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Private Integrated Services Network (PISN) management; Compendium of PISN management services

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Foreword

This ETSI Technical Report (ETR) has been produced by the European Computer Manufacturers' Association (ECMA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETSI Technical Report (ETR) is based upon a "snapshot" of the work of ETSI STC NA4, Working Group 3 and Question 23/4 of the ITU-T for the services description and for the functions to support these services (these services and functions have been adapted to suit the Private Telecommunication Network (PTN) environment). The services are not to be standardized and the compendium provided in this ETR does not attempt to be exhaustive in its coverage. Instead it explores sufficient material to assist further standardization work.

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1 Scope

This ETSI Technical Report (ETR) identifies a set of Private Telecommunication Network (PTN) Management Services representative of PTN networks. This list is not meant to be exhaustive nor constricting and, as such, will not be subject to standardization, at least not at this stage. Services identified in this ETR may not be complete or necessarily offered in a particular implementation. However, they will provide a check-list to guide the standardization process, ensuring that it supplies all the functionality that is necessary to support the perceived usage of a management implementation.

Each PTN Management Service is briefly described in terms of its activity and identifiable separate component parts. From these the groupings of functions supporting these components are identified.

The range of PTN Management Services, the activity description and the components for each are not to be standardized. The function groupings will only be standardized in so far as they impact interfaces.

2 References

2.1 ECMA references

ECMA-105	Private Telecommunication Networks - Signalling at the S Reference Point - Data Link Layer Protocol (SSIG-L2) (1993)
ECMA-106	Private Telecommunication Networks - Signalling Protocol at the S Reference Point - Circuit Mode Basic Services (SSIG-BC) (1993)
ECMA-133	Reference Configurations for Calls through Exchanges of Private Telecommunication Networks (1989)
ECMA-141	Private Telecommunication Networks - Inter-Exchange Signalling - Data Link Layer Protocol (QSIG-L2) (1993)
ECMA-143	Private Telecommunication Networks - Inter-Exchange Signalling Protocol - Circuit Mode Basic Services (QSIG-BC) (1992)
ECMA-155	Addressing in Private Telecommunication Networks (1991)
ECMA-179	Services for Computer Supported Telecommunications Applications (CSTA) Phase I (1992)
ECMA TR/52	Computer Supported Telecommunications Applications (CSTA) (1990)
ECMA TR/54	A Management Framework for Private Telecommunication Networks (1990)
ECMA TR/57	Private Telecommunication Networks (1991)
ECMA TR/65	PTNX Functions for the Utilization of Intervening Networks in the Provision of Overlay Scenarios (Transparent Approach) - General Requirements (1994)
ECMA/TC32/93/6	Guidelines for the Definition of PTN Managed Object Classes (1st draft, February 1993)

2.2 ITU-T references

Rec. M.3010	Principles for a Telecommunications Management Network (COM IV-R 28)
Rec. M.3200	TMN Management Services (Bath, March 1993)
Rec. M.3201	TMN Management Service: Traffic Management (Bath, March 1993)
Rec. M.3203	TMN Management Service: Management of customer controlled services (Bath, March 1993)
Rec. M.3400	TMN Management Functions (COM IV-R 28)

2.3 ETSI references

ETS 300 189	Private Telecommunication Network (PTN); Addressing (December 1992)
I-ETS 300 291	Network Aspects - Functional Specification of Customer Administration on the OS/NE interface (January 1995)
I-ETS 300 292	Network Aspects - Functional Specification of call routing information management on the OS/NE interface (January 1995)
Draft TR NA43304	TMN Management Services (NA(91)30, September 1992)
Draft TR NA43306	TMN Management Services: Prose Descriptions (NA(91)31, September 1992)
Draft prETS 300 SIP(1)	ISDN: Attendant Supervisory Information Presentation (SIP) Supplementary Service: Service Description (ECMA/TC32-TG6/92/165, June 1992)

2.4 CENELEC references

ENV 41007	Definition of terms in private telecommunication networks (1989)
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3 Definitions

For the purpose of this ETR the following definitions apply.

3.1 Imported definitions

PTN	(defined in ENV 41007)
PTN Authority	(defined in ECMA-155 and ETS 300 189)
QSIG	(defined in ECMA TR/65)

For a general range of definitions see ENV 41007-1 and ETS 300 189

3.2 Document-specific definitions

3.2.1 Business Management level

A level (or layer) of the management hierarchy which has responsibility for the total enterprise and is the layer at which agreements between operators are made (described in annex B in ITU-T Rec. M.3010)

3.2.2 Element Management level

A level (or layer) of the management hierarchy which manages each network element on an individual basis (described in annex B in ITU-T Rec. M.3010). It covers:

- Control and coordination of a subset of network elements
- Maintaining statistical, log and other data about network elements

3.2.3 Entity

Defines parts of NEs, e.g. equipment, software, which are separately visible to management.

3.2.4 Network Management level

A level (or layer) of the management hierarchy which has the responsibility for the management of all the network elements, both individually and as a set. It is not concerned with how a particular element provides services internally (described in annex B in ITU-T Rec. M.3010). It covers:

- Control and coordination of the network view of all the network elements within its scope or domain
- The provision, cessation or modification of network capabilities for the support of service to customers

3.2.5 (PTN) Management Service

Similar to the definition of TMN Management Service in CCITT Rec. M.60 except that its scope is PTN Management rather than the TMN. It is also referred to in ECMA TR/54 using the old term of PTN Management Application Service.

3.2.6 PTN Management

Implicitly from ECMA TR/54 this is a TMN-like environment but with a scope restricted to PTNs.

3.2.7 Service Management level

A level (or layer) of the management hierarchy which is concerned with, and responsible for, the contractual aspects of services that are being provided to PTN users or available to potential new PTN users (described in annex B in ITU-T Rec. M.3010). It covers:

- PTN user/Public network point of contact
- Interaction with service providers
- Interaction between services
- Maintaining statistical data (e.g. QoS)

4 Acronyms and abbreviations

AI	Artificial Intelligence
CPU	Central Processing Unit
CSIG	Layer 3 SIGNalling system at the C reference point (see ECMA TR/65)
IVN	InterVening Network
LAN	Local Area Network
MP	Management Process
MS	Management Service
NP	Numbering Plan
OMP	Overall Management Process
PM	Performance Monitoring
PNP	Private Numbering Plan
PTE	Private Telecommunication Entity
PTN	Private Telecommunications Network
PTNX	Private Telecommunications Network eXchange
QSIG	SIGNalling information flows at the Q-reference point
SIP	Supervisory Information Presentation
SS#7	Signalling System No. 7
SSIG	SIGNalling information flows at the S-reference point
TSIG	SIGNalling information flows at the T-reference point

5 Introduction

Management Services are the users' requirements for managing a telecommunication network. As such it must be the aim of the management interfaces to support these requirements even if not all the services are provided by automated equipment (e.g. the OMP or MP). The Management Services thus represent a marketing view.

It is not envisioned that many 'new' Management Services will be documented as they are currently enacted by human operators. These operators interact with the existing management systems so as to realise these Management Services. It must be an aim of standardization to allow for the continuing automation of these services so as to enhance the efficiency of the human operators.

For consideration when identifying Management Services is that such services are relevant to specific areas in the management hierarchy, i.e. Business, Service, Network and Element Management. A human operator can interact with each level in the hierarchy from a workstation and uses different Management Services from each level. This is depicted in figure 1. For example, a maintenance engineer would want to interact at the Element Manager level normally and would need to see manageable objects in far more detail than would operators who are introducing new network users.

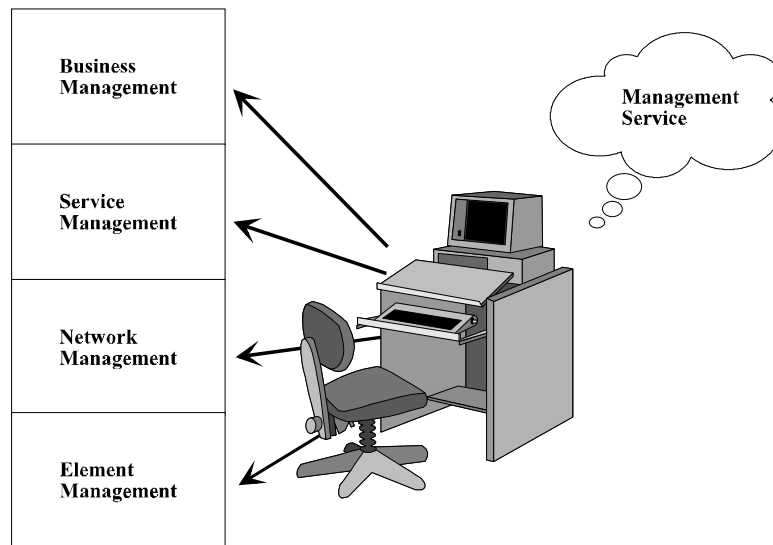


Figure 1 - Workstation at different management levels

In support of the above concept, a Management Service Template can be used to organise the categorization process. This is further described in annex A.

Information is included in annex D about the interactions between the services, indicating overlaps, dependencies and information flows.

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6 General

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Management Services for PTNs have been defined based upon TMN Management Service work undertaken principally for public network equipment. This is because many management features/requirements are shared between public and private networks. The purpose of this compendium is to bring together in a single document an overview of the management services which are relevant to PTNs. Additional Management Services are defined which are required for PTN Management where an equivalent TMN Management Service does not exist. Some of these additional services may also be adapted for use in public networks.

The Functional Groupings have also been based upon work developed for TMN but have been simplified to separate generic activities from the data involved. This has been done to ease the step to an object oriented specification which is required for both PTN Management and TMN.

Annexes have been provided to give more details of some of the additional Management Services, to show how TMN Management services have been adapted and to give an overview of the major relationships between Management Services.

7 Approach to Management Services

Each Management Service that is listed represents a broad area of activity for PTN management. Each Management Service is broken down into a set of Components of Service which represent the general activities that are required to enable the service to be offered.

The management functions which are necessary to support each of these Components can be determined and new functions defined only if none suitable already exist. The functions are grouped for commonality and rationalised thus avoiding potential duplications of effort.

During the process of grouping and rationalisation of the functions, the requirement(s) for each particular function (identified by the Component(s) of Service it is associated with) can be analysed. This leads to the Managed Objects and messages which are necessary to represent the functions at the management interfaces.

The above process is documented in the methodology described in Technical Report ECMA TR/54 Management Framework. Figure 2 illustrates the methodology and has been drawn from ECMA TR/54.

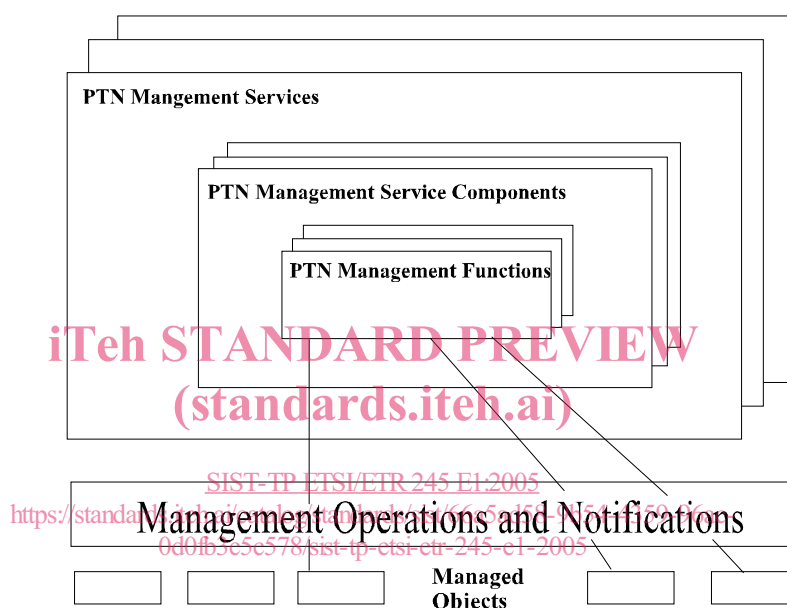


Figure 2 - PTN-Management methodology illustrated

The Management Services approach compliments the classical object oriented approach as it ensures that all the Managed Objects that are required to support the Management Services are identified. It also allows 'high management level' Managed Objects to be identified which do not directly reflect managed resources but rather represent a composite of resources and so would be difficult to identify purely by using an object oriented approach.

8 Task 1 - Describe MANAGEMENT SERVICES for PTN Management

List of Management Services and Management Service Components

Task 1 of the methodology in ECMA TR/54 calls for each Management Service identified to be described from its user's perspective.

8.1 PTN Management Services

The following services do not imply any implementation aspects of functions within physical building blocks. Each PTN Management Service is annotated to show its origin, and annex C gives information on how each service relates to those developed for the public service equipment.

8.1.1 Name of Service: User aspects administration

[from ITU-T/ETSI]

Description:

Interaction with the PTN Authority is the principle means by which PTN users are able to control their own PTN access. The management service of User aspects administration allows a PTN control authority to interact with the PTN in order to support PTN users. This service is intended to cover all the aspects of dealing with PTN users which will require support from the PTN and will include both logical and physical aspects. However, it should be noted that other management services will need to be called upon for the administration of those aspects not directly associated with the user.

Comprising the logical aspects is the ability for the PTN control authority to allocate and administer the telecommunication services for specific PTN users. Not only does this include the service considerations for an individual user but also it must consider the service interactions of the whole user community on the PTN. It should be noted that this aspect must be considered independently of the user's access to allow for mobility considerations.

On the physical side the PTN control authority will need to be able to interact with the access equipment associated with an individual PTN user. There is a strong relationship here with the Management Service for Management of PTN User Access where access equipment is considered as a whole (independent of individual users). Note that there may not be a fixed relationship between users and the access that they use.

Components of Service:

1. Manage service provision
2. Administer service facilities and supplementary services
3. Administer user's access line
4. Manage line test

8.1.2 **Name of Service: Routeing administration**

[from ITU-T/ETSI]

Description:

The purpose of management of routing information in a PTNX is to allow a manager to change the PTN routing information dynamically. In order to provide this service certain requirements should be met:

1. It must be possible to verify routing information in a PTNX with a minimal disturbance to the normal operation of the PTNX.
2. It must be possible to switch between routing plans according to predefined conditions, e.g. timing schedule, traffic loading etc.
3. It must be possible to define functionality in such a way that routing plans may easily be changed.
4. It must be possible to avoid redundant information by using information held by the PTN.

Components of Service:

none specified

8.1.3 **Name of Service: Traffic measurement and analysis administration**

[from ITU-T/ETSI]

Description:

none specified

Components of Service:

none specified

8.1.4 **Name of Service: Tariff and charging administration**

[from ITU-T/ETSI]

Description:

This service is commonly called Accounting.

The tariff and charging administration covers the part of the management activities related to the tariffs in, and influencing, the PTN and to the charging data for service usage. The activities may include creation, interrogation, modification and deleting data, and the management of the data collecting process. The activities may also include all types of methods used to verify that the charging data is correct.

In a PTN environment this service is more to do with charges incurred for services by other networks (e.g. PSTN). There is a correspondence here with interworking between public networks.

Components of Service:

1. Administration of a tariff for a service
2. Management of data collecting process for billing, accounting and service provisioning

8.1.5 **Name of Service: Management of the security of PTN Management**

[from ITU-T/ETSI]

Description:

none specified

Components of Service:

none specified

8.1.6 **Name of Service: Traffic management**

[from ITU-T/ETSI]

Description:

The objective of traffic management is to enable as many calls as possible to be successfully completed. This objective is met by maximising the use of all available network resources in any given traffic situation. It is also seen as the function of supervising the performance of a network and to be able, when necessary, to take action to control the flow of traffic and to optimize usage so as to achieve the maximum utilisation of network capacity.

Initially the work will concentrate upon a PTNX.

The management service will collect traffic information from the PTNX and send commands to it to modify its operation and/or to re-configure the network. The PTNX may send traffic management information periodically or upon threshold triggering. The management service may alter the thresholds and/or the periods at which the NE sends the traffic data.

Components of Service:

1. Network status monitoring
 - 1.1 circuit groups
 - 1.2 switching nodes
 - 1.3 hard to reach (HTR) destinations
2. Network performance monitoring
3. Traffic management control actions
 - 3.1 protective action
 - 3.2 expansive action
 - 3.3 traffic management control
4. Access control

8.1.7 **Name of Service: Management of PTN User Access**

[from ITU-T/ETSI]