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## DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1

## STAGE 3 DESCRIPTION FOR SUPPLEMENTARY SERVICES USING DSS 1

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# STAGE 3 DESCRIPTION FOR ADDITIONAL INFORMATION TRANSFER SUPPLEMENTARY SERVICES USING DSS 1

## CLAUSE 1 – USER-TO-USER SIGNALLING (UUS)

## ITU-T Recommendation Q.957

(Previously "CCITT Recommendation")

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## 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 Q.957, clause 1, was prepared by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

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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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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.

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# STAGE 3 DESCRIPTION FOR ADDITIONAL INFORMATION TRANSFER SUPPLEMENTARY SERVICES USING DSS 1

*(Helsinki, 1993)*

## 1 User-to-User Signalling (UUS)

### 1.1 Definition

The **user-user signalling (UUS) supplementary service** allows an ISDN user to send/receive a limited amount of information to/from another ISDN user over the signalling channel in association with a call to the other ISDN user.

### 1.2 Description

#### 1.2.1 General description

The UUS supplementary services provide a means of communication between two users by using as a basis the layer 3 protocol defined in 5/Q.931 [1]. User-user signalling is used to exchange information between two users to provide the services described in the Stage 1 Service Description. The exchange of user-user signalling is limited by flow control procedures provided by the network or the user. The exchange of user-to-user information is not a network acknowledged service. Any acknowledgement procedure shall be controlled at a higher layer between users.

Three UUS services associated with circuit-switched calls that may be provided by the network to users are:

i) *service 1* – User-user information exchanged during the setup and clearing phases of a call, by transporting User-user information element within Q.931 [1] call control messages;

ii) *service 2* – User-user information exchanged from the sender's point of view during call establishment, between the ALERTING and CONNECT messages, within USER INFORMATION messages; and

iii) *service 3* – User-user information exchanged while a call is in the Active state, within USER INFORMATION messages.

All three services may be used separately or in any combination in association with a single call. As an option, at call set-up, users may be able to specify that the requested user-to-user signalling service(s) is (are) required for the call, i.e. the call should not be completed if user-to-user information cannot be passed.

#### 1.2.2 Specific terminology

The **user** is the DSS 1 protocol entity at the user side of the user-network interface.

The **network** is the DSS 1 protocol entity at the network side of the user-network interface.

The **called user** is the user who is offered an incoming call at the terminating interface.

The **calling user** is the user who initiates an outgoing call at the originating interface.

The **served user** is the user requesting the User-to-User (UUS) supplementary service.

The **invoke component** is defined in Recommendation Q.932 [2].

### 1.2.3 Qualifications on the applicability to telecommunications services

See Recommendation I.257.1 [3].

### 1.2.4 State definitions

The states associated with basic call control according to Recommendation Q.931 [1] are applicable.

## 1.3 Operational requirements

### 1.3.1 Provision/withdrawal

UUS services 1 and 2 must be subscribed to by the calling user. UUS service 3 must be subscribed to by the served user. Whether these component services are offered to the user as separate supplementary or in any particular combination is a service provider option.

### 1.3.2 Requirements on the originating network side

The basic call control procedures according to 5.1/Q.931 [1] are applicable.

### 1.3.3 Requirements in the network

Not applicable to DSS 1.

### 1.3.4 Requirements on the terminating network side

The basic call control procedures according to 5.2/Q.931 [1] are applicable.

### 1.3.5 Assumptions made about the terminal

Terminal equipment using UUS service 1 is expected to be able to generate and accept the User-user information element (see 4.5.30/Q.931 [1]) as described in 1.5.2.1 below. In the case of explicit activation, it is also expected to support the codings and procedures in 1.5.2.1.

Terminal equipment using UUS service 2 is expected to be able to generate and/or accept USER INFORMATION messages containing the User-user information element (see 4.5.30/Q.931 [1]) as described in 1.5.2.2.3 below. It is also expected to support the codings and procedures in 1.5.2.2.

Terminal equipment using UUS service 3 is expected to be able to generate and/or accept USER INFORMATION messages containing the User-user information element (see 4.5.30/Q.931 [1]) as described in 1.5.2.3.4 below. It is also expected to support the codings and procedures in 1.5.2.3 below. In the case that congestion control is used, it is also expected to support the CONGESTION CONTROL message and the Congestion Level Information Element (see 4.5.14/Q.931 [1]), and to comply with the procedures of 1.5.2.3.5 below.

## 1.4 Coding requirements

### 1.4.1 Messages

The following messages are applicable to service activation for services 1, 2 and 3: SETUP, SETUP ACKNOWLEDGE, CALL PROCEEDING, PROGRESS, ALERTING, CONNECT, DISCONNECT, RELEASE, RELEASE COMPLETE. The FACILITY message is also applicable to the activation of service 3.

The following messages are applicable to the operation of service 1: SETUP, ALERTING, CONNECT, DISCONNECT, RELEASE, RELEASE COMPLETE.

The following message is applicable to the operation of services 2 and 3: USER INFORMATION. Where the congestion control procedures are used, the following message is applicable to service 3: CONGESTION CONTROL.

The following are message contents for UUS services.

Message Type: ALERTING

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = ALERTING | 4.4/Q.931 | Both | M | 1 |
| Facility | 8.2.3/Q.932 | Both | O (Note 1) | 19 |
| User-user | 4.5.30/Q.931 | Both | O (Note 2) | 2-131 |

NOTES

1 Always included for activation of service 2. Always included in user-network direction for explicit activation of service 1. Not included otherwise for UUS service 1.

2 May be included for service 1 (explicit or implicit activation) where no contention is allowed.

3 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: CALL PROCEEDING

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = CALL PROCEEDING | 4.4/Q.931 | Both | M | 1 |
| Facility | 8.2.3/Q.932 | Both | O (Note 1) | 19 |

NOTES

1 Included only for rejection of explicit service 1, service 2 or service 3 request.

2 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: CONGESTION CONTROL

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | N → U | M | 1 |
| Call reference | 4.3/Q.931 | N → U | M | 2-* |
| Message type = CONGESTION CONTROL | 4.4/Q.931 | N → U | M | 1 |
| Congestion level | 8.2.3/Q.931 | N → U | M | 1 |
| Cause | 4.5.24/Q.931 | N → U | M | 4-32 |

NOTE – Other optional information elements per Recommendation Q.931.

Message Type: CONNECT

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = CONNECT | 4.4/Q.931 | Both | M | 1 |
| Facility | 8.2.3/Q.932 | Both | O (Note 1) | 19 |
| User-user | 4.5.30/Q.931 | Both | O (Note 2) | 2-131 |

NOTES

1 Always included for explicit service 1 activation when contention is allowed for the call, and for service 3 activation during call establishment. May also be included for explicit service 1 activation when contention is not allowed for the call, if not present in the ALERTING message. Not otherwise included for UUS service.

2 May be included for service 1 (explicit or implicit activation). Not included otherwise.

3 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: DISCONNECT

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = DISCONNECT | 4.4/Q.931 | Both | M | 1 |
| Facility | 8.2.3/Q.932 | Both | O (Note 2) | 19 |
| User-user | 4.5.30/Q.931 | Both | O (Note 1) | 2-131 |

NOTES

1 May be included for UUS service 1 where DISCONNECT is the first clearing message. Not included otherwise.

2 May be included to indicate explicit service/acceptance or service 1, 2 or 3 rejection.

3 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: FACILITY

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = FACILITY | 8.1/Q.932 | Both | M | 1 |
| Facility | 8.2.30/Q.932 | Both | O (Note 1) | 19 |

NOTES

1 Included for UUS service 3 activation or deactivation during a call.

2 Other mandatory and optional information elements per Recommendation Q.932.

Message Type: PROGRESS

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = PROGRESS | 4.4/Q.931 | Both | M | 1 |
| Facility | 8.2.3/Q.932 | N → U | O (Note 1) | 19 |
| User-user | 4.5.30/Q.931 | N → U | O (Note 2) | 2-131 |

NOTES

1 Included only for rejection of explicit service 1, service 2 or service 3 request.

2 Included (e.g. in conjunction with in-band tones or announcements) when the PROGRESS message is sent by the network to indicate that the call has been cleared before reaching the active state by the remote user, and a User-user information element was present in the clearing message.

3 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: RELEASE

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = RELEASE | 4.4/Q.931 | Both | M | 1 |
| User-user | 4.5.30/Q.931 | Both | O (Note 1) | 2-131 |

NOTES

1 May be included for UUS service 1 where RELEASE is the first clearing message. Not included otherwise.

2 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: RELEASE COMPLETE

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = RELEASE COMPLETE | 4.4/Q.931 | Both | M | 1 |
| User-user | 4.5.30/Q.931 | U → N | O (Note 1) | 2-131 |

NOTES

1 May be included for UUS service 1 where a RELEASE COMPLETE message is sent by the user to reject an incoming SETUP message. Not included otherwise.

2 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: SETUP

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = SETUP | 4.4/Q.931 | Both | M | 1 |
| Facility | 8.2.3/Q.932 | Both | O (Note 1) | 19 |
| User-user | 4.5.30/Q.931 | Both | O (Note 2) | 2-131 |

NOTES

1 Always included for explicit service 1 activation, service 2 activation, and service 3 activation during call establishment.

2 Always included for implicit service 1 activation; the length must be at least three octets. May also be included for service 1 when explicit activation is used. Not included otherwise.

3 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: SETUP ACKNOWLEDGE

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = SETUP ACKNOWLEDGE | 4.4/Q.931 | Both | M | 1 |
| Facility | 8.2.3/Q.932 | Both | O (Note 1) | 19 |

NOTES

1 Included only for rejection of explicit service 1, service 2 or service 3 request.

2 Other mandatory and optional information elements per Recommendation Q.931.

Message Type: USER INFORMATION

| Information element | Reference | Direction | Type | Length |
|---|---|---|---|---|
| Protocol discriminator | 4.2/Q.931 | Both | M | 1 |
| Call reference | 4.3/Q.931 | Both | M | 2-* |
| Message type = USER INFORMATION | 4.4/Q.931 | Both | M | 1 |
| More data | 4.5.19/Q.931 | Both | O | 1 |
| Facility | 8.3.2/Q.932 | Both | O (Note 1) | 14 |
| User-user | 4.5.30/Q.931 | Both | M | 2-131 |

NOTES

1 Included in conjunction with interaction with the Conference Call Add-on supplementary service if USER INFORMATION messages are sent/received to/from a specific conferee.

2 Other mandatory and optional information elements per Recommendation Q.931.

### 1.4.2 Codesets

All information elements are in codeset 0.

### 1.4.3 Information elements

The Facility information element is applicable to functional service activation for services 1, 2 and 3.

The User-user information element is applicable to the operation of service 1, 2 and 3.

The More data information element is applicable to the operation of services 2 and 3.

The Congestion level information element is applicable to the operation of service 3.

### 1.4.4 Codepoints

#### 1.4.4.1 Syntax for service activation using the Facility information element

Table 1-1 shows the definition of the operation required for the UUS supplementary service using ASN.1 as specified in Recommendation X.208 [4] and using the OPERATION macro as defined in Figure 4/X.219 [5].

The coding of the operation specific fields of the invoke component is shown in Figure 1-1 and Table 1-1.

TABLE 1-1/Q.957

**Definition of operations and errors**

```
User-User-Signalling    {   ccitt recommendation q 957
                            user-to-user-signalling (1)
                            operations-and-errors (1) }

DEFINITIONS             ::=

 BEGIN

 EXPORTS            UserUserService;

 IMPORTS            OPERATION,ERROR
                    FROM Remote-Operation-Notation
                    { joint-iso-ccitt remote-operations (4)
                    notation (0) }
                    rejectedByNetwork, rejectedByUser
                    FROM General-Error-List
                    { ccitt recommendation q 950 general-error-list (1) };

 UserUserService    OPERATION

        ARGUMENT SEQUENCE {   [1] IMPLICIT Service,
                              [2] IMPLICIT Preferred }

        RESULT
        ERRORS      { rejectedByNetwork, rejectedByUser }

 Service            ::=  INTEGER { service1(1), service2(2), service3(3) } (1...3)

 Preferred          ::=  BOOLEAN  {
                         preferred (TRUE),
                         required (FALSE) }

 userUserService         UserUserService    ::=   1

 END
```

### 1.4.4.2 Coding of the UUS service operation component

See Figure 1-1.

| Octet | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 6.6 | Class | | Form | Sequence tag | | | | |
| | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 6.7 | Length Format 0 | Length of sequence tag | | | | | | |
| 6.8 | Class | | Form | Service tag | | | | |
| | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6.8.1 | Length Format 0 | Length of service | | | | | | |
| 6.8.2 | Service | | | | | | | |
| 6.8.3 | Class | | Form | Preferred tag | | | | |
| | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 6.8.4 | Length Format | Length preferred | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6.8.5 | Preferred | | | | | | | |

FIGURE 1-1/Q.957

**Facility information element – Invoke component – Operation-specific fields for UUS supplementary service**

**Class (octets 6.6, 6.8 and 6.8.3)**

bits
8 7
0 0 Universal
1 0 Context Specific

All other values reserved.

**Form (octets 6.6, 6.8 and 6.8.3)**

bit
6
0 Primitive
1 Constructor

**Length format (octets 6.7, 6.8.1 and 6.8.4)**

bit
8
0 Length is one octet

**Length of sequence (octet 6.7)**

This field indicates the total length of the following sequence of fields (i.e. octet 6.8 and its subparts). It is the binary coding of the number of octets of the service, with bit 1 as the least significant bit.

**Length of service (octet 6.8.1)**

This field indicates the total length of the contents of the service field (i.e. octet 6.8.2). It is the binary coding of the number of octets of the service, with bit 1 as the least significant bit.

**Service (octet 6.8.2)**

bits

| 8 7 6 5 4 3 2 1 | |
|---|---|
| 0 0 0 0 0 0 0 1 | Service 1 |
| 0 0 0 0 0 0 1 0 | Service 2 |
| 0 0 0 0 0 0 1 1 | Service 3 |

All other values reserved.

**Length of preferred (octet 6.8.4)**

This field indicates the total length of the preferred field (i.e. octet 6.8.5). It is the binary coding of octets of the preferred field with bit 1 as the least significant bit.

**Preferred (octet 6.8.5)**

bits

| 8 7 6 5 4 3 2 1 | |
|---|---|
| 0 0 0 0 0 0 0 0 | False (service is required) |
| 0 0 0 0 0 0 0 1 | True (service is preferred) (see Note) |

NOTE – Any value other than "0000 0000" represents the value True.

## 1.5 Signalling requirements

### 1.5.1 Activation/deactivation/registration

Services 1, 2 and 3 may be provided on a per call basis following an explicit request from a user. The standard explicit activation procedure makes use of the Facility information element defined in Recommendation Q.932 [2].

Service 1 may also be activated implicitly as described in 1.5.2.1.1.1 below. In this case, activation and operation of the service are indistinguishable.

Procedures for call establishment are described in Recommendation Q.931 [1] with the following modifications. On call request, the SETUP message sent by the calling user shall contain independent service 1, 2 and 3 requests.

The SETUP message sent by the network towards the called user shall also contain the same independent service requests. If the called user can support the indicated services requested by the explicit mechanism, then specific service acceptances shall be indicated in the appropriate message(s) as defined in 1.5.2.1, 1.5.2.2 and 1.5.2.3 below.

Deactivation procedures are not required to support these services.

Called user procedures during activation (and, for service 1, normal operation) of these services are restricted in the case that call contention for calls is possible. For the purposes of these procedures, when a SETUP message is delivered to the called user, the called user should assume that call contention for the call may occur unless at least one of the following applies:

a) the SETUP message is delivered using a point-to-point data link;

b) terminal identification procedures have been successfully completed (see Annex A/Q.932 [2]) and the SETUP message contains an Endpoint identifier information element which uniquely selects the user equipment (i.e. the USID and TID values match the corresponding stored values and the interpreter bit value is 0);

c) the user equipment knows based on addressing and/or compatibility information in the SETUP message that it is uniquely identified;

d) the user equipment has local (i.e. configured) knowledge that call contention shall not occur.

From the network's point of view, call contention exists if based upon knowledge of terminal configuration (or other means, e.g. subscription), the network expects more than one ALERTING message for an incoming call request at the called user's interface.

### 1.5.2 Invocation and operation

#### 1.5.2.1 UUS service 1

##### 1.5.2.1.1 Call establishment phase

###### 1.5.2.1.1.1 Implicit operation

Service 1 may be implicitly requested by including a User-user information element of variable length as specified in 4.5/Q.931 [1] in the SETUP message, transferred across the user-network interface at the calling side as described in 5.1.1/Q.931 [1]. This information element is transported by the network and delivered unchanged in the User-user information element included in the SETUP message transferred across the user-network interface at the called side as described in 5.2.1/Q.931 [1]. For activation purposes, this information element must be at least three octets long, as defined in 4.5/Q.931 [1].

In the case where call contention by users for the incoming call is not possible, a User-user information element may be included in the ALERTING and/or CONNECT messages transferred across the user-network in the interface at the called side as described in 5.2.5/Q.931 [1]. It may also be included in the DISCONNECT or RELEASE COMPLETE message (see 1.5.2.1.2). The content of this information element is transported by the network and delivered in the User-user information element included in the corresponding message(s) transferred across the user-network interface at the calling side as described in 5.1.7/Q.931 and 5.1.8/Q.931 [1].

In the case where the network has knowledge that call contention exists, the User-user information element may be included by the called user in the CONNECT message transferred at the called side. It may also be included in the DISCONNECT or RELEASE COMPLETE message (see 1.5.2.1.2). The content of the User-user information element delivered to the calling user shall be that received from the selected terminal as described in 5.2.8/Q.931 [1].

NOTE – In accordance with the Network Service Definition for Open Systems Interconnection, ISO 8348/Recommenda-tion X.213 [6], the called user may perform compatibility checking using the User-user information element contents (see Annex B/Q.931 [1]). In the context of the OSI Network Service, service 1 may be used to support the conveyance of the NS-User-Data parameter of the N-Connect and N-Disconnect primitives.

###### 1.5.2.1.1.2 Explicit operation (preferred or required)

Procedures for call establishment are as described in 5.1/Q.931 and 5.2/Q.931 [1] and 1.5.2.1.1.1 above, with the following modifications.

On call request, the SETUP message sent by the calling user shall contain an explicit service 1 request. The SETUP message sent by the network at the called side shall also contain an explicit service 1 request. The SETUP message sent by the calling user may contain a User-user information element. The SETUP message sent by the network at the called side shall also contain a User-user information element if present in the SETUP message sent by the calling user.

If the called user can support the transfer of User-user information elements in call establishment and clearing messages, a service 1 acceptance shall be included in

a) the ALERTING or CONNECT or first clearing messages prior to the Active state;

b) the CONNECT or first clearing message when the network has knowledge that call contention exists.

This explicit service 1 acceptance shall be forwarded by the network to the calling user in the ALERTING, CONNECT or DISCONNECT message.

A User-user information element may be included in the ALERTING message and/or CONNECT message transferred across the user-network interface at the called side as described in 5.2.5/Q.931 [1].

NOTE – In accordance with the Network Service Definition for Open Systems Interconnection, ISO 8348/Recommenda-tion X.213 [6], the called user may perform compatibility checking using the User-user information element contents (see Annex B/Q.931 [1]). In the context of the OSI Network Service, service 1 may be used to support the conveyance of the NS-User-Data parameter of the N-Connect and N-Disconnect primitives.

#### 1.5.2.1.2 Call clearing phase

A User-user information element may be included in the first message used to initiate the normal call clearing phase (see 5.3.3/Q.931 and 5.3.4/Q.931 [1]).

The information contained in such an information element is transferred to the remote user in the first clearing message (see 5.3.3/Q.931 and 5.3.4/Q.931 [1]). Such a transfer is only performed if the information is received at the local exchange of the remote user before sending a clearing message to that user; otherwise, the information is discarded without sending any notification.

In addition, when a SETUP message has been delivered using the broadcast capability at the data link layer, and the network is unable to determine from the first response received from the user that there is no call contention, only the following User-user information element transfer is allowed:

a) in the network to called user direction, in the case of premature clearing by the calling user, a User-user information element is sent in the RELEASE message to each called user that has already responded to the incoming SETUP message;

b) in the called user-network direction, the User-user information element shall only be accepted from a terminal which is selected.

If multiple clearing messages are received, the network may, as a network option, retain the User-user information element and, in case of explicit request, the Facility information element along with the cause retained according to 5.2.4.3/Q.931 [1]. In the event that this cause is returned to the calling user, the associated User-user information element shall also be returned. If there are multiple clearing messages containing causes of equal priority and User-user information elements, the User-user information element contained in the first clearing message shall be sent to the calling user. If any of the clearing messages with the highest priority causes do not contain User-user information elements and other clearing messages with causes of lower priority do contain User-user information elements, no User-user information element shall be sent back to the calling user. If the network does not retain User-user information elements, it shall include the Cause information element with cause value #43, “access information discarded”, in the next sequential message sent to the called user (as specified in 1.5.2.1.4.3).

In the case where call contention by users for the incoming call is not possible, a User-user information element may be included in the first normal clearing message sent by the called user during call establishment at the destination interface.

If the called user rejects the call with a clearing message containing a User-user information element, the network shall deliver the User-user information element in the DISCONNECT message sent to the calling user. However, if the network is providing in-band information to the calling user, and chooses not to initiate clearing procedures at that time, the network may deliver the User-user information element in a PROGRESS message sent to the calling user.

NOTE – It is intended that this capability may be used to provide the clearing data transfer (i.e. conveyance of the NS-User-Data parameter to the N-Disconnect primitives) described in CCITT Rec. X.213 [6] | ISO 8348.

#### 1.5.2.1.3 Actions at the transit exchange

Not applicable to DSS 1.

#### 1.5.2.1.4 Exceptional procedures

##### 1.5.2.1.4.1 Rejection of implicit service requests

The network shall discard the User-user information element if it is received from the calling user in a SETUP message, but the calling user has not subscribed to UUS service 1. If the discard occurs, the network shall continue to process the call request. The network may also inform the calling user that the UUS request is not accepted by sending a STATUS message containing cause #50, “requested facility non-subscribed”, or cause #43, “access information discarded”.

The called user may not be able to interpret incoming User-user information elements. In such situations, the user should discard this information without disrupting normal call handling. No specific signalling is provided by the network to accommodate this situation.

#### 1.5.2.1.4.2 Rejection of explicit service requests

General exceptional procedures are described in 6.3.6/Q.932 [2] and specific exceptional procedures are described below.

If the network cannot support service 1, or the calling user has not subscribed to the service, and it was requested as preferred, a service 1 rejection indicating "rejected by network" is included in the SETUP ACKNOWLEDGE, CALL PROCEEDING, PROGRESS, ALERTING or CONNECT message, depending on the state of the call at the time that the network determines that it cannot support the service.

If the service 1 request indicated required and the network cannot support it (e.g. because it is not implemented or because of temporary inability to provide the service), a DISCONNECT or RELEASE COMPLETE message (depending on the state of the call) is sent with cause #47 "resource unavailable, unspecified" or cause #69 "requested facility not implemented" and a service 1 rejection indicating "rejected by network".

If the service 1 request indicated required and the calling user has not subscribed to the service, a DISCONNECT or RELEASE COMPLETE message is sent with cause #50 "requested facility not subscribed" and a service 1 rejection indicating "rejected by network".

If the called user does not wish to accept the service 1 indication, and it was requested as preferred, a service 1 rejection indicating "rejected by user" is included in

a) the ALERTING or CONNECT or first clearing messages prior to the Active state;

b) the CONNECT or first clearing message when the network has knowledge that call contention exists.

This explicit service 1 rejection shall be forwarded by the network to the calling user in the ALERTING, CONNECT or DISCONNECT message.

If the called user does not wish to accept the service 1 indication, and it was requested as required, a service 1 rejection indicating "rejected by user" is included in a DISCONNECT or RELEASE COMPLETE message with cause #69 "requested facility not implemented". This explicit service 1 rejection shall be forwarded by the network to the calling user in the DISCONNECT message (except in the case that call contention is possible and another user accepts the call or rejects the call but accepts the User-user service indication).

If the called user does not include a service 1 acceptance or rejection in the ALERTING, CONNECT, DISCONNECT or RELEASE COMPLETE message, and the service 1 request indicated preferred, the network shall return an explicit rejection indicating "rejected by user" in the CONNECT or DISCONNECT message sent to the calling user.

If the called user does not include a service 1 acceptance or rejection in the ALERTING or CONNECT message, and the service 1 request indicated required, the network shall clear the call by sending a DISCONNECT message to the calling user with cause #69 "requested facility not implemented" and a service 1 rejection indicating "rejected by user". Furthermore, a DISCONNECT message with cause #31 "normal, unspecified" shall be sent to the called user. In the case that call contention is possible, a RELEASE message with cause #31 "normal, unspecified" shall be sent to each responding user.

If the called user does not include a service 1 acceptance or rejection in the DISCONNECT or RELEASE COMPLETE message, and the service 1 request indicated required, the network shall include a service 1 rejection indicating "rejected by user" in the DISCONNECT message sent to the calling user.

#### 1.5.2.1.4.3 Unexpected User-user information element in call control messages

The network shall discard the User-user information element if it is received from the called user in the ALERTING or CONNECT message, but a request for UUS was not indicated (either explicitly or implicitly) in the SETUP message delivered to the called user. If discard occurs, the network shall take action on the remaining contents of the message received from the calling user and shall send a STATUS message to the called user containing cause #43, "access information discarded".

The network shall discard the User-user information element if it is received from either user in a DISCONNECT, RELEASE or RELEASE COMPLETE message, but a request for UUS was not indicated (either explicitly or implicitly) in the SETUP message delivered to the called user. If discard occurs, the network shall take action on the remaining contents of the message received from the user. If the clearing party has sent a DISCONNECT (or RELEASE) message, the network shall send to the clearing party a RELEASE (or RELEASE COMPLETE) message containing cause #43, "access information discarded". If the clearing party had sent a RELEASE COMPLETE message, the network shall consider the call as cleared to that party; no additional action shall be taken.

If the SETUP message delivered to the called user contains the User-user information element, the network shall discard the User-user information element if it is received in the ALERTING message and call contention is allowed. If discard occurs, the network shall take action on the remaining contents of the message received from the called user and shall send a STATUS message to the called user containing cause #43, "access information discarded".

The network shall discard the User-user information element in the following cases not explicitly discussed elsewhere in 1.5:

- the overall length of the User-user information element is greater than 131 octets and UUS service 1 was activated either explicitly or implicitly;
- the network receives a message containing the User-user information element, but that message is not allowed to contain UUS as defined by this document.

If discard occurs, the network shall take action on the remaining contents of the message received from the sending user and shall send a STATUS message to that user containing cause #43, "access information discarded". However, if the network discards a User-user information element from a received clearing message, the network shall include cause #43, "access information discarded", in the next sequential clearing message sent to the user as specified in 5.3/Q.931 [1]. If the network discards a User-user information element from a RELEASE COMPLETE message, the network shall consider the call as cleared to that party; no additional action shall be taken.

#### 1.5.2.2 UUS service 2

##### 1.5.2.2.1 Call establishment phase

On call request, the SETUP message sent by the calling user shall contain an explicit service 2 request. The SETUP message sent by the network at the called side, shall also contain an explicit service 2 request.

If the called user can support USER INFORMATION messages during call establishment, a service 2 acceptance shall be included in the ALERTING message sent to the network. This explicit acceptance indication shall be forwarded in the ALERTING message sent by the network to the calling user.

##### 1.5.2.2.2 Actions at the transit exchange

Not applicable to DSS 1.

##### 1.5.2.2.3 Transfer of USER INFORMATION messages

Service 2 is only applicable when no call contention is possible.

Once an ALERTING message has been received, both the involved users can transfer information between themselves by transferring USER INFORMATION messages across the user-network interface. The network provides for the transfer of such messages from the calling to the called side and vice versa. The USER INFORMATION message included the call reference, the protocol discriminator, and the User-user information element as defined in 3.1.26/Q.931 [1]. The More data information element may also be included by the source user to indicate to the remote user that another USER INFORMATION message shall follow, containing information elements belonging to the same block. The use of a More data information element is not supervised by the network.

When UUS service 2 is provided, no more than two USER INFORMATION messages may be transferred in each direction after the ALERTING message and before the CONNECT message.

As a network option, USER INFORMATION messages may be transferred to the called user in the Active state.

Sending or receiving of USER INFORMATION messages does not change the state of the call.

#### 1.5.2.2.4 Exceptional procedures

##### 1.5.2.2.4.1 Service rejection/non-acceptance

General exceptional procedures are described in 6.3.6/Q.932 [2] and specific exceptional procedures are described below.

If the network cannot support service 2, or the calling user has not subscribed to the service, and it was requested as preferred, a service 2 rejection indicating "rejected by network" is included in a SETUP ACKNOWLEDGE, CALL PROCEEDING, PROGRESS or ALERTING message, depending on the state of the call at the time that network determines that it cannot support the service.

If the service 2 request indicated required and the network cannot support it (e.g. because it is not implemented or because of temporary inability to provide the service), a DISCONNECT or RELEASE COMPLETE message (depending on the state of the call) is sent with cause #47, "resource unavailable, unspecified", or cause #69, "requested facility not implemented", and a service 2 rejection indicating "rejected by network".

If the service 2 request indicated required and the calling user has not subscribed to the service, a DISCONNECT or RELEASE COMPLETE message is sent with cause #50, "requested facility not subscribed", and a service 2 rejection indicating "rejected by network".

If the network has the knowledge that a point-to-multipoint arrangement exists at the called user's interface, the service 2 request shall be rejected by the network. If the service 2 request indicated preferred, the network shall include a service 2 rejection indicating "rejected by network" in the ALERTING message returned to the calling user. If the service 2 request indicated required, the network shall send a DISCONNECT message with cause #69, "requested facility not implemented", and a service 2 rejection indicating "rejected by network" to the calling user.

If the called user does not wish to accept the service 2 indication, and it was requested as preferred, a service 2 rejection indicating "rejected by user" is included in the ALERTING message. This explicit service 2 rejection shall be forwarded by the network to the calling user in the ALERTING message.

If the called user does not wish to accept the service 2 indication and it was requested as required, a service 2 rejection indicating "rejected by user" is included in a DISCONNECT or RELEASE COMPLETE message with cause #69, "requested facility not implemented". This explicit service 2 rejection shall be forwarded by the network to the calling user in the DISCONNECT message.

If the called user does not include a service 2 acceptance or rejection in the ALERTING message or a rejection in the DISCONNECT or RELEASE COMPLETE message and the request indicated preferred, the network shall return an explicit rejection indicating "rejected by user" in the ALERTING or DISCONNECT message sent to the calling user.

If the called user does not include a service 2 acceptance or rejection in the ALERTING message and the request indicated required, the network shall clear the call by sending a DISCONNECT message to the calling user with cause #69, "requested facility not implemented", and a service 2 rejection indicating "rejected by user". Furthermore, a DISCONNECT message with cause #31, "normal, unspecified", shall be sent to the called user.

If the called user does not include a service 2 rejection in the DISCONNECT or RELEASE COMPLETE message and the request indicated required, the network shall include a service 2 rejection indicating "rejected by user" in the DISCONNECT message with cause #31, "normal, unspecified", shall be sent to the calling user.

##### 1.5.2.2.4.2 Excess USER INFORMATION messages

In the following cases, the network shall discard the USER INFORMATION message and send a STATUS message with cause #43, "access information discarded", to the sending user:

- if the network receives a USER INFORMATION message in the alerting phase, but service 2 is not activated;
- if the network receives more than two USER INFORMATION messages from a user;
- if the network receives a USER INFORMATION message in any other call phase than the alerting phase.

#### 1.5.2.3 UUS service 3

This service may be requested during call establishment or during the Active state of the call.

##### 1.5.2.3.1 Call establishment phase

On call request, the SETUP message sent by the calling user shall contain an explicit service 3 request. The SETUP message sent by the network at the called side shall also contain an explicit service 3 request.

If the called user can support USER INFORMATION message transfer during the Active state, a service 3 acceptance shall be included in the CONNECT message.

##### 1.5.2.3.2 Call active phase

During the Active state of a call, a user may request service 3 preferred only. A FACILITY message indicating a service 3 request is sent from the requesting user to the network. The network shall indicate the service 3 request to the user that did not request service 3 in the FACILITY message and start timer T1 at the that user's network interface.

If the user that did not request service 3 can support the transfer of USER INFORMATION messages during the Active state, a service 3 acceptance is returned in the FACILITY message. This explicit acceptance is conveyed back to the requesting user in a FACILITY message and the network shall stop timer T1.

##### 1.5.2.3.3 Actions at the transit exchange

Not applicable to DSS 1.

##### 1.5.2.3.4 Transfer of USER INFORMATION messages

When a call is in the Active state, with UUS service 3 activated, one user may transfer information to the other by conveying USER INFORMATION messages across the user-network interface. The network provides for the transport of such messages.

The USER INFORMATION message includes the call reference, protocol discriminator, and the User-user information element. The More data information element may also be included by the source user to indicate to the remote user that another USER INFORMATION message shall follow, containing information belonging to the same block. The use of the More data information element is not supervised by the network; in particular, integrity of blocks fragmented using this procedure is not guaranteed.

##### 1.5.2.3.5 Congestion control of USER INFORMATION messages

Network flow control mechanisms shall exist after the call has entered the Active call state to restrict USER INFORMATION message flow in each direction.

In each direction a burst capability of sending N USER INFORMATION messages shall immediately be available to each user, where N initially equals the value of the burst parameter X. The value of N shall be decremented by one for every USER INFORMATION message sent by the user and incremented by Y at regular intervals of T subject to the limitation that N shall not exceed X.

The burst parameter X shall be set to a value of X = 16 and the replenishment parameter Y shall be set to Y = 8.

NOTE – While some networks may support higher values of X and Y, the value of X and Y for international calls shall be set as above. It is up to the network using higher values to take the appropriate actions, unless bilateral agreements exist.

If the network within the period T receives more than N USER INFORMATION messages, the excess message(s) shall be discarded. The network shall respond to the first discarded messages with a CONGESTION CONTROL message including a Congestion level information element indicating "receive not ready". The CONGESTION CONTROL message shall also include a cause #43, "access information discarded". Subsequent received USER INFORMATION messages shall be discarded by the network without any indication to the user.

When the flow control restrictions are removed (i.e. timer T expires) then, if a USER INFORMATION message has been discarded due to that restriction, a CONGESTION CONTROL message indicating "receive ready" shall be sent to the user. If no USER INFORMATION has been discarded, no indication shall be sent.

The user cannot flow control USER INFORMATION messages received from the network.

If the network receives a CONGESTION CONTROL message from the user, a STATUS message with causes #111 "protocol error, unspecified" shall be sent to the user and no further action shall be taken.

#### 1.5.2.3.6 Exceptional procedures

##### 1.5.2.3.6.1 Rejection of service requested during call establishment

General exceptional procedures are described in 6.3.6/Q.932 [2] and specific exceptional procedures are described below.

If the network cannot support service 3, or the calling user has not subscribed to the service, and it was requested as preferred, a service 3 rejection indicating "rejected by network" is included in a SETUP ACKNOWLEDGE, CALL PROCEEDING, PROGRESS, ALERTING or CONNECT message, depending on the state of the call at the time that the network determines that it cannot support the service.

If the service 3 request indicated required and the network cannot support it (e.g. because it is not implemented or because of temporary inability to provide the service), a DISCONNECT or RELEASE COMPLETE message (depending on the state of the call) is sent with cause #47 "resource unavailable, unspecified" or cause #69 "requested facility not implemented", and a service 3 rejection indicating "rejected by network".

If the service 3 request indicated required and the calling user has not subscribed to the service, a DISCONNECT or RELEASE COMPLETE message is sent with cause #50 "requested facility not subscribed", and a service 3 rejection indicating "rejected by network".

If the called user does not wish to accept the service 3 indication, and it was requested as preferred, the service 3 rejection indicating "rejected by user" is included in the CONNECT message. This explicit service 3 rejection shall be forwarded by the network to the calling user in the CONNECT message.

If the called user does not wish to accept the service 3 indication, and it was requested as required, the service 3 rejection indicating "rejected by user" is included in a DISCONNECT or RELEASE COMPLETE message with cause #69 "requested facility not implemented". This explicit service 3 rejection shall be forwarded by the network to the calling user in the DISCONNECT message (except in the case that call contention is possible and another user accepts the call).

If the called user does not include a service 3 acceptance or rejection in the CONNECT message or a rejection in the DISCONNECT or RELEASE COMPLETE message and the request indicated preferred, the network shall return an explicit rejection indicating "rejected by user" in the CONNECT or DISCONNECT message sent to the calling user.

If the called user does not include a service 3 acceptance or rejection in the CONNECT message and request indicated required, the network shall clear the call by sending a DISCONNECT message to the calling user with cause #69 "requested facility not implemented", and service 3 rejection indicating "rejected by user". Furthermore, a DISCONNECT message with cause #31, "normal, unspecified", shall be sent to the called user.

If the called user does not include a service 3 rejection indicating "rejected by user" in the DISCONNECT or RELEASE COMPLETE message and the request indicated required, the network shall include a service 3 rejection in the DISCONNECT message sent to the calling user.

##### 1.5.2.3.6.2 Rejection of service requested after call establishment

General exceptional procedures are described in 6.3.6/Q.932 [2] and specific exceptional procedures are described below.

If the network cannot support service 3, or the requesting user has not subscribed to the service, a service 3 rejection indicating "rejected by network" is included in a FACILITY message.

If the user that did not request service 3 does not wish to accept the service 3 indication, a service 3 rejection indicating "rejected by user" shall be returned in the FACILITY message and stop timer T1.

If the requested user does not respond to the service 3 request before timer T1 expires, the network shall return a service 3 rejection indicating "rejected by user" to the requesting user.

Collision of requests for service 3 occurs when there is an outstanding request for service 3 and a subsequent request is received from the remote user. In this situation, the entities (user or network) observing the collision shall reject the second request with a FACILITY message including a service 3 rejection indicating "rejected by user" or "rejected by network". Consequently, both requests will be rejected.

#### 1.5.2.3.6.3 Receipt of unexpected USER INFORMATION messages

Whenever a USER INFORMATION message is received from the user and

a) it is not allowed in the current call state (e.g. in any other state than Active where only service 3 is activated); and/or

b) the appropriate UUS service has not been activated,

the message shall be discarded by the network. The network shall also send a STATUS message with a cause #43 "access information discarded".

## 1.6 Interaction with other supplementary services

### 1.6.1 Call Waiting

No impact.

### 1.6.2 Call Transfer

#### 1.6.2.1 Normal Call Transfer

No applicable interaction at this time.

#### 1.6.2.2 Explicit Call Transfer

No applicable interaction at this time.

#### 1.6.2.3 Single Step Call Transfer

No applicable interaction at this time.

### 1.6.3 Connected Line Identification Presentation

No impact.

### 1.6.4 Connected Line Identification Restriction

No impact.

### 1.6.5 Calling Line Identification Presentation

No impact.

### 1.6.6 Calling Line Identification Restriction

No impact.

### 1.6.7 Closed User Group

No impact.

### 1.6.8 Conference Calling

See 1.6.11/Q.954.1 [7].

### 1.6.9 Direct-Dialling-In

No impact.

#### 1.6.10 Call diversion (call forwarding) services

##### 1.6.10.1 Call Forwarding Busy

For further study.

##### 1.6.10.2 Call Forwarding No Reply

For further study.

##### 1.6.10.3 Call Forwarding Unconditional

For further study.

##### 1.6.10.4 Call Deflection

For further study.

#### 1.6.11 Line Hunting

No applicable interaction at this time.

#### 1.6.12 Three-Party Service

No impact.

#### 1.6.13 User-User Signalling

##### 1.6.13.1 Service 1

Not relevant.

##### 1.6.13.2 Service 2

Not relevant.

##### 1.6.13.3 Service 3

Not relevant.

#### 1.6.14 Multiple Subscriber Number

No impact.

#### 1.6.15 Call Hold

No impact.

#### 1.6.16 Advice of Charge

No impact.

#### 1.6.17 Sub-addressing

No impact.

#### 1.6.18 Terminal Portability

No applicable interaction at this time.

#### 1.6.19 Call Completion to Busy Subscriber

No applicable interactions at this time.

#### 1.6.20 Malicious Call ID

No impact.

#### 1.6.21 Reverse Charging

No impact.

#### 1.6.22 Multi-Level Precedence and Preemption

No impact.

## 1.7 Interactions with other networks

### 1.7.1 Interaction with non-ISDNs

#### 1.7.1.1 UUS service 1

In the case of interworking with a non-ISDN network, the return of a PROGRESS or an ALERTING message with the Progress indicator information element indicating #1 "call is not end-to-end ISDN; further call progress information may be available in-band" to the calling user shall serve as indication that, in particular, the delivery of User-user information elements in call control messages cannot be guaranteed.

In the case of interworking with a non-ISDN called user, the return of a PROGRESS or an ALERTING message with the Progress indicator information element indicating #2 "destination address is non-ISDN" to the calling user shall serve as indication that, in particular, the delivery of User-user information elements in call control messages cannot be guaranteed.

#### 1.7.1.2 UUS service 2

In the case of interworking with a non-ISDN network, the return of a PROGRESS or an ALERTING message with the Progress indicator information element indicating #1 "call is not end-to-end ISDN; further call progress information may be available in-band" to the calling user shall serve as indication that, in particular, the delivery of User-user information elements in call control messages cannot be guaranteed.

In the case of interworking with a non-ISDN called user, the return of a PROGRESS or an ALERTING message with the Progress indicator information element indicating #2 "destination address is non-ISDN" to the calling user shall serve as indication that, in particular, the delivery of User-user information elements in call control messages cannot be guaranteed.

#### 1.7.1.3 UUS service 3

When interworking with a non-ISDN network occurs, a PROGRESS or an ALERTING message with the progress indicator information element indicating #1, "call is not end-to-end ISDN; further call progress information may be available in-band", is sent to the calling user to indicate that the service cannot be guaranteed.

In the case of interworking with a non-ISDN called user, the return of a PROGRESS or an ALERTING message with the progress indicator information element indicating #2 "destination address is non-ISDN" to the calling user shall serve as indication that the full service cannot be guaranteed.

### 1.7.2 Procedures for interworking with private ISDNs

The procedures described in 1.5 apply with the following exceptions:

The exceptional procedures described in 1.5.2.1.4.1, 1.5.2.1.4.3, 1.5.2.2.4.2 and 1.5.2.3.6.3 apply except that the public ISDN shall not send STATUS messages to the private ISDN.

The network shall not flow control USER INFORMATION messages received from the private ISDN, i.e. the procedures described in 1.5.2.3.5 are not applicable (see Note).

NOTE – Generally, interworking between a public ISDN and a private ISDN is based on bilateral agreements. The actions to be taken if the private ISDN violates the agreed flow control limit are implementation dependent and are outside the scope of this Recommendation.

## 1.8 Signalling flow

No UUS supplementary service signalling flow is necessary in addition to basic call control according to Q.931 [1].

### 1.9 Parameter values (timers)

The value of network timer T is set to 10 seconds.

The value of network timer T1 is set to 10 seconds.

### 1.10 Dynamic description (SDLs)

See Annex A/Q.931.

## References


[1] CCITT Recommendation Q.931 *ISDN user-network interface layer 3 specification for basic call control.*

[2] CCITT Recommendation Q.932 *Generic Procedures for the control of ISDN supplementary services.*

[3] CCITT Recommendation I.257.1 *Stage 1 description for User-User Signalling supplementary service.*

[4] CCITT Recommendation X.208 *Specification of Abstract Syntax Notation One (ASN.1).*

[5] CCITT Recommendation X.219 *Remote operations: Model, Notation and Service definitions.*

[6] CCITT Recommendation X.213 *Network service definition for Open Systems Interconnection (OSI) for CCITT applications.*

[7] CCITT Recommendation Q.954.1 *Conference calling.*