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INTERWORKING OF SIGNALLING SYSTEMS

MISCELLANEOUS INTERWORKING ASPECTS

ITU-T Recommendation Q.608

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation Q.608 was published in Fascicle VI.6 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

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

8 MISCELLANEOUS INTERWORKING ASPECTS

In producing the interworking specifications in the present form some interworking aspects were found, which are not covered by the specifications of the signalling systems themselves and need to be taken into account when using the SDL diagrams for interworking specification.

8.1 *Transfer of no charge information*

Difficulties related to the use of charge or no charge information were recognized by CCITT for the following reasons:

In the case of interworking with systems not able to provide the no charge information together with the answer signal, a *no charge* call is only possible by withholding the answer signal. In the international network, the absence of the answer signal results in a time-out within a delay period of 2 to 4 minutes as described in Recommendation Q.118, which considers this situation to be abnormal. Thus for certain cases of interworking, intentional withholding of the answer signal would be identical with the abnormal condition. Thus discrimination is impossible.

It is recommended that:

a) withholding the answer signal cannot be a satisfactory solution since

- the connection may remain in the abnormal transmission condition (e.g. failure to enable the echo suppressor in Signalling System R2 and retention of band-stop filter in Signalling System R1),
- the time supervision will interrupt the connection after 2 or 4 minutes,

and the answer signal should thus be retained (be used) even in the case of a *no charge* condition over the international network;

b) there is no necessity to modify existing equipment to provide *charge/no charge* information transfer capabilities.

From a technical viewpoint, international *no charge* calls are possible without restrictions only when the Signalling Systems No. 6, No. 7 (TUP) or R2 are used exclusively throughout the entire international network (assuming that *no charge* information is received from the national network).

In the case of interworking with systems not able to transfer the *no charge* information, a *no charge* call can at present only be provided by withholding the answer signal. Consequently the transfer of *no charge* information must not be performed in these cases.

In the case of Signalling System No. 6, the information *no charge* should be sent together with the *address-complete, no charge.* If this information is contradicted by the subsequent *answer, charge* signal the call should nevertheless not be charged (§ 4.1.9, Signalling System No. 6 specification).

The transfer of *no charge* information is possible when interworking:

from any of the Signalling Systems: No. 6[1)] , No. 7 (TUP)[1)] and R2 to any of the Signalling Systems: No. 6, No. 7 (TUP) and R2.

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1) When interworking from Signalling System No. 6 or No. 7 (TUP) to Signalling System R2 the comments of § 8.1 have to be taken into account.

8.2 *Time-out guidelines*

8.2.1 *Time-outs connected with subscribers' behaviour*

The specified register time-out of 4 to 6 seconds (after each digit is received which is resorted to when address complete cannot be identified in another way) has proved to give satisfactory technical functioning at least in those cases where the exception described in Recommendation Q.261, § 4.1.5, e) does not apply.

Insufficient information is obtained to motivate a change at this stage of the duration of the 4 to 6 seconds time-out specified in the outgoing register in cases where no address-complete indication is available.

It is recommended that the 4 to 6 seconds interdigital time-out procedure should be used where needed only. It is furthermore recommended that Administrations make their network numbering known to their respondents so that maximum use of number length analysis can be made whenever address-complete information cannot be given.

8.2.2 *General time-out guidelines for new signalling systems*

i) 20-30 seconds is considered to be the proper time-out interval for outgoing registers for non-receipt of address signals, or address complete.

ii) When backward signals are provided, if the address-complete signal is not available before 15-20 seconds after the last received address signal at the incoming register, then an address incomplete signal should be sent. If, however, it is known that the address is complete, then the time-out should be extended to 20-30 seconds.

iii) If it is known that a positive (real) address-complete signal is available but will *not* be returned within the lower limit of the 20-30 second time-out period of the outgoing register then an artificial address-complete signal should be sent within 15-20 seconds. The indiscriminate use of such a signal should be avoided. A new "call-in-progress" signal should not be used instead of the "artificial address-complete" signal.

iv) When backward signals are not available and complete number length analysis in the outgoing register is not practical, then the 4-6 seconds time-out is used to determine address complete instead of the 20-30 seconds time-out mentioned in point i). This time-out commences when the minimum number length has been reached. The number length is determined when the time-out matures or if the known maximum number length is received.

8.2.3 *General time-out guidelines for existing signalling systems*

These guidelines are primarily intended for signalling on international calls where fully overlap digit sending can occur. Other guidelines may be appropriate to some national applications.

During call set up both incoming and outgoing registers are normally supervised by timers. The duration of the time-out interval is defined in the relevant Recommendations defining the signalling systems. These are summarised in the table below. In the case of a multi-link connection with overlap signalling, the time between digit transmission or reception will be supervised at each exchange, and according to existing Recommendations, at both incoming and outgoing registers in each exchange. It is considered that this situation is unsuitable since the cleardown of a call where insufficient digits are dialled can lead to unpredictable results because of the possibility of timers expiring in a different order on subsequent call attempts. In some cases this can lead to different tones being returned to the calling subscriber on subsequent calls. Since the first to expire and therefore normally the controlling time-out will be the incoming register time-out of around 15-20 seconds, it is recommended that this time-out should only be activated at a single point in the connection at any stage of call set up. The most suitable point is the incoming register at the exchange closest to the called subscriber at any point in the call set up. To achieve this it is recommended that the incoming register time-out should be inhibited at each exchange once the outgoing circuit has been seized. The longer time-out of around 20-30 seconds which will be active at outgoing registers, and in some cases incoming registers also, should not be inhibited.

This feature need not be implemented at existing exchanges or for Signalling System No. 4 which has time-outs not in conformance with modern practice.

8.2.4 *Summary of inter-digital time-outs*

Type of time-out	Signalling System					
	4	5	6	7	R1	R2
Outgoing	15-30 s Q.127 § 4.4.1.2a.2		20-30 s Q.268 § 4.8.5.1 (a)	20-30 s Q.724 § 6.4.1		> 24 s Q.476 § 5.5.1.2
Incoming Receipt of digit	30-60 s Q.127 § 4.4.3(2)a	10-20 s (to KP signal) 20-40 s typical (to ST signal) Annex 2 Tables 4 and 6	15-20 s Q.261 § 4.1.6	15-20 s Q.724 § 1.7	10-20 s (to ST signal) Q.325 § 3.6.2.2	8-24 s (15-24 s) (preferred) Q.476 § 5.5.2.1
Outgoing Determination of ST condition		4-6 s Q.152 § 3.2.1			4-6 s Q.321 § 3.2.1b(ii)	
Incoming Time-out after ST received			20-30 s Q.268 § 4.8.5.3 (a)	20-30 s Q.724 § 6.4.3 (a)		

8.3 *Reset procedures*

8.3.1 When the reset signal is received on an incoming Signalling System No. 6 or 7 (TUP) circuit the succeeding circuit is released by the clear-forward procedure in all cases.

8.3.2 When the reset signal is received on an outgoing Signalling System No. 6 or 7 (TUP) circuit the response is:

i) to initiate the clear-forward sequence on the outgoing circuit;

ii) to release exchange equipment as appropriate, i.e. SPITE 3 in the register phase and SPITE 5 in the speech phase;

iii) to return an appropriate signal and/or tone on the incoming circuit as shown in the following table.

Signalling System No.	Register phase	Wait for answer	Answered	Clear-back
4	Busy flash	Busy flash	Clear-back + congestion tone if possible	Congestion tone if possible
5	Busy flash	Busy flash		
6	CFL	CFL		
7 (TUP)	CFL	CFL		
R1	Congestion tone	Congestion tone		
R2	A4/B4	Congestion tone		