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1. SIGNALLING CONNECTION CONTROL PART MESSAGES

The signalling connection control part (SCCP) messages are used by the peer-to-peer protocol. The meaning and definition of the various information elements contained in these messages are specified in Section 2. The actual inclusion of these information elements in a given message depends on the class of protocol and is specified in Section 3. *

1.1 Connection-oriented protocol classes (2, 3, 4). [Text from the CCITT Red Book Vol. VI pertaining to connection-oriented messages and procedures has been temporarily removed.] * *

1.1.1 Connection establishment phase. *

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1.1.3.11 Restart confirmation (RTC). *

1.1.3.12 Inactivity test (IT). *

1.2 Messages for connectionless protocol classes (0 and 1).

1.2.1 Unitdata (UDT). A SCCP wanting to send data in a connectionless mode uses a "unitdata" message.

A "unitdata" message must contain the called party address parameter, the calling party address parameter (which may not include any information), the protocol class and user data.

An asterisk '*' indicates a change from the CCITT Red Book Vol VI that is specific to U. S. Networks

A bar '|' indicates a change from Issue 1 of Bell Communications Research Specification of Signalling System Number 7, Vol. 1 and 2.

1.2.2 **Unitdata service (UDTS).**

Whenever it is not possible to route a "unitdata" message and the message return on error option is included, a "unitdata service" message is sent back to the originator.

A "unitdata service" message contains the following information: the called party address parameter, the calling party address parameter (which may not include any information), the diagnostic and the returned user data.

1.3 Messages for SCCP sub-system management.

1.3.1 **Subsystem-Prohibited.** The Subsystem-Prohibited (SSP) message is sent to concerned destinations to inform SCCP Management (SCMG) at the destinations of the failure of a subsystem. Upon receipt of a SSP message, the SCCP routing tables are updated.

A SSP message must contain the following information: the prohibited subsystem, the point code of the prohibited subsystem, and the Subsystem Multiplicity Indicator (SMI).

1.3.2 **Subsystem-Allowed.** The Subsystem-Allowed (SSA) message is sent to concerned destinations to inform SCMG at the destinations that a subsystem which was formerly prohibited is now allowed. Upon receipt of a SSA message, the SCCP routing tables are updated.

A SSA message must contain the following information: the allowed subsystem, the point code of the allowed subsystem, and the Subsystem Multiplicity Indicator.

1.3.3 **Subsystem-Status-Test.** SCMG at a node which has received a SSP message starts an audit procedure. The purpose of this procedure is to provide a mechanism for recovery in the event that a SSA message is lost.

A Subsystem-Status-Test message must contain the following information: the subsystem being audited, the point code of the subsystem being audited, and the Subsystem Multiplicity Indicator.

1.3.4 **Subsystem-Out-of-Service-Request.** When a subsystem wishes to go out-of-service, the request is transferred by means of a Subsystem-Out-of-Service-Request (SOR) message between the SCMG function at that node and the SCMG at the duplicate subsystem's node. The purpose of the SOR message is to allow subsystems to go out-of-service without degrading performance of the network.

A SOR message must contain the following information: the affected subsystem, the point code of the subsystem, and the Subsystem Multiplicity Indicator.

1.3.5 **Subsystem-Out-of-Service-Grant.** When SCMG receives a SOR message, if both it and the concerned subsystem agree to the request, a Subsystem-Out-of-Service-Grant (SOG) message is sent to the SCMG function associated with the duplicate subsystem.

The SOG message must contain the following information: the affected subsystem, the point code of the subsystem, and the Subsystem Multiplicity Indicator.

1.3.6 **Subsystem-Backup-Routing (Architecture Dependent).** If a subsystem becomes prohibited at an end node adjacent to an intermediate node, a Subsystem-Backup-Routing (SBR) message is sent by SCMG at the intermediate node to SCMG associated with the backup subsystem. The SBR message is sent prior to rerouting traffic to the backup subsystem. The purpose of the SBR message is to provide additional network connectivity information so that SCMG at the end node may determine the traffic mix received for a subsystem.

The SBR message must contain the following information: the affected subsystem, the point code of the subsystem, and the Subsystem Multiplicity Indicator.

1.3.7 **Subsystem-Normal-Routing (Architecture Dependent).** If a subsystem that was prohibited becomes allowed at an end node adjacent to an intermediate node, a Subsystem-Normal-Routing (SNR) message is sent by SCMG at the intermediate node to SCMG associated with the backup subsystem. The SNR

message is sent, prior to rerouting traffic to the primary subsystem, to the backup of the now allowed subsystem. This allows SCMG at the end node to update the traffic mix information that the subsystem is receiving.

The SNR message must contain the following information: the affected subsystem, the point code of the subsystem, and the Subsystem Multiplicity Indicator.

1.3.8 Subsystem-Routing-Status-Test (Architecture Dependent). SCMG at a node that received a SBR message, sends a Subsystem-Routing-Status-Test (SRT) message periodically to SCMG at the node that originated the SBR message. The purpose of this procedure is to provide a mechanism for recovery from a lost SNR message.

The SRT message must contain the following information: the affected subsystem, the point code of the subsystem, and the Subsystem Multiplicity Indicator.

2. MESSAGE FIELDS

2.1 Message type code. The "message type code" field is to be found in all the messages. It uniquely identifies the type of the messages (CR, CC... as described in Section 1).

2.2 Local reference number (source/destination). [This field is only used for connection-oriented procedures.]

2.3 Calling/called party address. The "calling/called party address" field contains enough information to uniquely identify the origination/destination signalling point and/or the SCCP access point.

It can be any combination of a global title (dialed digits for example), a signalling point code, and a subsystem number. In order to allow the interpretation of this address, it begins with an address indicator which indicates which information elements are present.

The address indicator also includes a routing indicator specifying if translation is required, a global title indicator specifying global title format, and a national/international indicator specifying use of national or international coding methods.

The addition of the ISDN Call Identity as a separate element or as part of the above mentioned elements (e.g., the global title) is a subject for further study.

The "calling/called party address" parameter has two different meanings depending on whether it is included in a connection-oriented or connectionless message.

For a connection-oriented message these fields have a global significance (i.e. independent of the direction the message is going).

For a connectionless message these fields have a local significance (i.e. dependent on the direction the message is going just as for OPC and DPC).

2.4 Protocol class. For connection-oriented protocol classes, the "protocol class" field is used during the connection establishment phase: it is negotiated between the two-end SCCPs.

For connectionless protocol classes the "protocol class" field is used also to indicate whether or not a message should be returned on error occurrence.

2.5 Segmenting/reassembling. [This field is only used for connection-oriented procedures.]

2.6 Receive sequence number. [This field is only used for connection-oriented procedures.]

2.7 Sequencing/segmenting. [This field is only used for connection-oriented procedures.]

2.8 Credit. [This field is only used for connection-oriented procedures.]

2.9 Refusal cause. *

[This field is only used for connection-oriented procedures.] *

2.10 Release cause. [This field is only used for connection-oriented procedures.] *

2.11 Diagnostic. For connectionless protocol classes the "diagnostic" field is used to indicate the reason why a message was returned.

For connection oriented protocol classes the "diagnostic" field is for further study. *

2.12 Reset cause. [This field is only used for connection-oriented procedures.] *

2.13 Error cause. [This field is only used for connection-oriented procedures.] *

2.14 User data. The "user data" field contains information coming from upper layers or from SCCP management. * *

2.14A *Affected subsystem number* *

The "affected subsystem number (SSN)" identifies a subsystem which is failed, withdrawn, congested, or allowed. In the case of SST or SRT message, it also identifies the subsystem being audited. In the case of SOR or SOG message, it identifies a subsystem requesting to go out of service. * | * | * |

2.14B *Affected point code* * |

The "affected point code (PC)" identifies a point code where the affected subsystem is located. * |

2.14C *Sub-system multiplicity indicator* *

The "sub-system multiplicity indicator" is used in "SCCP management messages" to indicate the number of associated replicated subsystems. *

2.15 End of optional parameters. The "end of optional parameters" field is used in any message containing optional parameters to indicate where the part allocated to these optional parameters ends.

3. INCLUSION OF FIELDS IN THE MESSAGES

The inclusion of the information elements specified in Section 2 in the various messages specified in Section 1 according to their type depends on the class of protocol. SCCP messages are specified in Table 1/Q.712 and SCCP management messages are specified in Table 2/Q.712.

The following applies to Tables 1 and 2/Q.712:

MAN = mandatory field

OPT = optional field (which is included in a message when needed)

Note 1: For further study

Fields \ Messages	CR	CC	CREF	RLSD	RLC	DT1	DT2	AK	ED	EA	RSRM	RSCM	ERR	IT	UDT	UDTS	RJ (1)	RTR (1)	RTC (1)
Message type code	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN
Destination local reference number		MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN			MAN		
Source local reference number	MAN	MAN		MAN	MAN						MAN	MAN							
Called party address	MAN	OPT	OPT												MAN	MAN			
Calling party address	OPT														MAN	MAN			
Protocol class	MAN	MAN													MAN				
Segmenting/Reassembling						MAN													
Receive sequence number								MAN									MAN		
Sequencing/Segment						MAN													
Credit	OPT	OPT							MAN								MAN		
Release cause				MAN															
Diagnostic(1)				OPT							OPT		OPT			MAN			
Reset cause											MAN								
Error cause													MAN						
User data	OPT	OPT	OPT	OPT		MAN	MAN		MAN						MAN	MAN			
Refusal cause			MAN																
End of optional param	OPT	OPT	OPT	OPT							OPT(1)		OPT(1)						

TABLE 1/Q.712. Inclusion of Fields in Messages

Fields \ Messages	SSP	SSA	SST	SOR	SOG	SBR	SNR	SRT
SCMG format ID	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN
Affected SSN	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN
Affected PC	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN
Sub-system multiplicity indicator	MAN	MAN	MAN	MAN	MAN	MAN	MAN	MAN

TABLE 2/Q.712. SCCP Management Messages

Fields / Messages	SSP	SSA	SST	SOR	SOG	SBR	SNR	SRT
SCMG format ID	m	m	m	m	m	m	m	m
Concerned SSN	m	m	m	m	m	m	m	m
Concerned PC	m	m	m	m	m	m	m	m
Sub-system multiplicity indicator	m	m	m	m	m	m	m	m

TABLE 2/Q.712 -Subsystem Management Messages.