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PUBLIC DATA NETWORKS: NETWORK ASPECTS

CALL PROGRESS SIGNALS IN PUBLIC DATA NETWORKS

ITU-T Recommendation X.96
Superseded by a more recent version

(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 X.96 was prepared by the ITU-T Study Group VII(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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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.

Recommendation X.96

CALL PROGRESS SIGNALS IN PUBLIC DATA NETWORKS

(Geneva, 1976; amended at Geneva, 1980 and Malaga-Torremolinos, 1984, Melbourne, 1988 and Helsinki, 1993)

The CCITT,

considering

that the establishment of public data networks for data transmission in various countries and the subsequent international interconnection of these networks creates the possibility that, in certain circumstances, there is a need to inform the caller about the progress of the call,

unanimously declares

1) that call progress signals should be returned to the caller to indicate the circumstances which have prevented the connection being established to a called number;

2) that call progress signals should be returned to the caller to indicate in some circumstances the progress made towards establishing the call;

3) that in addition, for packet-switched services, call progress signals should also be transmitted:

- if a problem is detected at a DTE/DCE interface which may have an impact on data integrity,
- for the virtual call (VC) service, to the calling and called DTEs when a call is reset or cleared after having been established,
- for the permanent virtual circuit (PVC) service between two DTEs to both DTEs when the permanent virtual circuit is reset.

The call progress signals and their related circumstances giving rise to them are defined in Table 1.

Call progress signal format and coding shall be in accordance with relevant interface specifications in the X–Series Recommendations.

In a circuit-switched service, call progress signals may only be transmitted during the call set-up phase. In a packet-switched service they may also be transmitted during the data transfer phase and the call clearing phase of a virtual call.

The call progress signals are categorized according to their significance to the network or DTE and the type of action expected of the DTE receiving the signal – refer to Table 2.

The sequence of call progress signals in Table 1 implies, for categories C and D, the order of call set-up processing by the network. In general the DTE can assume, on receiving a call progress signal, that no condition higher up the table is present. Network congestion, network out-of-order, long-term network congestion and no connection are exceptions to this general rule. The actual coding of call progress signals does not necessarily reflect this sequence.

Except as noted in Note 4 to Table 1, all call progress signals will be extended to the DTE unmodified. Users and DTE manufacturers are warned to make due allowance for possible later extensions to this table by providing appropriate fall-back routines for unexpected signals.

TABLE 1/X.96

Call progress signal	Definition	Category	Applicable to			See Note
			Circuit switching	Packet switching		
				VC	PVC	
Terminal called	The incoming call was signalled to the DTE and call acceptance is awaited.	A	(M)	–	–	1
Redirected call	The call has been redirected to another number assigned by the originally called subscriber, because, for example, it was busy.	A	(M)	(M)	–	
Connect when free	The called number is busy and the call has been placed in a queue. The call will be connected when the called number becomes free if the caller waits.	A	(M)	–	–	
Registration/ cancellation confirmed	The facility registration or cancellation requested by the calling DTE has been confirmed by the network.	B	(M)	(M)	(M)	11
Redirection facility active	The redirection facility is active.	B	(M)	–	–	2
Redirection facility not active	The redirection facility is not active.	B	(M)	–	–	2
No connection	Cause unspecified.	C1	M	–	–	
Selection signal transmission error	A transmission error has been detected in the selection signals by the first Data Switching Exchange (DSE).	C2	M	–	–	
Local procedure error	A procedure error caused by the DTE is detected by the DCE at the local DTE/DCE interface. Possible reasons are indicated in relevant X–Series Recommendations on interfaces (e.g. incorrect format, expiration of a time–out).	D1	M	M	M	3
Network congestion	A condition exists in the network such as: 1) temporary network congestion, 2) temporary fault condition within the network, including procedure error within a network or an international link.	C2	M	M	M	
Network out of order	Temporary inability in the network to handle data traffic.	C2	–	–	M	

TABLE 1/X.96 *(cont.)*

Call progress signal	Definition	Category	Applicable to			See Note
			Circuit switching	Packet switching		
				VC	PVC	
Invalid facility request	A facility requested by the calling DTE (circuit switching or packet switching services) or the called DTE (packet-switching service only) is detected as invalid by the DCE at the local DTE/DCE interface. Possible reasons include: – request for a facility which has not been subscribed to by the DTE; – request for a facility which is not available in the local network; – request for a facility which has not been recognized as valid by the local DCE.	D1	M	M	–	
ROA out of order	The ROA nominated by the calling DTE is unable to forward the call.	D2	(M)	(M)	–	4
Changed number	The called DTE has been assigned a new number.	D1	M	–	–	
Not obtainable	The called DTE address is out of the numbering plan or not assigned to any DTE.	D1	M	M	–	
Access barred	The calling DTE is not permitted the connection to the called DTE. Possible reasons include: – unauthorized access between the calling DTE and the called DTE; – incompatible closed user group.	D1	M	M	–	
Reverse charging acceptance not subscribed	The called DTE has not subscribed to the reverse charging acceptance facility.	D1	FS	(M)	–	
Incompatible user class of service	The called DTE belongs to a user class of service which is incompatible with that of the calling DTE.	D1	M	–	–	5
Fast select acceptance not subscribed	The called DTE has not subscribed to the fast select acceptance facility.	D1	–	(M)	–	
Incompatible destination	The remote DTE/DCE interface or the transit network does not support a function or facility requested.	D1	–	M	M	
Ship absent	The called ship is absent.	D1	–	M	–	13

TABLE 1/X.96 *(cont.)*

Call progress signal	Definition	Category	Applicable to			See Note
			Circuit switching	Packet switching		
				VC	PVC	
Out of order	The remote number is out of order. Possible reasons include: 1) DTE is uncontrolled not ready; 2) DCE power off; 3) network fault in the local loop; 4) in packet switched services only: – X.25 layer 1 not functioning; – X.25 layer 2 not in operation.	D1 or D2	(See Note 6)	M (See Note 7)	M	8
Network fault in the local loop	The local loop associated with the called DCE is faulty.	D2	M	(See Note 7)		9
DCE power off	Called DCE has no mains power or is switched off.	D1	M Unless out of order is provided	(See Note 7)		9
Uncontrolled not ready	Called DTE is uncontrolled not ready.	D1	M	(See Note 7)		9
Controlled not ready	Called DTE is signalling controlled not ready.	D1	M	FS	FS	1
Number busy	The called DTE is detected by the DCE as engaged on other call(s), and therefore as not being able to accept the incoming call.	C1	M	M	–	
Call the information service	The called number is temporarily unobtainable. Call the network information service for details.	D1	M	–	–	
Remote procedure error	A procedure error caused by the remote DTE or an invalid facility request by the remote DTE is detected by the DCE at the remote DTE/DCE interface. Possible reasons are indicated in relevant X–Series Recommendations on interfaces.	D1	–	M	M	
Long term network congestion	A major shortage of network resource exists.	D2	M	–	–	10
Network operational	Network is ready to resume normal operation after a temporary failure or congestion.	C2	–	M	M	

TABLE 1/X.96 *(end)*

Call progress signal	Definition	Category	Applicable to			See Note
			Circuit switching	Packet switching		
				VC	PVC	
Remote DTE operational	Remote DTE/DCE interface is ready to resume normal operation after a temporary failure or out of order condition (e.g. restart at the DTE/DCE interface). Loss of data may have occurred.	C1	–	–	M	
DTE originated	The remote DTE has initiated a clear, reset, restart or deflection procedure.	B or D1	–	M	M	12
PAD clearing	The call has been cleared by the local PAD as an answer to an invitation from the remote DTE (X.28 only).	B	–	M (X.28 only)	–	
Private/public network reached	See Annex F/X.21.	A	–	–	–	14
DTE interactive	The called DTE has registered for being inactive until the date and time indicated.	D1	–	–	–	
Call distribution within a hunt group	The call has been distributed within a hunt group at the called DTE.	A	–	O	–	

– Not applicable.

M Mandatory in all networks.

(M) Mandatory where the relevant optional user facility is provided.

O Optional

FS Further study.

NOTES

1 The international implications of *controlled not ready* and *manual answering* are for further study.

2 Sent as confirmation/answer for the *redirection activation/deactivation* facility.

3 For circuit switching, applicable only to the calling DTE.

4 The *ROA out-of-order* call progress signal will not be returned to a DTE which does not subscribe to the *ROA selection* facility.

5 Some networks may use the *not obtainable* call progress signal to signal this condition.

6 Used as an alternative signal in networks where one or more of the conditions *uncontrolled not ready, DCE power off* and *network fault in the local loop* cannot be uniquely identified.

7 Although the basic *out-of-order* call progress signal is transmitted for these conditions, the diagnostic field in the *clearing* or *resetting* packet may give more precision.

8 The fact that a DTE is also out of order when the link access procedure layer is not operating correctly is a subject for further study.

9 Should be provided where the network can identify the condition.

10 Activated by the operational staff of the network.

11 Applicable only to the DTE/DCE interface (*restart* packets in case of packet switching service).

12 Possible reasons for this include *reverse charging not accepted*. *Reset*, restart and deflection are not applicable to the circuit–switching service.

13 Used only in conjunction with mobile maritime service.

14 Refer to Notes 3 and 4 of Annex F/X.21.

TABLE 2/X.96

Category	Significance
A	Call not cleared. Calling DTE is expected to wait (for circuit-switched services only).
B	Call cleared because the procedure is complete.
C1 and C2	*Call cleared* The call has failed due to conditions of a temporary nature. The DTE may try again after a suitable delay as the next attempt may be successful. However, after a number of unsuccessful call attempts with the same response, the action taken by the DTE should be as defined in category D1 or D2. Some Administrations may specify by regulation the interval between and maximum number of call attempts permitted by a DTE in these circumstances. *Reset* (for packet–switched services only) The DTE may continue to transmit data recognizing that data loss may have occurred.
D1 and D2	*Call cleared* The calling DTE should take other action to clarify when the call attempt might be successful. *Reset* (for permanent virtual circuit only) The DTE should cease data transmission and take other action as appropriate.
C1 and D1	Due to subscriber condition.
C2 and D2	Due to network condition.