INTERNATIONAL TELECOMMUNICATION UNION

CCITT Q.951

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

STAGE 3 DESCRIPTION FOR SUPPLEMENTARY SERVICES USING DSS 1

STAGE 3 DESCRIPTION FOR NUMBER IDENTIFICATION SUPPLEMENTARY SERVICES USING DSS 1

SECTION 1 – Direct-Dialling-In (DDI)

SECTION 2 – Multiple Subscriber Number (MSN)

SECTION 8 – Sub-addressing (SUB)

Recommendation Q.951

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT 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 Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation Q.951, §§ 1, 2, 8, was prepared by Study Group XI and was approved under the Resolution No. 2 procedure on the 4th of February 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 Q.951

STAGE 3 DESCRIPTION FOR NUMBER IDENTIFICATION SUPPLEMENTARY SERVICES USING DSS 1

1 Direct-Dialling-In (DDI)

1.1 *Definition*

This service enables a user to call directly to another user on an ISDN private branch exchange (ISPBX) or other private systems, without attendant intervention. This supplementary service is based on the use of the ISDN number and does not include Sub-addressing.

1.2 *Description*

1.2.1 *General description*

DDI numbers form part of the international numbering plan according to Recommendation E.164.

This Recommendation provides the flexibility to Administrations to use national numbering plans of fixed or variable lengths. This flexibility also applies to DDI numbers, i.e. even within a given ISPBX or other private system, DDI numbers of different lengths may appear.

In networks with an open numbering plan, the length of the DDI number is not necessarily known by the servicing local exchange nor by any other entity of the public network.

DDI is provided when at least a part of the ISDN number which is significant to the called user is passed to that user. These last digits (fixed or variable length) are sent from the exchange and received by the ISPBX or other private system by en-bloc or overlap receiving, which finally and automatically establish a call to the destination without the assistance of an operator. These last digits are sent in accordance with Recommendation Q.931, § 5.2.

1.2.2 *Specific terminology*

The DDI number is that part of the ISDN number which is significant to an ISPBX or other private system.

1.2.3 *Qualification of the applicability to telecommunication services*

No restrictions.

1.2.4 *State definitions*

The states associated with basic call control according to Recommendation Q.931 are applicable.

1.3 *Operational requirements*

1.3.1 *Provision/withdrawal*

This service shall be provided after prior arrangement with the Administration and shall be withdrawn on the subscriber's request or for administrative reasons.

1.3.2 *Requirements on the originating network side*

The basic call control procedures according to Recommendation Q.931, § 5.1 are applicable.

1.3.3 *Requirements in the network*

Not applicable to DSS 1 (digital subscriber Signalling System No. 1).

1.3.4 *Requirements on the terminating network side*

When the DDI feature is provided to the called user, at least the DDI number shall be passed to the user in the called party number information element. The en-bloc or overlap receiving procedure is used to transfer the called party number information according to the rules specified in Recommendation Q.931, § 5.2.

The destination network side may check the range and the format of the DDI number before it is passed to the called user.

1.4 *Coding requirements*

The DDI number is a part of the ISDN number which shall be inserted in the called party number information element coded as in Recommendation Q.931, § 4.5.8.

1.5 *Signalling requirements*

1.5.1 *Activation/deactivation/registration*

Not applicable to DSS 1.

1.5.2 *Invocation and operation*

1.5.2.1 *Normal operation*

1.5.2.1.1 *Actions at the originating local exchange*

Not applicable.

1.5.2.1.2 *Actions at the transit exchange*

Not applicable to DSS 1.

1.5.2.1.3 *Actions at the destination local exchange*

The DDI number is delivered from the network to the called user according to the procedures of Recommendation Q.931, § 5.2.

The type of number is included in the called party number information element sent to the called user and shall be coded as:

– unknown (see Table 4-8/Q.931, Note 2 against "Type of Number"); or

– subscriber number, national number or international number (see Table 4-8/Q.931, Note 3 against "Type of Number").

Note – This coding is independent of the use of en-bloc procedures (where the called party number is sent in a single message) or overlap procedures (where the called party number is sent in segments in several messages as it becomes available).

1.5.2.2 *Exceptional procedures*

No exceptional procedures are required.

1.6 *Interactions with other supplementary services*

1.6.1 *Call Waiting*

No interaction.

1.6.2 *Call Transfer*

No applicable interaction at this time.

1.6.3 *Connected Line Identification Presentation*

No interaction.

1.6.4 *Connected Line Identification Restriction*

No interaction.

1.6.5 *Calling Line Identification Presentation*

No interaction.

1.6.6 *Calling Line Identification Restriction*

No interaction.

1.6.7 *Closed User Group*

No interaction.

1.6.8 *Conference Calling*

No applicable interaction at this time.

1.6.9 *Direct-Dialling-In*

Not relevant.

1.6.10 *Call Diversion (Call Forwarding) service*

No applicable interaction at this time.

1.6.10.1 *Call Forwarding Busy*

1.6.10.2 *Call Forwarding No Reply*

1.6.10.3 *Call Forwarding Unconditional*

1.6.10.4 *Call Deflection*

1.6.11 *Line Hunting*

No applicable interaction at this time.

1.6.12 *Three-Party Service*

No applicable interaction at this time.

1.6.13 *User-to-User Signalling*

No interaction.

1.6.13.1 *Service 1*

No interaction.

1.6.13.2 *Service 2*

No interaction.

1.6.13.3 *Service 3*

No interaction.

1.6.14 *Multiple Subscriber number*

In some networks, subscription to the DDI and Multiple Subscriber Number supplementary service is mutually exclusive.

1.6.15 *Call Hold*

No interaction.

1.6.16 *Advice of Charge*

No applicable interaction at this time.

1.6.17 *Sub-addressing*

No interaction

1.6.18 *Terminal Portability*

No interaction

1.6.19 *Call Completion Busy Subscriber*

No interaction

1.6.20 *Malicious Call ID*

No interaction

1.7 *Interactions with other networks*

No special requirements for interactions with other networks are necessary.

1.8 *Signalling flows*

Normal basic call control signalling flows according to Recommendation Q.931 are applicable.

1.9 *Parameter values (timers)*

The timers associated with basic call control according to Recommendation Q.931 are applicable.

1.10 *Dynamic description (SDLs)*

Recommendation Q.931 is applicable.

2 multiple Subscriber Number (MSN)

2.1 *Definition*

The Multiple Subscriber Number (MSN) supplementary service provides the possibility for assigning multiple ISDN numbers to a single public or private access. Note that this allows, e.g.,:

1) a calling user to select, via the public network, one or multiple distinct terminals out of a multiple choice (e.g. in a passive bus configuration);

2) to identify the terminal to the network for the application of other supplementary services.

It is considered:

– that in the case of a basic access, some service providers may not have knowledge or control over what is connected, e.g. private ISDN or a terminal configuration;

– that Administrations have differing numbering methods;

– that common international terminal specifications are desired.

2.2 *Description*

2.2.1 *General description*

The stage 1 description, i.e. the MSN supplementary service description as seen from the user, can be found in Recommendation I.251.2.

The stage 2 description, i.e. the information flow for the MSN supplementary service, can be found in Recommendation Q.81, § 2.

This Recommendation specifies the stage 3 description, i.e. the protocol requirements for the MSN supplementary service at the coincident S and T reference point or at the T reference point (as defined in Recommendation I.411).

The MSN supplementary service enables each individual terminal on one access to have one or more identities, by which one individual terminal (e.g. at a passive bus configuration) can be discriminated from the others.

The Multiple Subscriber Number may be either:

– the whole ISDN number; or

– a part of the ISDN number (the least significant "n" digit(s) where "n" may be a number up to the full length of the ISDN number, and shall be a number large enough to allow all terminals on an access to be assigned an individual number); or

– as a service provider option, a number which can be mapped from the ISDN number by the network at the destination network side.

National or international prefixes cannot form part of the Multiple Subscriber Number.

2.2.2 *Specific terminology*

The served user for the MSN supplementary service is the called user or another private installation on the destination side of the network.

The multiple subscriber number forms an end-to-end relationship but may have only local significance between the network and a specific terminal at the access.

2.2.3 *Qualification on the applicability to telecommunication services*

The MSN supplementary service is applicable to all telecommunication services.

2.2.4 *State definitions*

The states associated with basic call control according to Recommendation Q.931 apply.

2.3 *Operational requirements*

2.3.1 *Provision and withdrawal*

The service shall be provided after prior arrangement with the service provider and shall be withdrawn on the subscriber's request or for administrative reasons. The service provider shall allocate a proper set of ISDN numbers which shall meet the overall needs of the access concerned.

2.3.2 *Requirements on the originating network side*

The basic call control procedures according to Recommendation Q.931, § 5.1 are applicable.

If the access has the MSN supplementary service, the network may use (as a network option) the information in the calling party number information element to identify the calling terminal, and if necessary, assign the appropriate basic or supplementary service profile.

At the option of the service provider, one of the MSN numbers may be designated by the MSN subscriber as the default number for the interface.

2.3.3 *Requirements in the network*

This section is not applicable to DSS 1 (digital subscriber Signalling System No. 1).

2.3.4 *Requirements on the destination network side*

When the Multiple Subscriber Number is provided to the called user, the network shall send the available part of the called party number or the relating digit(s) to the user en-bloc in the SETUP message according to Recommendation Q.931, § 5.2.

2.4 *Coding requirements*

The Multiple Subscriber Number of the called user is coded in the called party number information element as specified in Recommendation Q.931, § 4.5.8.

The Multiple Subscriber Number of the calling user is coded in the calling party number information element as specified in Recommendation Q.931, § 4.5.10.

2.5 *Signalling requirements*

2.5.1 *Activation, deactivation and registration*

Not applicable.

2.5.2 *Invocation and operation*

2.5.2.1 *Normal operation*

2.5.2.1.1 *Actions at the originating local exchange*

The Multiple Subscriber Number, if provided by the calling user, shall be delivered from the user to the network according to the procedures of Recommendation Q.931, § 5.1. The type of number indicated in the calling party number information element sent to the network shall be coded as:

– unknown (see Table 4-10/Q.931, Note 2 of type of number); or

– subscriber, national or international number (see Table 4-10/Q.931, Note 3 of type of number).

The "numbering plan identification" field of the calling party number information element shall be coded either "unknown" or "ISDN/telephony numbering plan (Recommendation E.164)".

If the user sends a multiple subscriber number, then the user shall supply sufficient digits to identify uniquely one ISDN number from the set of ISDN numbers at that access.

2.5.2.1.2 *Actions at the transit exchange*

This section is not applicable to DSS 1.

2.5.2.1.3 *Actions at the destination local exchange*

The multiple subscriber number is delivered from the network to the user according to the procedures of Recommendation Q.931, § 5.2. The type of number indicated in the called party number information element sent to the network shall be coded as:

– unknown (see Table 4-8/Q.931, Note 2 of type of number); or

– subscriber, national or international number (see Table 4-8/Q.931, Note 3 of type of number).

The "numbering plan identification" field of the called party number information element shall be coded either "unknown" or "ISDN/telephony numbering plan (Recommendation E.164)".

2.5.2.2 *Exceptional procedures*

2.5.2.2.1 *Actions at the originating network side*

If a network receives fewer digits in the calling party number information element than is required to identify uniquely one ISDN number from the set of ISDN numbers at that access, then the network shall discard this information element and shall behave as though the calling party number information element had not been received.

2.5.2.2.2 *Actions at the destination user side*

If a user with the MSN supplementary service receives fewer digits in the called party number information element than it is programmed to require for terminal selection, then that user shall use the available information in that information element for its terminal selection procedure.

If a terminal which has the MSN supplementary service receives a SETUP message without multiple subscriber number digits, the terminal will handle the call according to Recommendation Q.931, § 5.2.

If a terminal which does not support the MSN supplementary service receives a SETUP message with multiple subscriber number digits, the terminal will handle the call according to Recommendation Q.931, § 5.2.

2.6 *Interaction with other supplementary services*

2.6.1 *Call Waiting*

No interaction.

2.6.2 *Call Transfer*

No applicable interaction at this time.

2.6.3 *Connected Line Identification Presentation*

No interaction.

2.6.4 *Connected Line Identification Restriction*

No interaction.

2.6.5 *Calling Line Identification Presentation*

If no calling party number information is provided by the calling user or the number received by the network is incorrect, then the default number stored at the originating network side is used for conveyance through the network.

2.6.6 *Calling Line Identification Restriction*

No interaction.

2.6.7 *Closed User Group*

If the calling user does not identify its MSN, then the Closed User Group (CUG) attributes assigned to the default number shall be applied at the originating network side.

2.6.8 *Conference calling*

No applicable interaction at this time.

2.6.9 *Direct-Dialling-In*

In some networks, subscription to the Direct-Dialling-In and the MSN supplementary service is mutually exclusive.

The Direct-Dialling-In digits can be used by the private ISDN in the context of the private ISDN's MSN supplementary service.

2.6.10 *Call diversion services*

2.6.10.1 *Call Forwarding Busy*

No applicable interaction at this time.

2.6.10.2 *Call Forwarding No Reply*

No applicable interaction at this time.

2.6.10.3 *Call Forwarding Unconditional*

No applicable interaction at this time.

2.6.10.4 *Call Deflection*

No applicable interaction at this time.

2.6.11 *Line Hunting*

No applicable interaction at this time.

2.6.12 *Three-Party Service*

No applicable interaction at this time.

2.6.13 *User-to-User Signalling*

2.6.13.1 *Service 1*

No interaction.

2.6.13.2 *Service 2*

No applicable interaction at this time.

2.6.13.3 *Service 3*

No applicable interaction at this time.

2.6.14 *Multiple Subscriber Number*

Not relevant.

2.6.15 *Call Hold*

No interaction.

2.6.16 *Advice of Charge*

No applicable interaction at this time.

2.6.17 *Sub-addressing*

No interaction.

2.6.18 *Terminal Portability*

No interaction.

2.6.19 *Completion of Calls to Busy Subscriber*

No applicable interaction at this time.

2.6.20 *Malicious Call Identification*

No applicable interaction at this time.

2.7 *Interaction with other networks*

2.7.1 *Interaction with non-ISDNs*

No special requirements for interaction with other networks are necessary.

Note – The MSN supplementary service may be used to enable successful terminal selection when some compatibility information is absent when a call originates in an analogue PSTN.

2.7.2 *Procedures for interworking with private ISDNs*

When the network knows that a private ISDN is attached to the access, the MSN supplementary service shall not apply.

Note – The number digits can be conveyed by the DDI supplementary service.

2.8 *Signalling flows*

No MSN supplementary service specific signalling flow is necessary in addition to normal basic call control according to Recommendation Q.931.

2.9 *Parameter values (timers)*

The timers associated with basic call control according to Recommendation Q.931, § 9 are applicable.

2.10 *Dynamic description (SDLs)*

Annex A of Recommendation Q.931 is applicable.

8 Sub-addressing (SUB)

8.1 *Definition*

The Sub-addressing (SUB) supplementary service allows the called (served) user to expand his addressing capacity beyond the one given by the ISDN number.

8.2 *Description*

8.2.1 *General description*

The sub-addressing possibility offers an additional addressing capacity independent from the ISDN number.

A called party sub-address, if presented by a calling user is delivered unaffected to the called user. The called party sub-address may form part of the compatibility checking by the called user. Only the served user defines the significance of the sub-address.

The functions offered by the SUB supplementary service can be used to identify a particular endpoint of a call beyond the ISDN access.

If a calling user wants to transfer called party sub-address information to the called user, the calling user shall insert the called party sub-address information into the SETUP message as part of the basic service (see Figure I.8-1/Q.951, in Appendix I).

The sub-address information is transferred transparently through the network from the originating to the destination user-network interface. At the called user side, the called party Sub-address shall be offered to the served user within the SETUP message, if the called user has subscribed to this supplementary service.

Note 1 – Other sub-address information elements, e.g. calling party sub-address or Connected party sub-address information elements are not the subject of the SUB supplementary service and hence are described in the appropriate supplementary service specifications (e.g., in the Calling Line Identification Presentation and Connected Line Identification Presentation supplementary services specifications).

Note 2 – The maximum size of the called party sub-address is 20 octets. However, for a certain period of time, the size of the sub-address may be less than 20 octets either within certain networks or between networks.

8.2.2 *Specific terminology*

The served user for the SUB supplementary service is the called user or another private installation on the destination side of the network.

8.2.3 *Qualification on the applicability to telecommunication services*

See Recommendation I.251.8.

8.2.4 *State definitions*

The states associated with basic call control according to Recommendation Q.931 apply.

8.3 *Operational requirements*

The SUB supplementary service uses the incoming call and call offering procedures described in Recommendation Q.931, § 5. The called party sub-address information is included in the called party sub-address information element which will be carried by the SETUP message sent to the called user.

8.3.1 *Provision and withdrawal*

The SUB supplementary service may be available without prior arrangement or it may be provided after subscription agreement between the user and the service provider.

If the subscription option is required, the user shall subscribe to the SUB supplementary service in order to receive called party sub-address information in incoming SETUP messages.

Withdrawal is done by the service provider at the subscriber's request or for administrative reasons.

8.3.2 *Requirements on the originating network side*

The normal basic call control procedures according to Recommendation Q.931, § 5.1, apply.

8.3.3 *Requirements in the network*

This section is not applicable to DSS 1.

8.3.4 *Requirements on the destination network side*

The normal basic call control procedures according to Recommendation Q.931, § 5.2 apply.

8.4 *Coding requirements*

For the SUB supplementary service, the calling user shall use the called party sub-address information element defined in Recommendation Q.931, § 4.5.9.

The maximum length of the called party sub-address information element is 23 octets, allowing for the transfer of 20 octets sub-address information.

8.5 *Signalling requirements*

8.5.1 *Activation, deactivation and registration*

Not applicable.

8.5.2 *Invocation and operation*

8.5.2.1 *Normal operation*

8.5.2.1.1 *Actions at the originating local exchange*

The normal basic call control procedures according to Recommendation Q.931, § 5 apply.

8.5.2.1.2 *Actions at the transit exchange*

This section is not applicable to DSS 1.

8.5.2.1.3 *Actions at the destination local exchange*

The called party sub-address information element shall be delivered from the network to the served user in the SETUP message according to the procedures of Recommendation Q.931, § 5.2. This implies that the calling user has provided the sub-address information.

8.5.2.2 *Exceptional procedures*

If the called party sub-address information element exceeds the maximum length given in Recommendation Q.931, § 3, then this information element will be treated as an information element with content error (see Recommendation Q.931, § 5.8.7.2).

If the SUB supplementary service is not provided to the called user or the length of the called party sub-address information element exceeds the maximum length (see § 8.2.1, Note 2) the network shall discard the called party sub-address information element. No indication shall be given to the calling user.

If the SUB supplementary service is provided to the called user but no sub-address information has been included by the calling user in the called party sub-address information element, the SUB supplementary service cannot be provided and the call shall be offered to the called user without the called party sub-address information element.

If a terminal supports the SUB supplementary service but the received sub-address information does not match with the terminal's own sub-address, then the call shall be ignored [see also § B.3.1 a) of Recommendation Q.931].

If a terminal supports the SUB supplementary service and a SETUP message without sub-address is received, then the terminal shall handle the call according to Recommendation Q.931, § 5.2.

Note – If a terminal which does not support the SUB supplementary service receives a SETUP message with called party sub-address information, then the terminal will handle the call according to Recommendation Q.931, § 5.2 [see also § B.3.1 b) of Recommendation Q.931].

8.6 *Interaction with other supplementary services*

8.6.1 *Call Waiting*

No interaction.

8.6.2 *Call Transfer*

No applicable interaction at this time.

8.6.3 *Connected Line Identification Presentation*

No interaction.

8.6.4 *Connected Line Identification Restriction*

No interaction.

8.6.5 *Calling Line Identification Presentation*

No interaction.

8.6.6 *Calling Line Identification Restriction*

No interaction.

8.6.7 *Closed User Group*

No interaction.

8.6.8 *Conference Calling*

No applicable interaction at this time.

8.6.9 *Direct-Dialling-In*

No interaction.

8.6.10 *Call diversion services*

No applicable interaction at this time.

8.6.10.1 *Call Forwarding Busy*

8.6.10.2 *Call Forwarding No Reply*

8.6.10.3 *Call Forwarding Unconditional*

8.6.10.4 *Call Deflection*

8.6.11 *Line Hunting*

No applicable interaction at this time.

8.6.12 *Three-Party Service*

No applicable interaction at this time.

8.6.13 *User-to-User signalling*

8.6.13.1 *Service 1*

No interaction.

8.6.13.2 *Service 2*

No applicable interaction at this time.

8.6.13.3 *Service 3*

No applicable interaction at this time.

8.6.14 *Multiple Subscriber Number*

No interaction.

8.6.15 *Call Hold*

No interaction.

8.6.16 *Advice of Charge*

No applicable interaction at this time.

8.6.17 *Sub-addressing*

Not relevant. The interactions between the different sub-addressing capabilities at the calling or the called user side are shown in Figure I.8-1/Q.951, in Appendix I.

8.6.18 *Terminal Portability*

No interaction.

8.6.19 *Completion of Calls to Busy Subscriber*

No applicable interaction at this time.

8.6.20 *Malicious Call Identification*

No applicable interaction at this time.

8.7 *Interaction with other networks*

8.7.1 *Interaction with non-ISDNs*

If the call is not supported by the ISDN for the whole connection, the SUB supplementary service may not be applicable.

8.7.2 *Interaction with private ISDNs*

The procedures specified in § 8.5.2 shall be used.

8.8 *Signalling flow*

No SUB supplementary service specific signalling flow is necessary in addition to basic call control according to Recommendation Q.931.

8.9 *Parameter values (timers)*

No specific timers are required.

8.10 *Dynamic description (SDLs)*

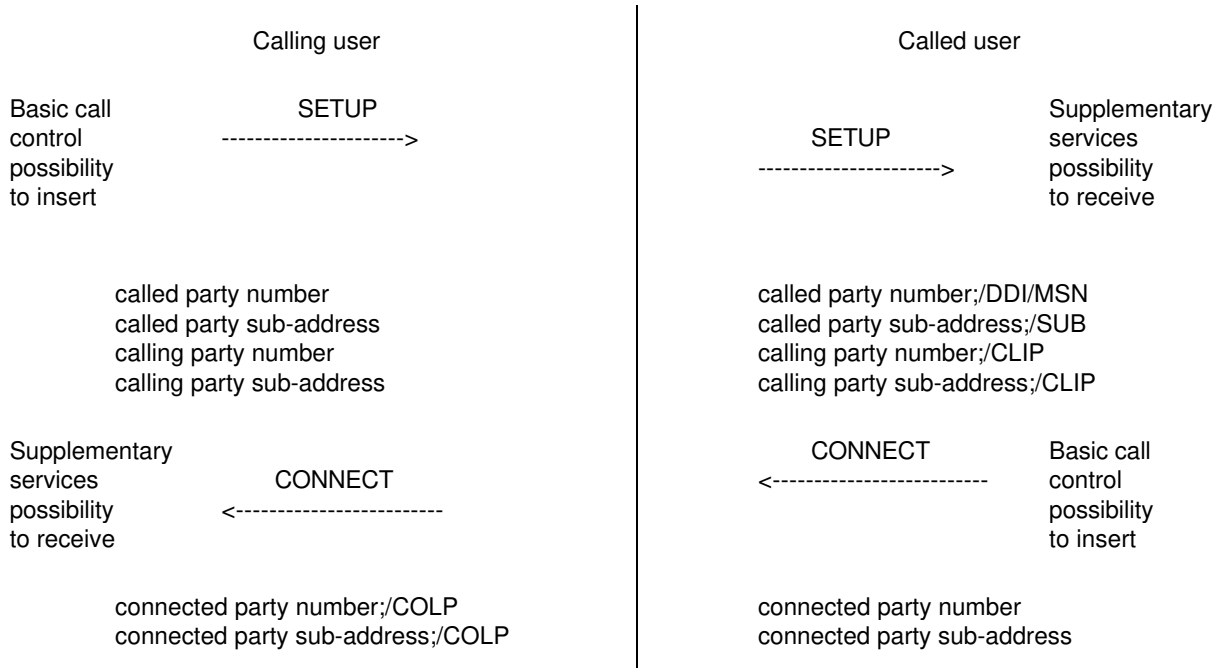
See Recommendation Q.931, Annex A.

APPENDIX I

(to § 8 of Recommendation Q.951)

Relationship of address information elements and supplementary services

The correlation of address information elements to the basic call control or supplementary service are shown in Figure I.8-1/Q.951.



The following symbols appearing after an information element name indicate the service to which they apply:

DDI	Direct-Dialling-In supplementary service
MSN	Multiple Subscriber Number supplementary service
SUB	Sub-addressing supplementary service
CLIP	Calling Line Identification Presentation supplementary service
COLP	Connected Line Identification Presentation supplementary service

FIGURE I.8-1/Q.951

Correlations of address information elements to the basic call control or supplementary services