INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.602

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(03/93)

INTERWORKING OF SIGNALLING SYSTEMS

INTERWORKING OF SIGNALLING SYSTEMS – INTRODUCTION

ITU-T Recommendation Q.602

(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.602 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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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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CONTENTS

		Page
2.1	Functional partitioning	1
2.2	Descriptive tools	1
2.3	Symbols	3
2.4	Rules for interworking diagrams	3

INTERWORKING OF SIGNALLING SYSTEMS – INTRODUCTION

(Geneva, 1980; modified at Helsinki, 1993)

interworking is defined to be

- the controlled transfer of signalling information across the interface between different signalling systems where the significance of the transferred information is identical or where the significance is translated in a defined number; and
- the performance of appropriate switching procedures in association with the transfer.

The duration of interworking commences with the instant when an outgoing signalling system is successfully selected and the interworking continues throughout the call until the connection is released. Interworking ceases with the release of the connection whether the release is initiated by reception of a clear-forward signal or in response to some other condition.

2.1 Functional partitioning

When interworking is specified in SDL, three separate functional blocks with distinct procedures[1)] are used (see Figure 2), namely

- the incoming signalling system logic procedures;
- the interworking logic procedures;
- the outgoing signalling system logic procedures.

It is understood that interworking logic procedures are dealt with in the second functional block. This functional subdivision allows only those events which can be processed within the individual incoming and outgoing signalling system logic procedures part to be sent to or from the interworking logic procedures part.

Both the incoming and outgoing signalling system logic procedures cause actions such as the sending of an acknowledgement signal, the starting of time supervision, and the generation of an interworking event that includes additional information, e.g. the use of satellite circuits and echo suppressors.

The action following the reception of an interworking event may be the generation of one or more signals as well as the operation of internal signalling and switching procedures.

The interworking logic procedures are used to specify the action to be taken in all cases, especially when there is no direct translation from an interworking event to a signal.

2.2 Descriptive tools

A general approach to specifying interworking - known as events approach – is used.

To prepare SDL diagrams three sets of events are used (see Recommendation Q.603), namely

- Forward Interworking Telephone Events (FITEs);
- Backward Interworking Telephone Events (BITEs); and
- Switching Processing Interface Telephone Events (SPITEs).

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1) In the Recommendations on interworking of signalling systems the term “procedure” is used in the same way as the term “process” in 2.1/Z.101.

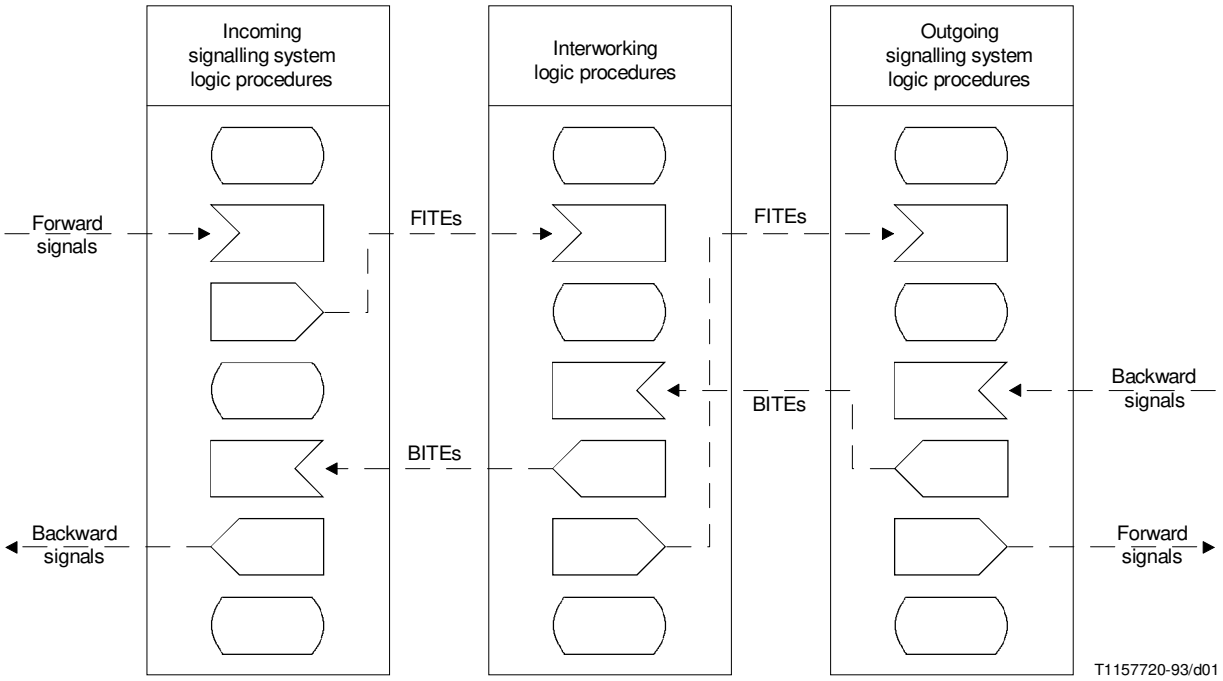

FIGURE 2/Q.602

Partitioning of interworking procedures in functional blocks (SPITEs are not presented in this figure)

FITEs perform information transfer in the forward direction from an incoming signalling system to an outgoing signalling system.

BITEs perform information transfer in the backward direction from an outgoing signalling system to an incoming signalling system.

SPITEs describe the information flow at the functional interface between signalling and switching. These events are considered to be internal to the signalling procedures.

In the events approach, all information transfer between any incoming and outgoing signalling system occurs at a standard interface by means of interworking telephone events. This is illustrated in Figure 2. The concept of an interworking event is generally valid and applies to all interworking combinations.

To provide a tool for the interworking specifications, *information analysis tables* (see Recommendation Q.604) are prepared. They identify the information elements of all forward and backward signals (which are relevant to interworking) for each signalling system. They also identify the possible information loss, addition or change which occurs in the case of interworking of signalling systems.

Due to the coding method used in Signalling System No. 7 ISUP, a complete analysis of the signalling information carried within the signalling messages would have resulted in a large increase of the size of interworking diagrams. Therefore, FITE and BITE letter designations were defined to carry specific ISUP messages. They are analyzed in the interworking diagrams using mapping tables, the signalling indicators they carry and the normal FITE and BITE.

Consequently, the tables presenting information contents of Signalling System No. 7 ISUP messages were not provided.

2.3 Symbols

The symbols and rules of SDL used for interworking specifications are presented in Recommendation Z.102.

2.4 Rules for interworking diagrams

The general objective is to present all the interworking specifications by means of SDL.

The following rules apply to interworking specifications:

2.4.1 The interworking specifications shall be implementation independent.

2.4.2 They shall facilitate the specification of interworking with other signalling systems.

2.4.3 They shall be unambiguous and as complete as possible, this means specifically that:

a) only those switching procedures shall be represented which directly influence the interworking of signalling systems;

b) only those procedures of the outgoing and the incoming signalling system logic are specified which are relevant to interworking, i.e. procedures which are signalling system dependent and others which have no influence on the interworking procedures are not represented in the functional parts of the outgoing and incoming signalling system logic procedures;

c) detailed information, such as the exact description of the compelled signalling cycle, recognition times of signals, encoding, frequencies used, is not described in the outgoing or incoming functional parts. Such details can be found in the specifications of the signalling system;

d) conditions resulting from malfunctions of equipment which have no relevance to interworking, shall not be taken into account.

2.4.4 SDL connector symbols are used to cover some detailed procedures that need not be represented when their descriptions are not important for the interworking procedures.

2.4.5 Equipment terminology, e.g. “register” mentioned in the logic procedures, is understood to be functional.

2.4.6 The information analysis tables include only signals relevant to interworking. Any internal signals with a meaning specific to a single signalling system are not listed.

2.4.7 In drawing the SDL diagrams for the interworking specifications, it was assumed that no time elapses between consecutive states; i.e. state transitions are instantaneous. Time elapses only within a state.