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INTELLIGENT NETWORK

TELECOMMUNICATION APPLICATIONS FOR SWITCHES AND COMPUTERS (TASC) – TASC MANAGEMENT: ARCHITECTURE, METHODOLOGY AND REQUIREMENTS

ITU-T Recommendation Q.1303

(Previously “CCITT Recommendation”)

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The 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 Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation Q.1303 was prepared by ITU-T Study Group 11 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 17th of October 1995.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

CONTENTS

SUMMARY

This Recommendation identifies the architecture and requirements to support management of the TASC interface and is one in the Q.1300-Series Recommendations on TASC. The main purpose of TASC is to allow applications to be developed which integrate the services provided by both computing and telecommunication platforms. This would typically allow business applications to use TASC to integrate the computer workstation and telephone at the user's desktop. This Recommendation does not attempt to define management of either the switch or computer involved at the TASC interface.

INTRODUCTION

In order for the TASC interface between a switch and computer "host" to operate efficiently and reliably, it is necessary to provide a management activity. Whilst management of each end of the interface could be carried out by proprietary means, this would generally require a high degree of manual orchestration. The purpose of TASC Management is to describe a management interface between the switching and computing environment so as to assist in automating the management orchestration.

An overview of TASC is given in Recommendation Q.1300 with the TASC Architecture and Functional Services being defined in Recommendations Q.1301 and Q.1302, respectively. All of these Recommendations are considered essential preparatory reading for TASC Management. In particular Recommendation Q.1302 which describes the management requirements for each Functional Service in TASC.

This Recommendation uses many concepts esoteric to the management environment. It is suggested that the user of this Recommendation is familiar with management concepts.

BACKGROUND

This Recommendation was developed at the same time as the architecture and functional services were developed for TASC. Although some preliminary thoughts on management had been documented before in one of the regional *standards* bodies, this is the *first document published on* this topic.

TASC Management must accommodate many different management mechanisms internal to the switch and computer. Many of these will be proprietary but available documented *standards* are considered.

KEYWORDS

Architecture, Management, Requirements, TASC.

Recommendation Q.1303

TELECOMMUNICATION APPLICATIONS FOR SWITCHES AND COMPUTERS (TASC) – TASC MANAGEMENT: ARCHITECTURE, METHODOLOGY AND REQUIREMENTS

(Geneva, 1995)

1 Scope

This Recommendation tackles the area of enabling the switching and computing aspects, which make up TASC, to be managed. To do this, it considers how to orchestrate the management functions in the switching and computing application support environments. It does not consider how the management functions work in the switching and computing application support environments.

This Recommendation only considers the management methodology and requirements for TASC. Protocol aspects and the details of what may be managed are outside the scope of this Recommendation.

The scope of TASC Management needs bounds as each implementation will have different management needs. Thus, TASC Management is bounded by the management activity needed to support the defined TASC Functional Services plus additional management activities identified as "generic" by considering a number of potential management scenarios.

This Recommendation does not consider the following aspect for TASC Management:

- Charging.

TASC Management does not seek to replicate access to resources which are available via TASC Functional Services except where an alternative mechanism is required.

2 References

The following 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: all 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.

– CCITT Recommendation X.722 (1992) | ISO/IEC 10165-4:1992, *Information technology – Open systems Interconnection – Structure of management information – Guidelines for the definition of managed objects*.

– ITU-T Recommendation Q.1300 (1995), *Telecommunication Applications for switches and computers (TASC) – General overview*.

– ITU-T Recommendation Q.1301 (1995), *Telecommunication Applications for switches and computers (TASC) – TASC architecture*.

– ITU-T Recommendation Q.1302 (1995), *Telecommunication Applications for switches and computers (TASC) – TASC functional services*.

– CCITT Recommendation M.3020 (1992), *TMN interface specification methodology*.

– CCITT Recommendation I.112 (1988), *Vocabulary of terms for ISDNs*.

– ISO/IEC DIS 11579-1:1994, Information technology – *Telecommunications and information exchange between systems – Private Integrated Services Network – Part 1: Reference configuration for PISN exchanges (PINX)*.

3 Terms and definitions

This Recommendation uses terms defined in Recommendation Q.1300.

4 Abbreviations

For the purposes of this Recommendation, the following abbreviations are used:

ACSE	Association Control Service Element
CE	Communication Entity (TASC object) – see Recommendation Q.1301
E/R	Entity Relationship *(diagram)*
FS	Functional Service (TASC) – see Recommendation Q.1302
GDMO	Guidelines for the Definition of Managed Objects
ID	IDentifier – see Recommendation Q.1301
MIB	Management Information Base
NE	Network Element
NMF	Network Management Forum
OS	Operations System
OSI	Open Systems Interconnection
PTN	Private Telecommunication Network
SNMP	Simple Network Management Protocol
TASC	Telecommunication Applications for Switches and Computers – see Recommendation Q.1300
TMN	Telecommunication Management Network

5 Method for defining TASC Management

The development of TASC Management will take a top-down approach in that all management interactions will stem from requirements identified in this Recommendation. TASC Management will take an object oriented approach to representing the resources to be managed. This approach is in keeping with Systems Management being defined jointly by ISO/IEC JTC 1 and ITU-T; it is also used in the specification of the Telecommunication Management Network (TMN).

5.1 Relationship of reference points to interfaces

A reference point is a "conceptual point at the conjunction of two non-overlapping functional groups" according to Recommendation I.112. The ISO/IEC 11579-1 standard goes on to indicate that "in a specific functional arrangement, a reference point may, but need not, correspond to a physical interface between two units of equipment".

5.2 Ensemble definition and use

An Ensemble is a convenient mechanism to package up management into self-contained packages which are of general use in an implementation. The use of Ensembles (as described below) allows TASC Management to be developed progressively. Each phase will consist of one or more Ensembles which can be used individually as specified or combined together in an implementation.

5.2.1 Ensemble overview

In short, an Ensemble is the total set of specifications needed to do something useful.

Graphically an Ensemble could be pictured as in Figure 1:

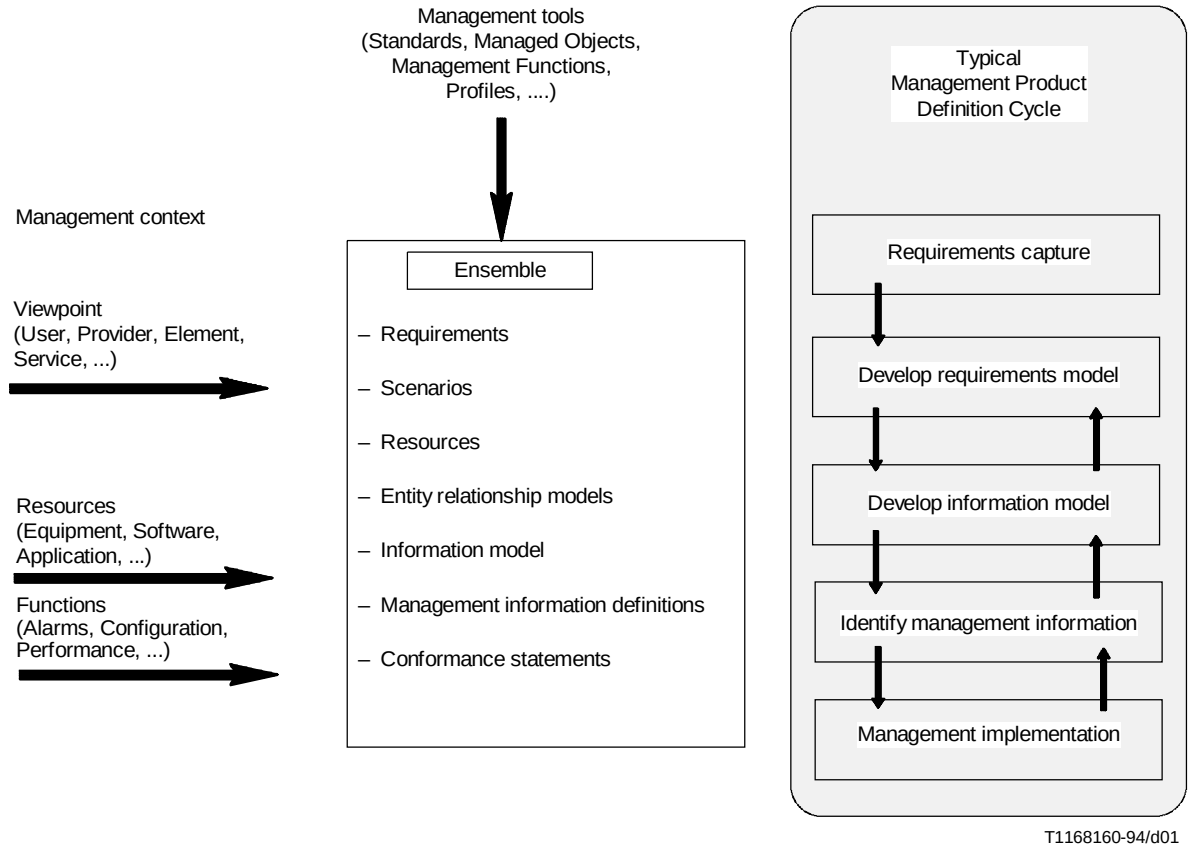

FIGURE 1/Q.1303

Ensemble phases compare with development phases

Figure 1 illustrates the parts which go to make up an Ensemble. It can be compared with a typical definition cycle for a project shown in the grey area. The Ensemble encompasses all the parts necessary to do a specific job. It also contains all the background information which identifies the job the Ensemble was designed for.

5.2.2 Management context

The “Management Context” describes why the Ensemble is required. The description of the "Management Context" includes the definition of the resources to be managed, the management functions to be performed, the scope of the problem to be solved, and the management view or level of abstraction from which the problem is to be approached. The influence of the Management Context on the Ensemble is shown in Figure 1.

5.2.3 Requirements

This should provide an outline description of the management problem that is being addressed by the Ensemble and identifies the boundaries of that problem. The solution that is proposed should also be briefly described and its boundaries identified.

5.2.4 Scenarios

Scenarios are used to show how the managed objects in the information model can be used to accomplish the functions specified for the Ensemble. Each may be depicted as a brief textual description plus message flow diagrams.

5.2.5 Resources

The resources or components of resources that are the subject of the management activity need to be defined for an Ensemble. This definition is limited to only those resources that are relevant to the Ensemble. The resources could be specified by textual descriptions or by reference to other documents which contain descriptions of the resources.

5.2.6 Management functions

This defines the management functions that can be performed on the resources. These functions may be primitive functions defined for OSI systems management (e.g. event management), higher level functions for general management (e.g. alarm surveillance), or other functions unique to the problem that the Ensemble addresses.

5.2.7 Information model

The Information Model focuses on the representation of the real world under study using modelling techniques. It contains information about both the elements of the model and their inter-relationships. The elements are defined in management information definitions. The elements of management information are defined using object definition templates and their inter-relationships are graphically illustrated through the use of Entity Relationship (E/R) diagrams.

5.2.8 Conformance

The scope of the conformance is limited to that which is required to implement the Ensemble.

5.3 Steps in defining TASC Management

The procedure identified in the TMN Interface Specification Methodology, Recommendation M.3020, should be used when developing TASC Management. This is augmented by the explicit packaging using the Ensemble concept described previously.

6 Requirements leading to TASC Management

Management functions within TASC will need to interwork with management functions for switching. As TMN is expected to define the architecture for managing some switch networks, then TASC management functions will need to inter-operate in a manner compatible with TMN. This will involve the use of managed objects for communication and identification of the appropriate TMN interface.

TASC management functions should also be capable of interworking with switching management systems that are not based upon TMN and to provide the capability to accommodate other network management systems such as the Simple Network Management Protocol (SNMP).

With three different management functions involved, i.e.:

1) TASC management;

2) computer system management; and

3) switch system management;

there is a need for TASC management to take a coordination role between computer and switch system management. This will ensure that the actions taken by either are harmonized and do not conflict or overlap.

6.1 Application uses for TASC Management

Typical example uses for TASC Management include:

- Coordinating the designations, etc. of TASC entities with the switch database as affected by other management sources.
- Support for a route determination service provided by the computer.
- Enabling the TASC application to handle telecommunication outages.

It should be possible to:

- initialize TASC;
- keep the computing and switching environments synchronized;
- discover information which may impact TASC.

6.2 Management Service descriptions

These Management Service descriptions are provided to guide the work in developing TASC Management. This list of descriptions is meant to act only as a checklist to verify that the specification for TASC Management can support a variety of activities. The list is not meant to be exhaustive or binding upon implementations.

6.2.1 General services

The intent of TASC Management is not to duplicate interactions already made possible by the TASC Functional Services unless there is a specific reason to do so.

6.2.1.1 Communication enabling

This refers to the TASC interface link between the host computer and the switch. Initialization needs to occur:

- on initial set-up of the TASC interface;
- after certain classes of failure where the TASC protocol being used by the computer or switch becomes suspect;
- after certain classes of reconfiguration where the TASC protocol being used by the computer or switch have been affected.

The role of communication enabling will usually encompass the following types of activities:

- Perform any context negotiation required for an "implicit" association which occurs when ACSE is not used, for example, to agree on:
  - Functional Services supported;
  - options supported for each Functional Services;
  - encoding rule to use.
- Identify Communication Entity (CE) objects which are within the Operation Domain of the implementation. This will accommodate subscription arrangements and allow for proper access rights to be established.
- Identify any functional restrictions for the objects.
- Establish defaults and initialization values.
- Determine the relationship (ordering) between a FS response and the action requested by the FS.

6.2.1.2 Performance degradation

It deals with the general area of balancing the needs of the TASC application with the needs of the computer and switch systems. This will involve accessing performance data, and possibly feeding back TASC performance data to the computer or switch-system management systems.

This will involve:

- Switch performance factors.
- Telecommunication Network performance factors.
- Queue performances.
- Agent performance factors.
- Link Performance.

6.2.1.3 Failure conditions

Failure reports will be received from both the computer and switch-system management, and TASC management will need to indicate faults within TASC. Handling of failure conditions consists of two aspects:

1) Detecting and verifying alarm conditions;
2) Repairing fault conditions.

6.2.1.3.1 Alarm Reporting functions

This subclause describes the Alarm Reporting functions required.

Alarm reporting relates to the following information:

1) Alarms – Alarm information upon the occurrence of an alarm.
2) Alarm History – Historical alarm information.

6.2.1.3.2 Alarm Summary functions

This subclause describes the Alarm Summary functions required.

Alarm summary relates to the following information:

- Alarm Summary – Current Alarm Summary.

6.2.1.3.3 Alarm Event Criteria functions

This subclause describes the Alarm Event Criteria functions required.

Alarm event criteria relates to the following information:

- Condition for Event to be considered an alarm.

6.2.1.3.4 Log Control functions

This subclause describes the Log Control functions required. Logs record relevant historical information.

Log Control relates to the following activity:

- Allow/Inhibit Logging – The server is requested to allow/inhibit logging of Log Records.

Log Control relates to the following information:

- Log Condition – Current assignment of specified Log attributes.

6.2.1.4 Recovery and restoration

Recovery comes under several headings:

- recovery from an interface failure;
- recovery from a computing application failure;
- recovery from a switching application failure;
- recovery from a computing system failure;
- recovery from a switching system failure.

In the latter two, the recovery of the failed system will be handled by the management function responsible for that system. The role of TASC management is to introduce any resynchronization that is necessary.

6.2.1.5 Object configuration changes

The computer needs to be kept notified of any changes to the topology of the Operation Domain (e.g. number of objects, type of objects, interactions supported). The objects relevant to TASC are described in Recommendation Q.1301. Considerations include:

- Addressing changes;
- Monitoring support enabled/disabled;
- Subscription changes.

There are some generic management interactions with TASC objects:

- Enable, to make the TASC object operational.
- Disable, to make the TASC object non-operational.
- Query, to determine the current operational status of TASC objects.

The types of objects which can be managed reflect the management features of the TASC objects specified in Recommendation Q.1301. For TASC Management, the objects may be specified uniquely or be specified collectively via a filter mechanism in management services.

6.2.1.5.1 Line CE

The management requirements for this object are considered in 6.2.2.1 and 6.2.2.5.

6.2.1.5.2 Incoming Distribution CE

TASC Management requirements include:

- The current number of calls being handled by the Distribution CE can be compared with the maximum capacity for the Distribution CE.
- The number of queues available and the sequence of calls distributed between the queues can be determined.
- The number of calls which exit in the distribution function before they can be distributed.
- The availability and identity of announcements given to calls in a queue can be determined and potentially altered.
- The conditions for giving an announcement to a call in a queue can be determined and potentially altered.
- Handling of calls which fail to connect (i.e. Busy, Incompatible Destination) can be determined and potentially altered.

6.2.1.5.3 Line CP

The management requirements for this object are considered as part of 6.2.2.5.

6.2.1.5.4 Incoming Distribution CP

The management requirements for this object are considered as part of 6.2.2.5.

6.2.1.5.5 Registered User (and "Other" Registered User)

TASC Management requirements include:

- Allocation of user IDs.
- Changes to user IDs.
- Discover and change any passwords required for the sign on process.
- Passing user "sign-on" information from the point of input to the entity controlling the sign-on process.
- Discover and potentially alter any relationships between a user and CEs (e.g. allowed access points).
- Maintain history of user access to the system.
- Force Log-out for a user (individually or via a filter mechanism).
- Discover and potentially alter the telecommunication service profile for a user.
- Discover and potentially alter the TASC service profile for a user.

6.2.1.5.6 Agent

The management requirements for this object are as considered in 6.2.1.5.5 in addition to the following:

- Discover agent groups that are currently active.
- List members of agent groups.
- Discover and potentially alter the groups for which the agent is a member.
- Discover and potentially alter the "role" of the agent within each group, e.g.:
  - Supervisor;
  - Position in a hierarchically organized group.
- Discover and potentially alter relationships between an agent, or agent group, and Incoming Distribution CEs.
- Create (and populate) or destroy agent groups.
- Maintain identifiers for agent groups (part of 6.2.2.5).
- Report and maintain list of unauthorized access attempts.
- Reinitialize an Agent state where that state cannot be changed by normal means.

6.2.1.5.7 Non-Registered User

No requirements identified.

6.2.1.5.8 Originating Call View

A Call View is a transitory object and as such cannot be enabled or disabled. However, TASC Management will need to be able to query an identified Call View to determine its current Call View state.

6.2.1.5.9 Terminating Call View

A Call View is a transitory object and as such cannot be enabled or disabled. However, TASC Management will need to be able to query an identified Call View to determine its current Call View state.

6.2.1.5.10 Incoming Distribution Call View

A Call View is a transitory object and as such cannot be enabled or disabled. However, TASC Management will need to be able to query an identified Call View to determine its current Call View state.

6.2.1.6 Shared TASC knowledge

The following information needs to be determined at the start of the TASC association and may be changed during the duration of the association.

- Coordination of which computing applications can use a TASC FS and their domain of influence within the FS.
- Global or single-ended view to be used.
- Monitors agreed at association time, i.e. implicit.

6.2.2 Management associated with TASC Functional Services

The following identify generic management requirements for the TASC Functional Services defined in Recommendation Q.1302.

6.2.2.1 Line CE related management

- The computer can determine the number of calls that can be simultaneously connected to the CE.
- The computer is able to determine, and possibly affect, the restrictions about calls which may be connected to a specific CE.

- The computer is able to determine the type (i.e. call characteristics) of calls which the terminal can support (if this information is available).
- Any call affecting conditions (i.e. call forwarding) associated with CEs can be determined, and possibly affected.
- The calls currently being held by a CE can be determined.
- The calls currently active at a CE can be determined.
- A history (timed and dated) and source of changes (e.g. from network management) to the call settings of a CE can be determined.
- The calls currently queued ("camped-on") at a CE can be determined.
- The call completion facilities available can be determined.
- The length of text messages which may be displayed can be determined.
- Text messages left at a CE can be modified/deleted.
- A "call back" request can be cancelled.
- The call back requests that are currently pending can be determined for the originating/destination CE.
- The line features supported by a CE can be determined.
- The privileges necessary to set or clear a line feature on a CE can be determined.
- The monitor types, and filters, applicable to a CE can be determined.

6.2.2.2 Management of services

- The switch should be informed if a service becomes temporarily unavailable.
- The computer is able to determine the service profile for a CE.
- The number of conferences that may be created can be determined.
- The limits on the number of calls in a conference can be determined.

6.2.2.3 Timer management

- The computer should be able to determine, and possibly alter, the timers used by the switch for TASC Functional Services:
  a) when expecting a reply to a TASC FS request;
  b) when a TASC FS is deemed completed.
- Is able to specify a time period for which no TASC communication does not require investigative action.
- The computer should be able to determine, and possibly alter, the timer used to restrict the period for which the call is paused whilst waiting to be routed.

6.2.2.4 Problem management

- Any known routing problems which may affect the call are determinable.
- The states of a call can be determined, and potentially altered.

6.2.2.5 ID management

- The computer is aware of the current relationship of CE identifiers to physical equipment within the TASC Working Domain.
- CE identifiers can be verified as valid, accessible.
- Any calls and/or associated IDs which were not properly cleared during the TASC FS process can be detected and cleared.
- The membership of a call pick-up group can be determined, and possibly affected.

- It is possible to clear individual or all routing "crossRefID" in use (initiated by either computer or switch).
- The current log (switch and computer) of unknown "crossRefID's" can be reviewed and managed.
- The monitor IDs currently in effect can be determined, and potentially cleared.

6.2.2.6 Routing management

- Both switch and computer should be informed when any significant changes are made to the routing information held by its peer that is likely to change the routing information given.
- The computer should be able to view, and potentially alter, the conditions used by the switch to determine when to seek routing information from the computer.
- It is possible to determine how many non-default routing "trips" the switch can support.
- It is possible to determine which "trip" condition categories the switch can support.
- All, or individual, CEs can be forced back to their default state for routing "trips".
- All, or individual, CEs can be forced to disable their routing "trip".
- The current status of all, or individual, routing "trips" can be determined.
- The default states for the routing "trips" on CEs can be determined, and potentially altered.
- It is possible to identify which CEs can support routing "trips".

7 Functional architecture

The Functional Architecture identifies the "activity" groupings which make up TASC Management without specifying where they are located physically (although the locations are normally quite obvious for TASC Management).

7.1 Reference configuration

Fundamental to TASC are the two partners; the computing and switching environments. Each has its own management aspect which must be functionally coordinated in order to provide TASC Management.

- The computer management function, associated with the TASC application running on the host computer.
- The switch management function, associated with the telecommunications domain.

This arrangement is represented by Figure 2 where the computing and switching domains are portrayed. Each domain has its own management functions which communicate together to make up TASC Management. In addition, the management function for each domain communicates with the "application" (TASC or Switch) which operates in that domain.

In practise, it is expected that TASC Management will not be integrated into computer-system management and switch-system management functions so that each can be developed and operated independently of whether TASC is operational. To accommodate this, a further pair of functional entities are required as depicted in Figure 3.

The computer and switch TASC management entities interface directly, and link in to their respective TASC application function. There is also expected to be communication between the TASC management and system management entities (to form the computer or switch management functions), but this is implementation dependent.

7.2 Reference points

A reference point is used to identify a point where communication logically takes place. See Figure 4.

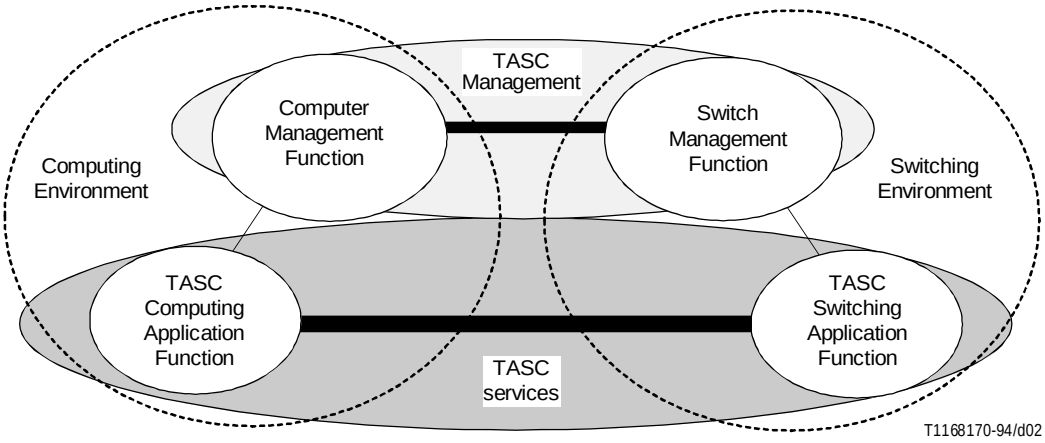

FIGURE 2/Q.1303

General representation of TASC Management architecture

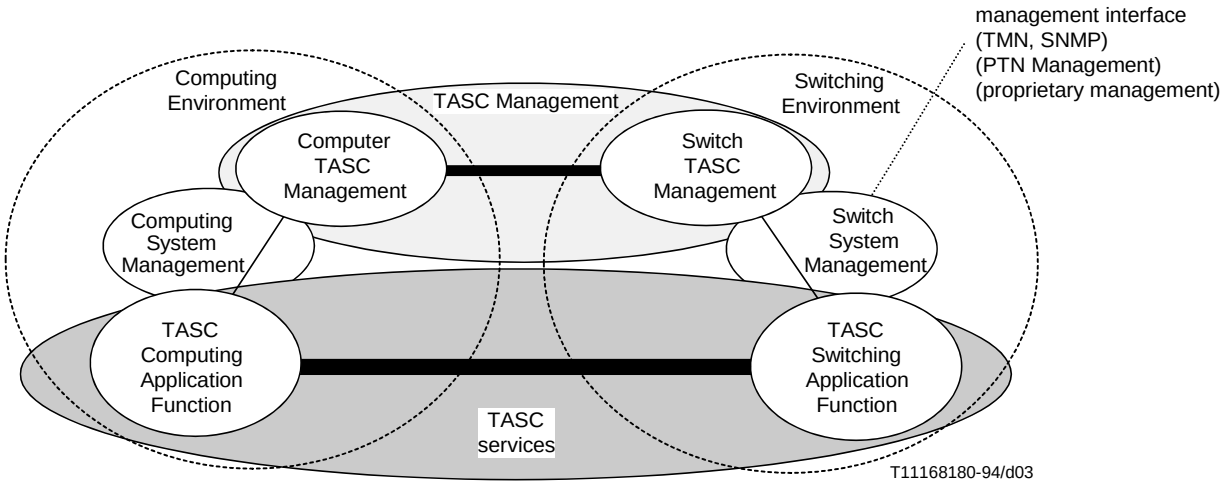

FIGURE 3/Q.1303

Functional representation of TASC Management architecture

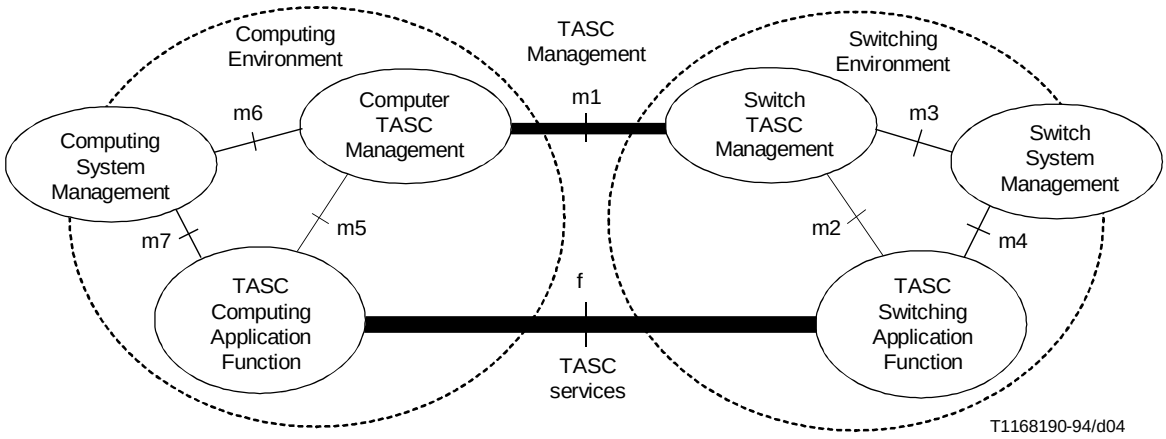

FIGURE 4/Q.1303
TASC Management reference points

TABLE 1/Q.1303

Reference Point	TASC reference	Description
m1	✓	Deals with all aspects of TASC Management which occur in either environment
m2	✓	Interacts with objects representing TASC resources
m3	✓	Links TASC Management into the system management of the switch
m4	✓	Impacts by system management upon TASC resources
m5	✓	Allows computer applications to access management for TASC, also makes TASC computing resources visible
m6	✓	Links TASC Management into the computer's own management system
m7	✓	Impacts by computer's own management system on the computer application
f	✓	TASC functional service interaction (not strictly part of TASC management though)

Table 1 describes the various reference points which are depicted in Figure 4.

8 Information mechanisms

For TASC Management, the only reference point which will be considered as an interface is the m1 reference point depicted in Figure 4. As an interface, this will be referred to as the TASC Management M1 interface.

8.1 Establishing the scope of an interface

The TASC Management interface (M1), which is a physical realization of the m1 reference point, should provide:

- a protocol to carry communication messages;
- services to perform TASC Management functions;
- representation of the resources which may be accessed by TASC Management.

8.2 Representation of resources to be managed

The resources in the switching and computing environments which may be accessed by TASC Management will be represented by objects. An object has attributes which represent the information associated with resources.

An object may represent:

- one resource;
- part of a resource; or
- several logically associated resources (or parts thereof).

This is illustrated by Figure 5 below.

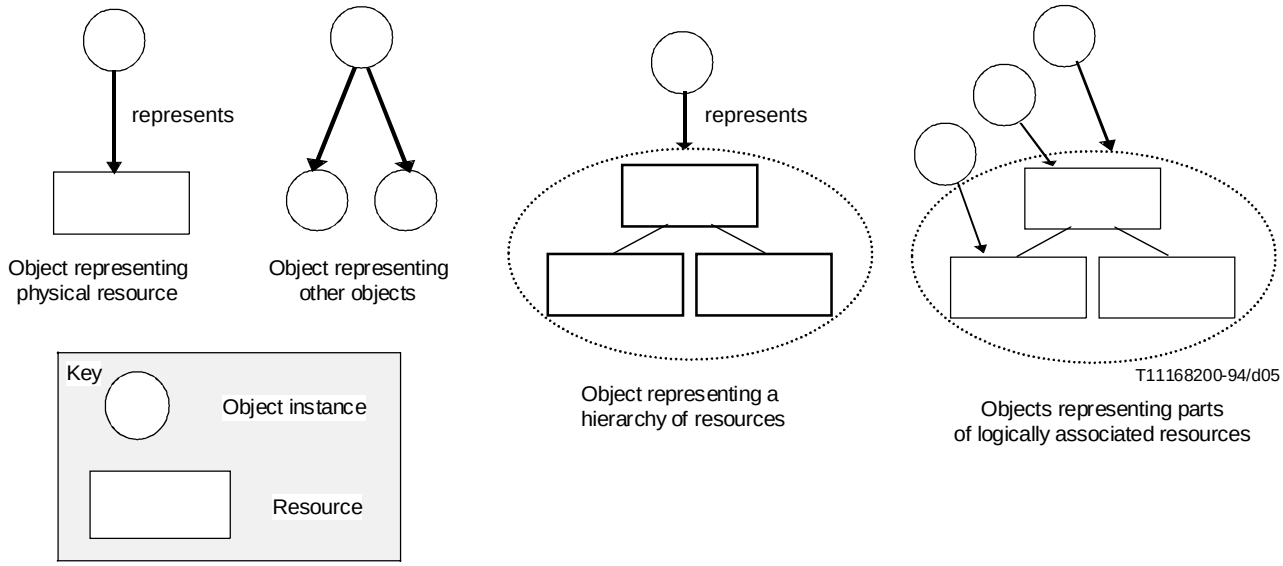

FIGURE 5/Q.1303

Illustration of objects and resources

The object instances available at an interface implementation will need to be discovered as part of the process of initializing the M1 interface.

8.3 Exchanging management information

All management accesses are via interactions with the objects defined for TASC Management. The interactions occur as operations on the attributes associated with an object instance:

- GET attribute to read resource information values.
- SET attribute to change resource information values.

9 Model architecture

In the arena of telecommunications management, the Guidelines for the Definition of Managed Objects (GDMO), Recommendation X.722, provide a framework for the definition of managed objects. This framework specifies a template using ASN.1 which enables all managed objects to share a common ancestry. The work on OSI Systems Management and TMN have both been based upon GDMO and provide a wealth of object definitions from which TASC Management can develop.

The Simple Network Management Protocol (SNMP) is a *de facto* management standard which is widely supported by certain classes of communication equipment and has been identified as an interim management interface for private networks. It too has an object oriented representation of the resources to be managed.

9.1 Consideration of established switching and computing modelling

Both GDMO, the basis for TMN object definitions, and SNMP representations should be supported to allow the corresponding interface mechanisms to be used at the TASC interface. The GDMO and SNMP style for defining objects differs in a number of significant areas. This tends to force a choice between GDMO or SNMP, or to support both representations for the same resource.

An alternative approach is to restructure GDMO definitions to fit into an SNMP framework. Thus GDMO can become the base source from which the technology specific Management Information Bases, logical repositories of the managed objects are constructed. Some simplifications may be required to GDMO definitions to suit a TASC environment.

The concept is captured in a simple diagram, Figure 6, shown below:

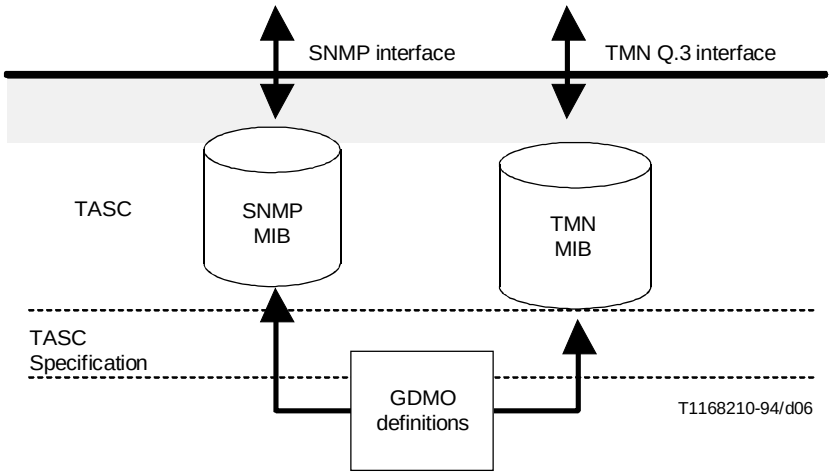

FIGURE 6/Q.1303

Combining SNMP and TMN representations

9.1.1 Conversion procedures between GDMO and SNMP

The Network Management Forum (NMF) body has already captured much of the ground work for conversion between GDMO and SNMP in their document Forum 030 (see bibliography). This gives instructions on how to convert GDMO definitions to the SNMPv2 framework and also gives a example for alarm reporting. Rather than reinventing the wheel, this work should be used as a basis for TASC Management.

9.2 Modelling mechanism

With the requirements leading to a TASC Management object established, the available GDMO defined managed objects can be consulted for an appropriate existing definition. Only if such an object does not exist should a new object definition be developed. The procedures outlined in Recommendation M.3020 should be adhered to when defining the new TASC managed object.

10 Overall TASC Management Information Model

Figure 7 shows how individual TASC management services can be constructed from a set of Ensembles. Generally a different set of Ensembles will be required for each TASC management service. Undoubtedly there will need to be additional objects to enable all the functions required of the TASC management service to be supported.

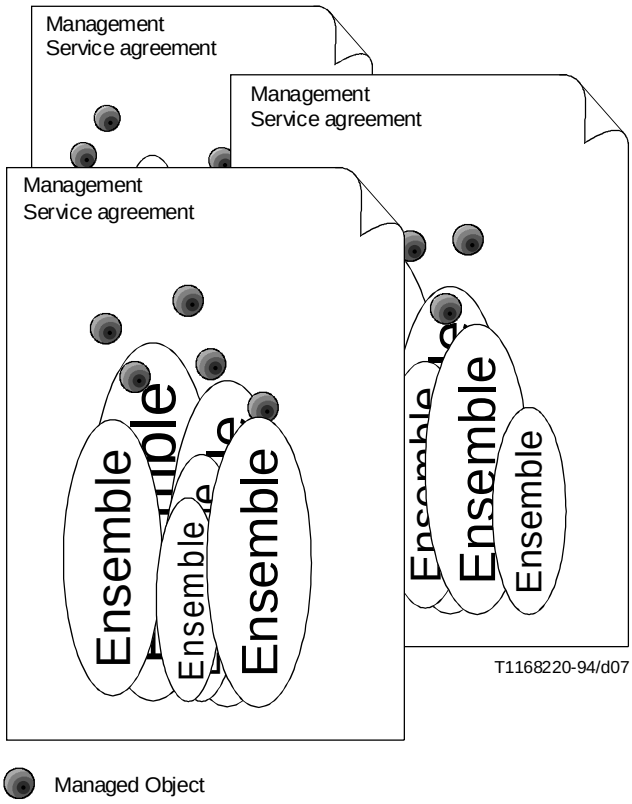

FIGURE 7/Q.1303

Example use of Ensembles to form TASC Management

Figure 7 illustrates how Ensembles can be of different scope (illustrated as variations in size) which are brought together to build the management service.

This Recommendation does not consider interactions between Ensembles, this will be the province of the management service agreement which is outside the scope of this Recommendation.

11 Physical scenarios

The connection between the computer TASC management and the switch TASC management aspects will convey management information for TASC between the two domains.

In Figure 8, portraying a physical example, the connection is shown as an interface and, although this is expected to be predominately the case, there exists the possibility that the management for computer and switch are integrated. In this case, the management communication between the aspects is internal to the equipment and does not appear at a physical interface.

It is expected that the interfaces between the TASC computing and switching applications and between computer and switch management will often share the same physical communication link. This is depicted in Figure 8 which shows the two interfaces being carried by a common link. Each interface will be separately identifiable within the link.

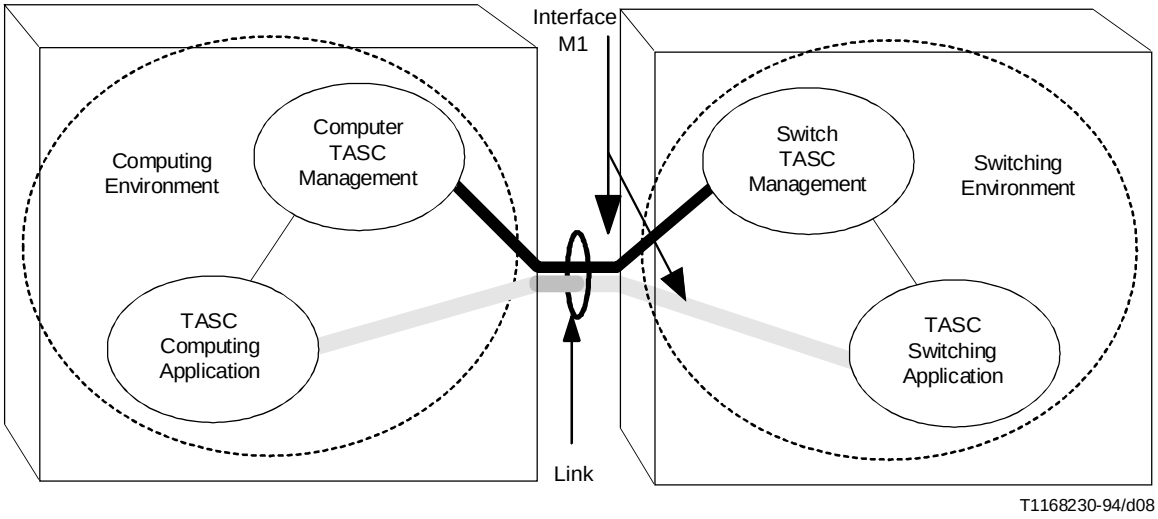

FIGURE 8/Q.1303

Multiple interfaces sharing the same link

Annex A

Interactions with existing management systems

(This Annex forms an integral part of this Recommendation)

A.1 TMN

A Telecommunication Management Network (TMN) is a standardized interface which may be used to manage the switch supporting the TASC switching application. This interface interacts with the switch-system management function as shown in Figure 3 which in turn interacts with the switch TASC management function supporting the TASC Management interface. Thus, TMN only indirectly interacts with TASC Management, the switch-system management function deals with TASC Management interactions which are relevant to the general switching environment and relays appropriate information to TMN.

TMN interacts with the switching environment via a Managed Information Base (MIB) which provides a number of Managed Objects to represent the switching environment. TASC Management also has its own separate MIB and it is the role of switch-system management to reflect changes made in one MIB to the other as appropriate. This is depicted in Figure A.1.

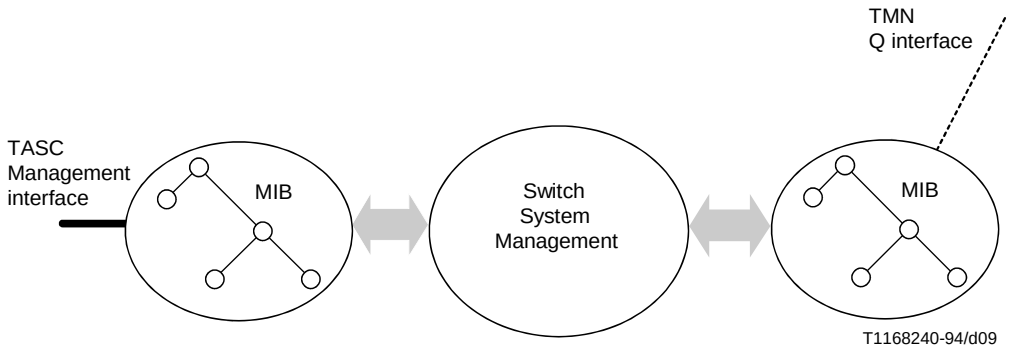

FIGURE A.1/Q.1303

Interaction between TASC Management and TMN MIBs

A.2 PTN Management

A Private Telecommunication Network (PTN) Management interface is a standardized interface for management of the switch supporting the TASC switching application. This interface interacts with the switch-system management function as shown in Figure 3 which in turn interacts with the switch TASC management interface supporting the TASC Management interface. Thus, PTN Management only indirectly interacts with TASC Management, the switch-system management function deals with TASC Management interactions which are relevant to the general switching environment and relays appropriate information to PTN Management.

The PTN Management interacts with the switching environment via a Managed Information Base (MIB) which provides a number of Managed Objects to represent the switching environment. TASC Management also has its own separate MIB and it is the role of switch-system management to reflect changes made in one MIB to the other as appropriate. This is depicted in Figure A.2.

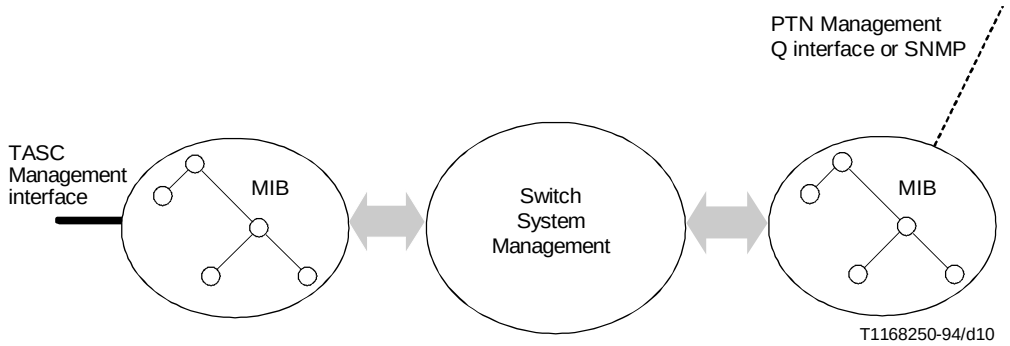

FIGURE A.2/Q.1303

Interaction between TASC Management and PTN Management MIBs

PTN Management may employ a Q-type interface which is based upon TMN protocols and management information, or it may employ an SNMP interface. However, in both cases the representation of management information will be based upon definitions appropriate to TMN Q interfaces.

A.3 Proprietary

A proprietary management interface may be used to manage the switch supporting the TASC switching application. This interface interacts with the switch-system management function as shown in Figure 3 which in turn interacts with the switch TASC management interface supporting the TASC Management interface. Thus, proprietary management only indirectly interacts with TASC Management, the switch-system management function deals with TASC Management interactions which are relevant to the general switching environment and relays appropriate information to proprietary management.

Due to its proprietary nature, it is not possible to specify how the TASC Management MIB interacts with the proprietary management interface.

Appendix I

Bibliography

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

– Network Management Forum, Translation of ISO/CCITT GDMO MIBS TO INTERNET MIBS, *Forum 030*.