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MAINTENANCE: COMMON CHANNEL SIGNALLING SYSTEMS

INTER-ADMINISTRATION AGREEMENTS ON COMMON CHANNEL SIGNALLING SYSTEM No. 7

Recommendation M.4110

FOREWORD

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Recommendation M.4110 was revised by Study Group IV and was approved under the Resolution No. 2 procedure on the 5th of October 1992.

CCITT NOTE

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

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Recommendation M.4110

INTER-ADMINISTRATION AGREEMENTS ON COMMON CHANNEL SIGNALLING SYSTEM No. 7

(Published in 1988 as M.770; revised and renumbered in 1992)

Abstract

Provides the various technical aspects that need to be considered when undertaking inter-administration agreements to establish Signalling System No. 7.

Keywords

– agreements;

– common channel signalling;

– maintenance;

– propagation delay;

– signalling security;

– Signalling System No. 7.

1 Introduction

The bringing into service of new telephone circuits and signalling systems requires that a number of agreements be made in advance by the Administrations involved. Such agreements may concern, for example:

– routing of circuits (cable, satellite, etc.);

– mode of operation (incoming, outgoing, both-way);

– circuit designation;

– order of selection of both-way circuits.

For common channel signalling systems, a number of agreements are needed in addition to those required for channel-associated signalling systems (e.g. Signalling System R2).

This Recommendation explains the principal inter-Administration agreements which must be made in advance of opening service on a Signalling System No. 7, and is provided as guidance to those Administrations intending to operate such a service.

2 Common channel Signalling System No. 7 (SS No. 7)

Many of the aspects covered by this Recommendation relate to matters contained in the specifications of SS No. 7, as appearing in the Q.700-Series Recommendations [1]. Where appropriate, cross references to such Recommendations are given.

Recommendations Q.701 [2], Q.721 [3], Q.767 [13] and Q.750 [14] provide functional descriptions of the Message Transfer Part (MTP), Telephone User Part (TUP), ISDN User Part (ISUP), and Operation and Maintenance Application Part (OMAP), respectively.

The Q.780–Series Recommendations [4] provide guidance on how to test SS No. 7 (levels 2, 3 and 4).

3 Aspects of SS No. 7 requiring inter-Administration agreement

3.1 *Signalling links and signalling security arrangements*

Signals for a given group of speech circuits between two exchanges may be "associated" (routed on a signalling link between the two exchanges), or "non-associated" (routed on two or more signalling links in tandem, involving one or more signal-transfer points) or a mixture of both (see § 3.1.2 of Recommendation Q.701 [2]).

Before entering into detailed discussions on the type of signalling security arrangements required, it is desirable that the terminal Administrations exchange information on the type and manufacturer of their international signalling point (exchange, signalling transfer point, or network data base) and the options available within their existing software systems. This information will enable each Administration to have an overall view of available signalling security arrangements. It will avoid misunderstandings and thus enable rapid progress in establishing detailed arrangements. Subsequently, agreement on the following matters will be required:

i) The use of "associated" and/or "non-associated" modes of signalling.

ii) The choice of signalling transfer points (STPs) in the case where the "non-associated" mode of signalling is used.

iii) Security measures against signalling network link failure, e.g. the use of load sharing between link sets. If load sharing between link sets is to be used, agreement must be reached as to the number of link sets involved.

iv) Alternative routing within the signalling network in the event of failure of a link set, i.e. if load sharing is not used, which STPs are available for a given signalling network relation, and the order of selection of these. Due regard must be paid to the limitation of the number of STPs in tandem in a given signalling network relation (see § 5 of Recommendation Q.705 [5]).

v) The routing of the signalling network links must ensure that the propagation delay of the links is as low as possible, and not significantly higher than that of the speech circuits which are served by Signalling System No. 7. This is to minimize the initial speech clipping of the verbal answer from the called party. The above factors must also be considered in any restoration plans, although the non-availability of links may force administrations to accept the possibility of clipping under failure conditions.

vi) The nature of the signalling network link to be used, e.g. 4.8 kbit/s analogue or 64 kbit/s digital, transmission routing, etc.

vii) The method of error correction to be employed in a given signalling relation, i.e. basic or preventive cyclic retransmission (see § 5 of Recommendation Q.703 [6]).

viii) Emergency restart conditions. (If there is automatic allocation of signalling terminals or signalling data links at the end of a signalling link, it must be ensured that the value (T2) of the timeout is different at each end (see § 7.3 of Recommendation Q.703 [6] and § 3.4.3 of Recommendation Q.704 [7])).

ix) For security reasons, the separation of routing of signalling links has to be considered when selecting higher order paths.

3.2 *Mode of signalling*

Signalling System No. 7 provides for two basic modes of sending signalling information namely, "en-bloc" or "overlap" (see Recommendation Q.724 [8]).

3.3 *Signalling network consideration for cross-border traffic*

For cross-border traffic between signalling points, a bilateral agreement needs to be made for the routing label assignment of signalling point codes.

Two alternative arrangements are described in § 6 of Recommendation Q.705 [5]. One arrangement provides for signalling points which are handling cross-border traffic to be given signal point codes taken from the international numbering plan contained in Recommendation Q.708 [9]. The other provides for these signalling points to be identified by common national point codes.

3.4 *Routing label assignment*

The routing label is that part of the message label which contains the information necessary to deliver the message to its destination point. It comprises the following (see § 2.2 of Recommendation Q.704 [7]):

– destination point code (DPC);

– originating point code (OPC);

– signalling link selection (SLS) field or signalling link code (SLC).

DPC and OPC labelling will be in accordance with Recommendation Q.708 [9]. However, it may be necessary to have a bilateral agreement for the SLS, so that it can be assigned individually to signalling links.

3.5 *Circuit identification code*

The circuit identification code (CIC) indicates one speech circuit among those directly interconnecting the destination and the originating points. The allocation of CICs to individual circuits is determined by bilateral agreement and/or in accordance with predetermined rules. See § 2.2.3 of Recommendation Q.723 [10].

3.6 *Reset of circuit and circuit group messages*

In systems which maintain status in memory, there may be occasions when the memory contains errors. In such cases the circuits must be reset to the idle condition in both exchanges to make them available for new traffic. Since the exchange with the erroneous memory has lost status information (idle, busy outgoing, busy incoming, blocked, etc.), reset-circuit signals or a circuit group reset should be sent as appropriate for the affected circuits (see § 1.15 of Recommendation Q.724 [8]).

Under certain fault conditions however, where a large number of circuits is involved, it is possible that some realisations of SS No. 7 terminal equipment will be unable to process the volume of reset messages generated. It is necessary, therefore, that Administrations agree bilaterally whether circuit and circuit group messages should both be used.

3.7 *Use of the circuit continuity check procedure*

Because in SS No. 7 the signalling information does not pass over the circuit carrying the speech path, capabilities are provided for making an in-band continuity check of the circuit (see § 1.4 of Recommendation Q.724 [8]).

Use of the continuity check procedure on circuits will depend upon the type of transmission system(s) used (e.g. analogue, digital, mixed analogue/digital, DCME, PCME) for the circuit, and whether end-to-end supervision of the transmission path is available and is indicated to the switching system. A continuity check may be applied on a call by call basis, or on a statistical basis only. Where end-to-end transmission path supervision is not available, continuity checks are advised. Any exceptions to this are for bilateral agreement.

3.8 *Choice of the time slot to be used within the primary order digital path for the signalling link*

In the case where time slot 16 is utilized for circuit supervision purposes (see § A.1 of Recommendation Q.33 [11] and § 7 of Recommendation Q.50 [12]), it is necessary to agree bilaterally on which time slot within the primary order digital path should be used for the signalling link.

3.9 *Choice of tests to be performed*

Before bringing into service the first SS No. 7 link between two Administrations, a bilateral agreement has to be made on which compatibility and pre-service tests have to be performed (see Recommendations Q.781, Q.782, Q.783 [4], Q.767 [13] and Q.750 [14]).

3.10 *Changing from one specification of the signalling system to another*

If an Administration changes from one version of the specification of the signalling system to another, distant Administrations should be informed as a precautionary measure before the change takes place, and to agree on the necessary tests, since potential interworking problems can then be anticipated. It is desirable therefore, that Administrations should be aware of the need for, and agree to, this exchange of information.

3.11 *Use of MTP routing verification tests (MRVT), SCCP routing verification tests (SRVT), and circuit validation tests (CVT)*

Signalling System No. 7 provides for test facilities MRVT, SRVT and CVT (see Recommendation Q.750 [14]) and Administrations will need to discuss and agree on the scope and constraints of operating such functions across network boundaries.

3.12 *Exchange of signalling system operational measurements*

Signalling System No. 7 provides for operational measurements (see Recommendation Q.752 [15]), and Administrations will need to discuss and agree on the scope and constraints for exchanging such measurements for the mutually effective management and maintenance of common channel signalling networks across network boundaries.

4 Timing on inter-Administration agreements

Due to the differing practices and procedures of Administrations no specific timetable for the inter-Administration agreements necessary on SS No. 7 can be offered. However, experience indicates that initial discussions between Administrations concerning the implementation of a new common channel signalling system should preferably commence about two years prior to the required “ready for service” date.

References

[1] CCITT Recommendations Q.700 to Q.795 *Specification of Signalling System No. 7.*

[2] CCITT Recommendation Q.701 *Functional description of the signalling system (Message Transfer Part).*

[3] CCITT Recommendation Q.721 *Functional description of the signalling system (Telephone User Part (TUP)).*

[4] CCITT Recommendations Q.780 to Q.783 *Signalling System No. 7 test specification.*

[5] CCITT Recommendation Q.705 *Signalling network structure.*

[6] CCITT Recommendation Q.703 *Signalling link.*

[7] CCITT Recommendation Q.704 *Signalling network functions and messages.*

[8] CCITT Recommendation Q.724 *Signalling procedures.*

[9] CCITT Recommendation Q.708 *Numbering of international signalling point codes.*

[10] CCITT Recommendation Q.723 *Formats and codes.*

[11] CCITT Recommendation Q.33 *Protection against the effects of faulty transmission on groups of circuits.*

[12] CCITT Recommendation Q.50 *Signalling between circuit multiplication equipments (CME) and international switching centres (ISC)*

[13] CCITT Recommendation Q.767 *Application of the ISDN user part of Signalling System No. 7 for international ISDN interconnection.*

[14] CCITT Recommendation Q.750 *Signalling System No. 7 management overview (OMAP).*

[15] CCITT Recommendation Q.752 *Signalling System No. 7 monitoring and measurements.*