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DIGITAL EXCHANGES

DIGITAL EXCHANGE INTERFACES FOR OPERATIONS, ADMINISTRATION AND MAINTENANCE

ITU-T Recommendation Q.513

(Previously "CCITT Recommendation")

FOREWORD

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

ITU-T Recommendation Q.513 was revised by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

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

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DIGITAL EXCHANGE INTERFACES FOR OPERATIONS, ADMINISTRATION AND MAINTENANCE

(Malaga-Torremolinos, 1984; modified at Helsinki, 1993)

1 General

This Recommendation applies to digital local, combined, transit and international exchanges for telephony in Integrated Digital Networks (IDN) and mixed (analogue/digital) networks, and also to local, combined, transit and international exchanges in an Integrated Services Digital Network (ISDN).

The field of application of this Recommendation is more fully defined in Recommendation Q.500.

This Recommendation is not intended to define any systems or equipment in or connected to, a digital exchange via these interfaces. Therefore only the interfaces characteristics are described.

In the text of this Recommendation, references are made to operation, administration and maintenance (OA&M) equipment which comprises either or both of the following:

a) operations systems (OS) which support personnel responsible for exchange OA&M. Note that the word exchange includes both signalling and switching equipment;

b) human-machine terminals which provide access to exchanges or operations systems.

Such terminals can vary in capability. Some may only perform simple functions such as displaying messages and providing human interface capability. More sophisticated terminals may also perform the analysis and filtering of information, display of exchange status information, provision of software support functions, etc.

2 General characteristics of the interfaces to OA&M equipment

2.1 Interfaces are provided for the transfer of information between exchanges and locations where OA&M functions are performed. Items a) and b) below illustrate examples of information that may cross the interface and which may need to be catered for. (The choice of information that crosses the interface is a matter for each Administration/ROA.)

a) The information transferred from the exchange to OA&M equipment may include customer usage and charging data, exchange system status indication, system resource utilization data, system performance measurements, alarms and messages alerting operating personnel to the current state of the exchange and other data.

b) The information transferred to the exchange from the OA&M equipment may include commands for system initializations and configuration control, data to effect changes in system operation, commands to initiate, terminate, or otherwise modify the services provided to customers, requests for status information and other commands.

2.2 An exchange may have access to one or more OA&M equipment.

2.3 Access may be provided using separate data links, multiplexed data links, or one or more data networks to each OA&M equipment.

2.4 The exchange shall not become unavailable due to the failure or malfunction of OA&M equipment, or the failure of links between the exchange and OA&M equipment.

2.5 The choice between single and multiple physical links at the exchange, and the configuration of the OA&M equipment is a national matter, not subject to CCITT Recommendations.

3 Functional characteristics of the interface to OA&M equipment

3.1 The exchange should not depend for its basic operation on the correct functioning of the OA&M equipment.

3.2 The interface should provide basic initialization, error detection and automatic recovery procedures for the data link.

3.3 The interface should support data transport mechanisms that may be employed by the exchange and the OA&M equipment to assure the reliable transfer of particular information (e.g. charging data).

3.4 The interface should support the setting of priorities by the exchange or OA&M equipment for the use of the transmission medium (data links).

3.5 The interface should support priority transfer of urgent messages.

4 Exchange OA&M interfaces

Exchange OA&M interfaces are shown in Figure 1.

There are two general classes of OA&M interfaces:

a) human-machine interfaces;

b) interfaces to OA&M OSs and workstations.

The interfaces for local and remote human-machine functions should conform to the MML Z.300-Series Recommendations.

It is planned to provide Recommendations which specify interfaces between exchanges and operations systems and between exchanges and workstations. Such specifications will be based on the concept of the Telecommunications Management Network (TMN). The principles and architecture of the TMN are defined in Recommendation M.30.

4.1 TMN interfaces

4.1.1 Q_3 interface

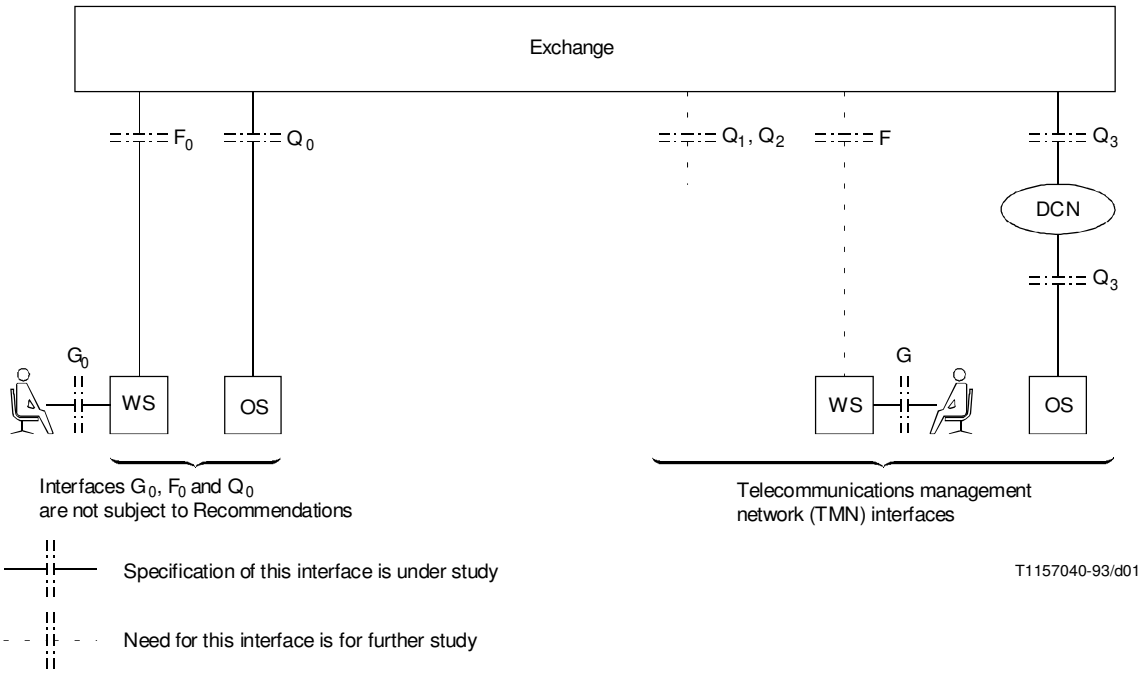
Interface Q_3 connects exchanges to OSs via the Data Communication Network (DCN).

The interface shall be capable of supporting the following two broad categories of information to be communicated:

a) transactions: low data volumes to be transported, e.g. exchange alarm messages;

b) bulk data transfers: large data volumes to be transported, e.g. billing data.

The characterization of these information types is for further study.



WS Work station
OS Operations system
DCN Data communication network

NOTE – An exchange is an example of a network element (NE) as defined in Recommendation M.30.

FIGURE 1/Q.513

Interfaces associated with operations, administration and maintenance in a digital, transit, local or combined exchange

The protocols used across the Q_3 interface will be based on the OSI model and will use OSI protocols specified by CCITT where possible. To allow for alternative DCNs, alternative lower layer protocol sets may be used, depending on the specific situation. Several protocol sets for layers 1, 2 and 3 have been used for similar data communications networks. Examples include:

a) X.25;

b) Signalling System No. 7 MTP/SCCP;

c) Q.921/Q.931.

Their use in TMN applications is for further study.

It is recommended that each set of TMN application functions with similar protocol needs be supported with unique protocol selections for layers 4 through 7 as defined by the OSI Reference Model (Recommendation X.200). The nulling of service options of individual layers above layer 3 and even entire layers above layer 3 may be necessary where justifiable.

4.1.2 Q_2 interface

Interface Q_2 may be used to connect exchanges to Mediation Devices (MDs) or to Network Elements (NEs) which contain a mediation function.

The need for the Q_2 interface on an exchange is for further study.

4.1.3 Q_1 interface

Interface Q_1 may be used to connect exchanges to NEs which support only the Network Element Function and no mediation function.

The need for the Q_1 interface on an exchange is for further study.

4.1.4 F interface

Interface F connects exchanges to workstations. The definition of functions and protocols is for further study.

4.1.5 G interface

Interface G is the human-machine interface for OA&M functions, providing output displays and text (e.g. CRT, printer, light panel) and input capabilities (e.g. keyboard).

This interface is specified in the Z.300-Series Recommendations which may be enhanced in the future.

4.2 Other OA&M interfaces

These interfaces are intended to represent existing OA&M interfaces during the period of transition to TMN. They are not subject to CCITT Recommendations.

4.2.1 Q_0 interface

Interface Q_0 connects exchanges to OSs, MDs and NEs using protocols and functions other than those defined in TMN Recommendations.

4.2.2 F_0 interface

Interface F_0 connects exchanges to workstations, using function and protocols not specified in TMN Recommendations.

4.2.3 G_0 interface

Interface G_0 is a human-machine interface not subject to CCITT Recommendations.

4.3 ISDN access interfaces

The exchange requirements for interworking between the exchange ISDN access sub-system including the V interfaces and the exchange TMN sub-system are for futher study.

4.4 Signalling System No. 7 network interface

The exchange requirements for interworking between the exchange Signalling System No. 7 sub-systems and the exchange TMN sub-system are for further study.