Planning / Supply Chain Strategy & Planning

This pattern consists of 6 processes.

- "Research". Research & analyse, including management of research gathering.
- "Strategy". Formulate strategy and business goals
- "Business Plans"
- "Operational support."
- "Partnership." (Null step for Supply Chain)
- "Commit." Gain Enterprise commitment.

Pre-condition / Inputs to this pattern are research, forecasts

Post-condition / Output are committed business plans and strategy.

Associated Use Case:

Example 3 – Order Lifecycle

Customer Orders, Service Orders and Resource Orders through to Closure. "Track and Manage" and "Reporting" run continuously.

Associated Use Case:

Example 4 – Product Lifecycle

From Research and New Product Development through In Service to Retirement.

Associated Use Case:

Level 4 Patterns

Later issues of the document will show how the Pattern approach can be extended to Level 4. Note that these are guidelines, they do not prescribe or mandate Level 4.

Organisational Context for eTOM

Introduction

This section sets out the enterprise context for process modeling, and the ways in which eTOM is applied. This section is not a guide on how to do process modeling in an organization, rather it sets out a generic framework for the various types of process (including manual human procedures) within a typical enterprise and shows how the eTOM can be related to those organizational processes.

Use of eTOM within an organisation

The use of the eTOM by organizations involves the extension and refinement of the eTOM to meet the specific business, operational, system and deployment needs of the organization.

This section is based on the following view of how processes are developed and modeled within organizations, and the relationship of the process models to organization structures and systems developments.

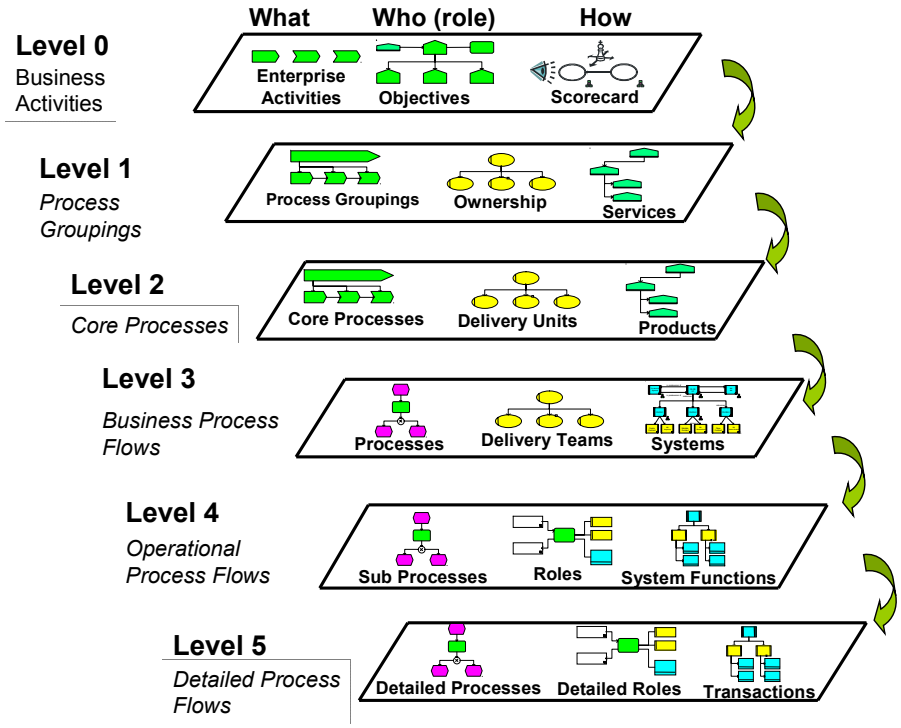

Fig. 1 Process Hierarchy

Level 0 – Business Activities

Identify and model: business objectives, value streams, environmental and fiscal constraints; develop balanced scorecard and product lines. These are the business goals that process and systems solutions must deliver.

Level 1 – Process Groupings

Design: product structure, product delivery and support process chains, enterprise-level data model, organisational structure. Identify business knowledge. This is the functional structure that delivers your business.

Defines different views of how processes are structured to deliver the Business Activities at Level 0.

Processes may be structured from:

- A process execution perspective showing standard end-to-end processes (e.g. Service Fulfilment)
- A functional perspective (e.g. Enterprise Value Domains).

Level 2 –Core Processes

Identify industry standard reference models; develop: generic processes, process hierarchy; identify and model business data definitions, system structure; define business roles. Processes are the key to delivering business objectives.

Recognizable sub-process of End-to-End Processes:

- Normally carried out within a Business Unit or Line of Business
- Defines those activities that deliver competitive advantage to business. As distinct from supporting processes.
- Normally modeled as Value Chains

Comprised of Tasks that are defined in detail in the Business Process Flows at Level 3.

Level 3 – Business Process Flows

Design detailed processes; assign business roles; identify supporting systems, data flows. Map business data models to systems data models. Consider failure paths; queues and bottlenecks. The detail is essential to ensure every action adds value to the business (which means to the customer) or is an essential requirement. Apply Lean Engineering techniques.

Defines the process flows of the Core Processes defined at Level 2.

- Comprised of Tasks
- Normally defined generically (i.e. not specific to a particular product, customer, geographical operation, etc).
- Often will only show the 'Sunny Day' scenario and exclude the detail of alternative actions, failures and error recovery.

Tasks can be decomposed into more detail if required in Level 4 Operational Process Flows.

Level 4 – Operational Process Flows

Develop detailed sub-process design; define operational roles; link processes to written procedures; identify detailed systems, equipment and resource usage.

Defines in more detail the Business Process Flows defined at Level 3.

Normally specific to an operational environment and will be characterized by the Application Systems and Organizational Units or Positions that support and execute them.

- Comprised of Steps
- Normally will include the 'Rainy Day' scenario showing the detail of alternative actions, failures and error recovery.

Steps can be decomposed into more detail if required in Level F Detailed Process Flows.

Level 5 – Detailed Process Flows

Deliver the process flow automatically through workflow systems, e-business solutions and systems development. Link process and data models to systems and software development environments.

Defines in more detail the Operational Process Flows defined at Level 4.

- Comprised of Operations.
- Specific to an operational environment and will be characterised by the Application Systems and Organisational Units or Positions that support and execute them.
- Should include the 'Rainy Day' scenario showing the detail of alternative actions, failures and error recovery.
- Any further detail required of an Operation will be described in a Procedure document or Work Instruction.

May be used to generate Workflows or be used a detailed requirements for systems development.

The eTOM and the Process Hierarchy

The TMF eTOM in its analysis has addressed the concerns shown in Level 0 through to Level 3.

However the concerns in Levels 4 and 5, and potentially lower Levels, needs to be addressed by an enterprise itself in implementing concrete detailed processes, roles and transactions.

For these more detailed Levels, the following section provides guidance on how an enterprise should execute these analysis steps. The benefit of these guidelines is that different enterprises will use a similar analysis approach to applying the eTOM to their own organization.

Guidance for extending and using the eTOM

Process Hierarchy: Decomposition Principles

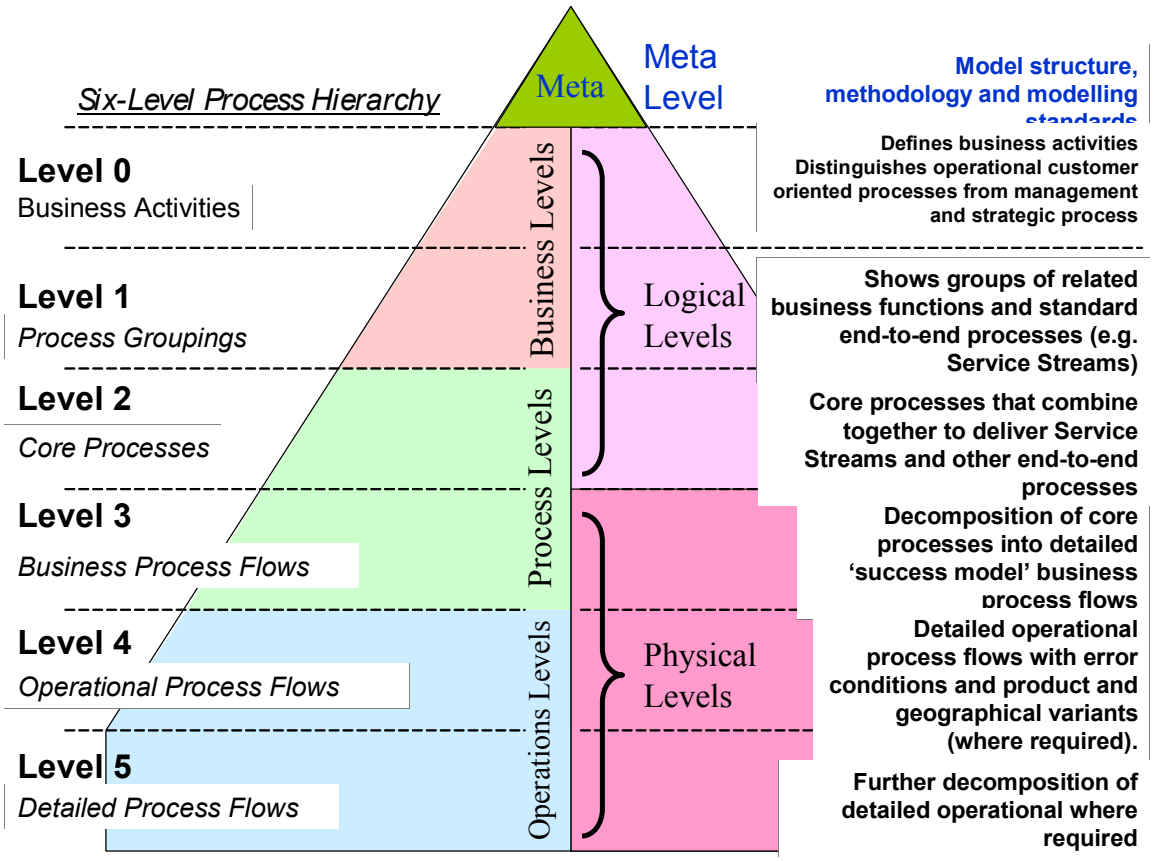

Fig. 2 Process Hierarchy and analysis focus for Levels

This diagram provides a more extended description of the 6 level decomposition model. It shows the focus of analysis for each of the levels. Note that in practice each level may have several layers of decomposition to deal with practical issues of handling complexity and scale. The test of what is in a Level is the focus of the analysis.

The eTOM has effectively produced an industry analysis of the process decompositions down to level 3 that provides both core processes and example process flows in the form of success models.

Process Hierarchy: Implementation Principles

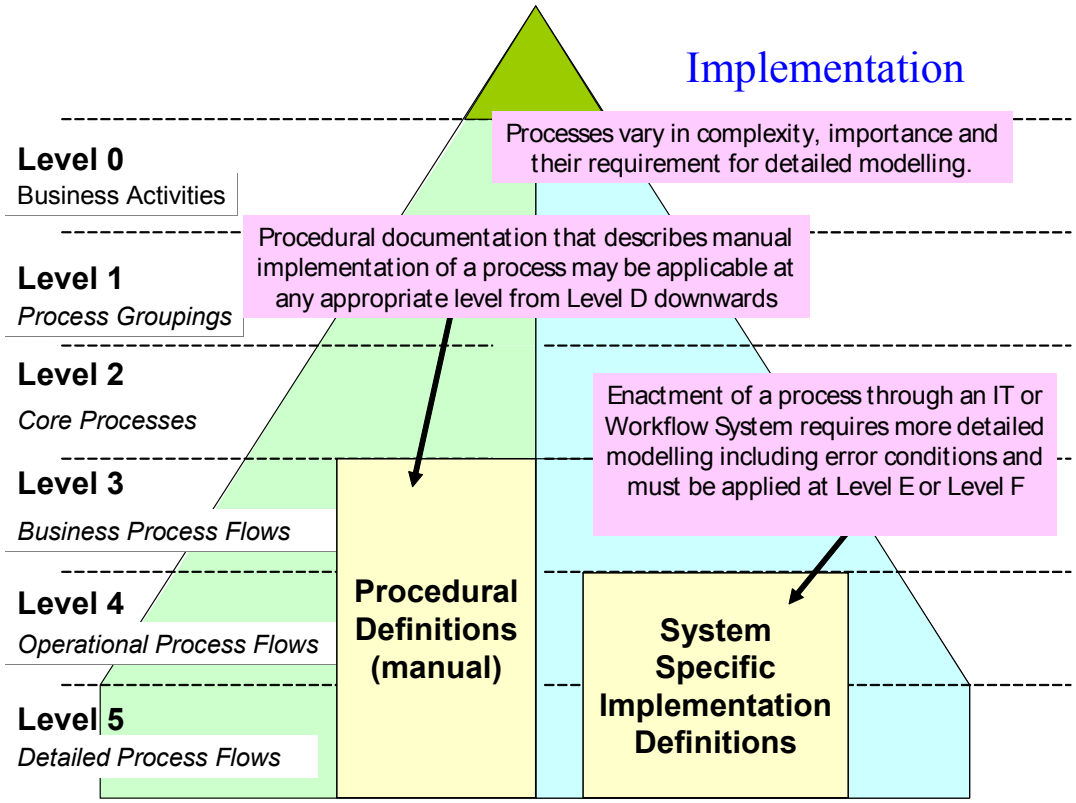

Fig. 3 Process Hierarchy Implementation

Process Hierarchy: Hierarchies

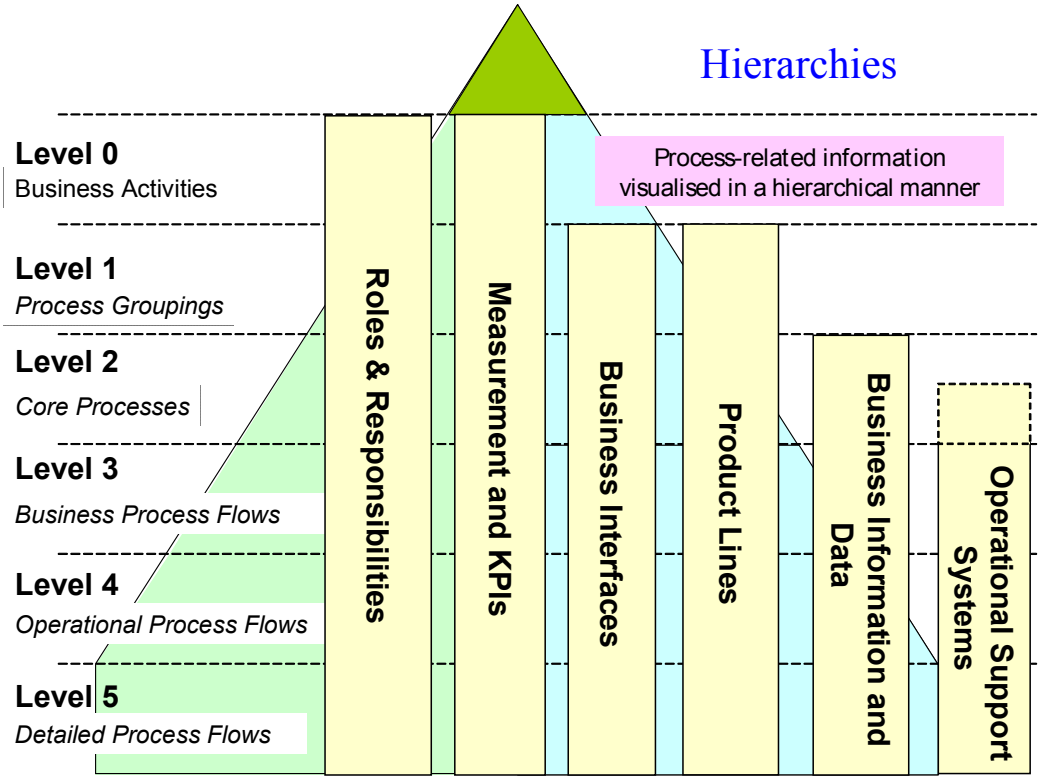

Fig. 4 Process Hierarchy hierarchies

This diagram shows those attributes and characteristics that have to be in lock step throughout the decomposition steps.

Process Hierarchy: Process View

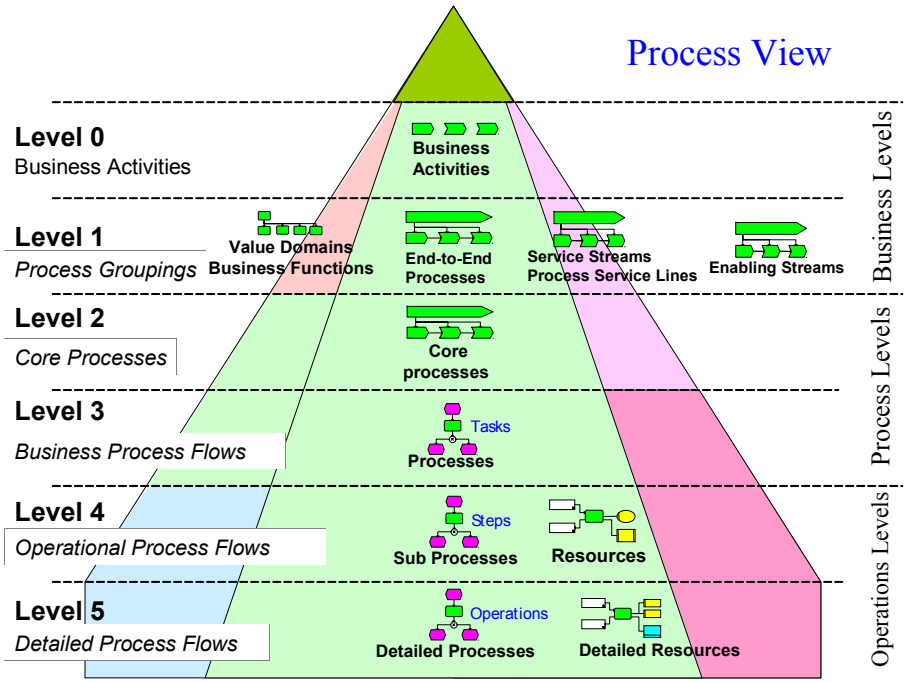

Fig. 5 Process Hierarchy: Processes and Resources

This figure shows a view of how processes are developed through the decomposition steps.

Audit Checklist

This section contains a checklist of the eTOM principles for its use and application within an organisation.

Principle	
eTOM.01	eTOM is an activity-based process decomposition model
eTOM.02	The eTOM Process Elements are comprehensive for a Service Provider
eTOM.03	An eTOM Process Element is a succession of activities with a control flow
eTOM.04	(Best Practice): an eTOM Process Element has a goal, value proposition, inputs, outputs. It consists of activities and uses resources. It has a CRUD and RACI model.
eTOM.05	eTOM is decomposed from notional Level 0 to a maximum of 3 levels – Levels 1, 2 and 3
eTOM.06	It is not the purpose of the eTOM to address the detailed processes and procedures of an enterprise
eTOM.07	Enterprise Management is decomposed to Level 2 only
eTOM.08	The goals, inputs, outputs, and activities of decomposed Process Elements at a lower level are consistent with the higher level Process Element. In particular, the input of the first lower level Process Element is the same as the input of the higher level PE; the output from the last lower level PE is the same as the output of the higher level PE; the goals of the lower level Process Elements taken together should match the goal of the higher level PE; the activities of the lower level Process Elements taken together should match the activity of the higher level PE.
eTOM.09	(Best Practice): each eTOM Process Element should identify its associated SID ABEs
eTOM.10	A particular Process Element will occur only once in the eTOM; there is no replication
eTOM.11	Process flows in eTOM are control flows, defining the sequence or order in which activities are performed.

eTOM.12		The swimlanes in a process flow are consistent within themselves and with respect to lower level decompositions.
eTOM.13		eTOM models success scenarios. Error conditions are not in scope.
eTOM.14		Dynamic aspects of process modeling are outside the scope of the eTOM.
eTOM.15		Terminology and naming conventions are <Noun> for Level 1 & 2 Process Names, <Verb Noun> for Level 3 Process Names, <Noun Verb> for events.
eTOM.16		Responsibility for association / translation between layers is generally positioned at the lower layer.
eTOM.17		A process has prime responsibility for ensuring that the results of data manipulation are stored appropriately.
eTOM.18		The Manage Resource Inventory processes have no processes to create or update the data elements maintained in the repository.

Outstanding issues

- Implications of the Horizontals and Verticals structure. Principles arising.
- Traceability at lower levels. E.g. For a Level 6 it should also be clear which of the Level 6 go back to which Level 3 (because they could go to several).
- Process dependencies and Process associations. E.g. The ABE and contract work.
- Section on status of the eTOM documentation. Check that flow examples are normative. Can examples be normative?
- Section on Hybrid approach to Process Modeling. Is it of benefit to discuss these distinctions when some not relevant to eTOM?
- Section on Decomposition. Say more about decomposition and uniqueness.
- Section on Flows. More explanation required for consistency of swimlanes.
- Use Cases for Patterns.
- Patterns at Level 4.
- Detail on the relationship of eTOM to NGOSS.

Administrative Appendix

This Appendix provides additional background material about the TeleManagement Forum and this document. In general. sections may be included or omitted as desired, however a Document History must always be included..

About this document

This is a TM Forum Guidebook. The guidebook format is used when:

- The document lays out a 'core' part of TM Forum's approach to automating business processes. Such guidebooks would include the Telecom Operations Map and the Technology Integration Map, but not the detailed specifications that are developed in support of the approach.
- Information about TM Forum policy, or goals or programs is provided, such as the Strategic Plan or Operating Plan.
- Information about the marketplace is provided, as in the report on the size of the OSS market.

Document Life Cycle

This version of the document is valid until updated or withdrawn

Document History

Version History

<This section records the changes between this and the previous document version as it is edited by the team concerned. Note: this is an incremental number which does not have to match the release number>

Version Number	Date Modified	Modified by:	Description of changes
0.21	November 2006	Philip Willliams	Document launch
1.0	December 2006	Mike Kelly	Formatting for first issue of document

1.1.	February 2007	Tina O'Sullivan	Updates from AC

Release History

<This section records the changes between this and the previous Official document release>

Release Number	Date Modified	Modified by:	Description of changes
Release 7.0	December 2006	Mike Kelly	Formatting for first issue of document

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About TeleManagement Forum

TeleManagement Forum is an international consortium of communications service providers and their suppliers. Its mission is to help service providers and network operators automate their business processes in a cost- and time-effective way. Specifically, the work of the TM Forum includes:

- Establishing operational guidance on the shape of business processes.
- Agreeing on information that needs to flow from one process activity to another.
- Identifying a realistic systems environment to support the interconnection of operational support systems.
- Enabling the development of a market and real products for integrating and automating telecom operations processes.

The members of TM Forum include service providers, network operators and suppliers of equipment and software to the communications industry. With that combination of buyers and suppliers of operational support systems, TM Forum is able to achieve results in a pragmatic way that leads to product offerings (from member companies) as well as paper specifications.