INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.601

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

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INTERWORKING OF SIGNALLING SYSTEMS

INTERWORKING OF SIGNALLING SYSTEMS – GENERAL

ITU-T Recommendation Q.601

(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.601 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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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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INTERWORKING OF SIGNALLING SYSTEMS – GENERAL

(Geneva 1980, modified at Helsinki 1993)

1.1 Change from narrative to SDL presentation

The Recommendations of the Q.600 Series provide a set of interworking specifications for CCITT signalling systems. The specifications are based on the CCITT Specification and Description Language (SDL) described in Recommendations Z.101 to Z.104. In these Recommendations on interworking, the SDL is used as a specification language.

Existing specifications in narrative form have not completely and unambiguously specified interworking of CCITT Signalling Systems. In addition, the introduction of digital switching, transmission and signalling systems creates new interworking demands.

Previous interworking specifications have been analysed and reconsidered in preparation of the present Recommendations. Where discrepancies exist between the previously printed interworking specifications and the interworking specifications of the present Recommendations, the latter shall be binding.

The new SDL interworking specifications will not replace the existing (narrative) specifications of the signalling systems concerned. They will only cover that part of the signalling system procedures which is of importance to interworking. The detailed procedures of the signalling systems are to be found in the existing Recommendations (*Red Book*, Fascicles VI.2, VI.3, VI.4, VI.7 and VI.8). Furthermore, only those switching procedures are shown that are relevant to interworking.

SDL provides an implementation independent and comprehensive method of presentation. It encompasses the previous interworking Recommendations and ensures that the interworking conditions are included in a regular and formalized manner. The chosen method facilitates the specification of interworking with future signalling systems. The use of well defined events with a graphical presentation reduces readers' language problems.

1.2 Compatibility between signalling systems

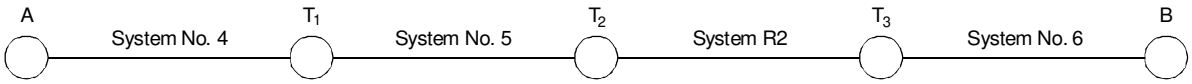
During the development of CCITT Signalling Systems, the signalling capacity has constantly been increased. In this way it has been possible to incorporate new features. However, it is not always possible to transfer these features when interworking with older systems.

In the case of signalling systems with large signalling capacity, it is possible to transmit distinct statements on certain conditions, e.g. "busy", "type of connection", etc. On the other hand, however, signalling systems with small signalling capacity require more general meanings to be assigned to the signals. Figure 1 illustrates this by an example.

1.3 Interworking combinations

Since the CCITT Signalling Systems are to be used for international telephone communication, interworking between the different signalling systems must be ensured. Interworking takes place in a transit exchange which must possess suitable equipment for processing the signals of both signalling systems involved. Interworking of the signalling systems can take place on all levels of the telephone network:

- national;
- regional;
- international.



Busy-flash signal	Busy-flash signal	A-4: Congestion in the national network	NNC: National-network-congestion signal
		B-4: Congestion (encountered after changeover from A signals to B signals)	CFL: Call-failure signal ADI: Address-incomplete signal
		A-15: Congestion in an international exchange or its output	SEC: Switching-equipment-congestion signal CGC: Circuit-group-congestion signal
		B-3: Subscriber line busy	SSB: Subscriber-busy signal (electrical)

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FIGURE 1/Q.601

Hypothetical transit connection; interworking of some backward signals

With a number of s different signalling systems the maximum number of interworking combinations will be:

$$i = s \cdot (s - 1)$$

If the present standardized Signalling Systems No. 4, No. 5, No. 6, No. 7 (TUP), R1 and R2 only are taken into account, a total of 30 different interworking combinations is obtained with $s = 6$.

The number of possible combinations becomes even greater if the national signalling systems are taken into account.

The method for interworking of standardized CCITT Signalling Systems described in these Recommendations may also be advantageous for interworking with other signalling systems.