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SERIES Q: SWITCHING AND SIGNALLING

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:  
User-to-User Signalling (UUS)**

ITU-T Recommendation Q.957.1

(Previously CCITT Recommendation)

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## **ITU-T RECOMMENDATION Q.957.1**

### **STAGE 3 DESCRIPTION FOR ADDITIONAL INFORMATION TRANSFER SUPPLEMENTARY SERVICES USING DSS 1: USER-TO-USER SIGNALLING (UUS)**

#### **Summary**

The User-to-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.

#### **Source**

ITU-T Recommendation Q.957.1 was revised by ITU-T Study Group 11 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 9th of July 1996.

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## Recommendation Q.957.1

### STAGE 3 DESCRIPTION FOR ADDITIONAL INFORMATION TRANSFER SUPPLEMENTARY SERVICES USING DSS 1: USER-TO-USER SIGNALLING (UUS)

(revised in 1996)

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

### 1.1 Definition

The **user-to-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 clause 5/Q.931 [1]. User-to-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-to-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-to-user information exchanged during the setup and clearing phases of a call, by transporting User-to-user information element within Q.931 [1] call control messages;
- ii) *service 2* – User-to-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-to-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 setup, 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-to-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-to-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-to-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-to-user	4.5.30/Q.931	Both	O (Note 2)	2-131
NOTE 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.				
NOTE 2 – May be included for service 1 (explicit or implicit activation) where no contention is allowed.				
NOTE 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
NOTE 1 – Included only for rejection of explicit service 1, service 2 or service 3 request.				
NOTE 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-to-user	4.5.30/Q.931	Both	O (Note 2)	2-131

NOTE 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.

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

NOTE 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-to-user	4.5.30/Q.931	Both	O (Note 1)	2-131

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

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

NOTE 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

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

NOTE 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-to-user	4.5.30/Q.931	N → U	O (Note 2)	2-131

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

NOTE 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-to-user information element was present in the clearing message.

NOTE 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-to-user	4.5.30/Q.931	Both	O (Note 1)	2-131

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

NOTE 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-to-user	4.5.30/Q.931	U → N	O (Note 1)	2-131

NOTE 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.

NOTE 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-to-user	4.5.30/Q.931	Both	O (Note 2)	2-131

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

NOTE 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.

NOTE 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

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

NOTE 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-to-user	4.5.30/Q.931	Both	M	2-131

NOTE 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.

NOTE 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-to-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/Q.957.1 – Definition of operations and errors

<b>User-to-user-Signalling {ccitt recommendation q 957 user-to-user-signalling (1) operations -and errors}</b>			
<b>DEFINITIONS</b>		<b>::=</b>	
<b>BEGIN</b>			
<b>EXPORTS</b>			<b>UserUserService;</b>
<b>IMPORTS</b>			<b>OPERATION, ERROR</b>
			<b>FROM Remote-Operation-Notation</b>
			<b>{joint-iso-ccitt remote-operations (4) notations}</b>
			<b>rejectedByNetwork, rejectedByUser</b>
			<b>FROM General-Error-List</b>
			<b>{ccitt recommendation q 950 general-error-list (1)};</b>
<b>UserUserService</b>	<b>::=</b>	<b>OPERATION</b>	
		<b>ARGUMENT SEQUENCE</b>	<b>{[1] IMPLICIT Service, [2] IMPLICIT Preferred}</b>
		<b>RESULT</b>	
		<b>ERRORS</b>	<b>{rejectedByNetwork, rejectedByUser}</b>
<b>UUSRequest</b>	<b>::=</b>	<b>OPERATION</b>	
		<b>ARGUMENT SEQUENCE</b>	<b>{[1] IMPLICIT Service, [2] IMPLICIT Preferred}</b>
<b>Service</b>	<b>::=</b>	<b>INTEGER</b>	<b>{service1(1), service2(2), service3(3)} (1...3)</b>
<b>Preferred</b>	<b>::=</b>	<b>BOOLEAN</b>	<b>{preferred (TRUE), required (FALSE)}</b>
<b>userUserService</b>	<b>UserUserService</b>	<b>::=</b>	<b>localValue 1</b>
<b>uUSRequest</b>	<b>UUSRequest</b>	<b>::=</b>	<b>localValue 66</b>
<b>END</b>			

### 1.4.4.2 Coding of the UUS service operation component

See Figure 1.

Octet	8	7	6	5	4	3	2	1
6.6	Class		Form	Sequence tag				
6.7	0	0	1	1	0	0	0	0
6.8	Class		Form	Service tag				
6.8.1	1	0	0	0	0	0	0	1
6.8.2	Length Format	Length of sequence tag						
6.8.3	0	Length of service						
6.8.4	Service							
6.8.5	Class		Form	Preferred tag				
6.8.6	1	0	0	0	0	0	1	0
6.8.7	Length Format	Length preferred						
6.8.8	0	0	0	0	0	0	0	1
6.8.9	Preferred							

**Figure 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-to-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-to-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-to-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-to-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-to-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-to-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, ITU-T Rec. X.213 | ISO/IEC 8348 [6], the called user may perform compatibility checking using the User-to-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-to-user information element. The SETUP message sent by the network at the called side shall also contain a User-to-user information element if present in the SETUP message sent by the calling user.



If the called user can support the transfer of User-to-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-to-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, ITU-T Rec. X.213 | ISO/IEC 8348 [6], the called user may perform compatibility checking using the User-to-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-to-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-to-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-to-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-to-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-to-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-to-user information element shall also be returned. If there are multiple clearing messages containing causes of equal priority and User-to-user information elements, the User-to-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-to-user information elements and other clearing messages with causes of lower priority do contain User-to-user information elements, no User-to-user information element shall be sent back to the calling user. If the network does not retain User-to-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-to-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-to-user information element, the network shall deliver the User-to-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-to-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 ITU-T Rec. X.213 | ISO/IEC 8348 [6].

### **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-to-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-to-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-to-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-to-user information element in call control messages**

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

- the overall length of the User-to-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-to-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-to-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-to-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-to-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-to-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 cause #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**

When the networks serving the remote users (user B and user C) perform the procedures specified in 7.9.2.4.1/Q.952.7 [9], first paragraph, 7.9.2.5.1/Q.952.7 [9], first paragraph and 7.10.2.1/Q.952.7 [9], third paragraph, then, in addition to those procedures, any UUS service that has previously been activated shall be cancelled by the networks.

If, in this case, the remote network receives a call control message or a USER INFORMATION message with a User-to-user information element from the remote user, this UUS supplementary service related information shall be discarded by the network without any indication to the remote user.



If the transferred call is in the active state, UUS service 3 may be renegotiated by the remote users according to the procedures specified in 1.5.2.3.2.

#### **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**

###### **1.6.10.1.1 Normal operation**

Any UUI and/or request for a UUS supplementary service that is contained in the incoming call request shall be forwarded with the call.

However, as a network provider option, the forwarding of the UUI and/or UUS supplementary service request can be restricted to forwarding users who subscribe to the relevant UUS supplementary service.

If the network supports this option, and the forwarding user is not subscribed to the requested UUS supplementary service, and the calling user requested the service as required, the CFB supplementary service shall not be invoked. The network shall initiate call clearing to the calling user using cause #29, "facility rejected".

If the network supports this option, and the forwarding user is not subscribed to the requested UUS supplementary service, and the calling user requested the service as preferred or requested the service

implicitly, the network shall not forward any UUI and/or UUS supplementary service request with the forwarded call.

NOTE – In the case of explicit request, since the UUS supplementary service request is not delivered to the forwarded-to user, no response is received on the request. Consequently, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.1.4.2, 1.5.2.2.4.1 or 1.5.2.3.6.1.

If, in case of user determined user busy, the forwarding user includes UUI and/or UUS service 1 supplementary service response in one or more DISCONNECT, RELEASE or RELEASE COMPLETE messages, the UUI and/or UUS service 1 supplementary service response shall be discarded by the network without any indication to the forwarding user.

#### **1.6.10.1.2 Exceptional procedures**

No impact.

#### **1.6.10.2 Call Forwarding No Reply**

Any UUI and/or UUS supplementary service request that is contained in the incoming call request shall be delivered to the forwarding user in the SETUP message.

##### **1.6.10.2.1 Service 1 implicitly requested**

###### **1.6.10.2.1.1 Normal operation**

The implicit service 1 request (i.e. the UUI) that is contained in the incoming call request shall be forwarded with the call.

However, as a network provider option, the forwarding of the UUI can be restricted to forwarding users who subscribe to the UUS service 1 supplementary service.

If the network supports this option, and the forwarding user is not subscribed to the UUS service 1 supplementary service, and the calling user requested the service implicitly, the network shall not forward UUI with the forwarded call.

NOTE – If the forwarded-to user provides UUI together with the alerting indication, the UUI will be discarded and not delivered to the calling user.

###### **1.6.10.2.1.2 Exceptional procedures**

No impact.

##### **1.6.10.2.2 Service 1 explicitly requested**

###### **1.6.10.2.2.1 Normal operation**

If the service is requested as required, the CFNR supplementary service shall not be invoked for this call.

If the service is requested as preferred, the following procedures apply:

- if the forwarding user accepts the service request in the ALERTING message, then the service acceptance, received from the forwarding user, shall be delivered to the calling user and the CFNR supplementary service shall not be invoked for this call;
- if the forwarding user rejects the service request in the ALERTING message, then the rejection shall be delivered to the calling user and the CFNR supplementary service can be invoked. The call shall be forwarded without the UUS supplementary service request and UUI, if any;

- if the forwarding user does not include a response related to the UUS supplementary service request in the ALERTING message, then the CFNR supplementary service can be invoked. The call shall be forwarded without the UUS supplementary service request and UUI, if any.

NOTE – As the UUS supplementary service request is ignored, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.1.4.2.

#### **1.6.10.2.2.2 Exceptional procedures**

No impact.

#### **1.6.10.2.3 Service 2**

##### **1.6.10.2.3.1 Normal operation**

If the service is requested as required, the CFNR supplementary service shall not be invoked for this call.

If the service is requested as preferred, the following procedures apply:

- if the forwarding user accepts the service request in the ALERTING message, then the service acceptance, received from the forwarding user, shall be delivered to the calling user and the CFNR supplementary service shall not be invoked for this call;
- if the forwarding user rejects the service request in the ALERTING message, then the rejection shall be delivered to the calling user and the CFNR supplementary service can be invoked. The call shall be forwarded without the UUS supplementary service request;
- if the forwarding user ignores the UUS service request in the ALERTING message, then the CFNR supplementary service can be invoked. The call shall be forwarded without the UUS supplementary service request.

NOTE – As the UUS supplementary service request is ignored, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.2.4.1.

#### **1.6.10.2.3.2 Exceptional procedures**

No impact.

#### **1.6.10.2.4 Service 3**

##### **1.6.10.2.4.1 Normal operation**

Any UUS supplementary service request that is contained in the incoming call request shall be forwarded with the call.

However, as a network provider option, the forwarding of the UUS supplementary service request can be restricted to forwarding users who subscribe to the UUS service 3 supplementary service.

If the network supports this option, and the forwarding user is not subscribed to the UUS service 3 supplementary service, and the calling user requested the service as required, the network shall not invoke the CFNR supplementary service.

If the network supports this option, and the forwarding user is not subscribed to the UUS service 3 supplementary service, and the calling user requested the service as preferred or requested the service implicitly, the network shall not forward any UUI and/or UUS supplementary service request with the forwarded call.

NOTE – In this case, since the UUS service 3 supplementary service request is not given to the forwarded-to user, no response is received on the request. Consequently, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.3.6.1.

#### **1.6.10.2.4.2 Exceptional procedures**

No impact.

#### **1.6.10.3 Call forwarding unconditional**

##### **1.6.10.3.1 Normal operation**

Any UUI and/or request for a UUS supplementary service that is contained in the incoming call request shall be forwarded with the call.

However, as a network provider option, the forwarding of the UUI and/or UUS supplementary service request can be restricted to forwarding users who subscribe to the relevant UUS supplementary service.

If the network supports this option, and the forwarding user is not subscribed to the requested UUS supplementary service, and the calling user requested the service as required, the network shall not invoke the CFU supplementary service. The network shall initiate call clearing towards the calling user using the cause #29, "facility rejected".

If the network supports this option, and the forwarding user is not subscribed to the requested UUS supplementary service, and the calling user requested the service as preferred or requested the service implicitly, the network shall not forward any UUI and/or UUS supplementary service request with the forwarded call.

NOTE – In the case of explicit request, since the UUS supplementary service request is not delivered to the forwarded-to user, no response is received on the request. Consequently, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.1.4.2, 1.5.2.2.4.1 or 1.5.2.3.6.1.

##### **1.6.10.3.2 Exceptional procedures**

No impact.

#### **1.6.10.4 Call Deflection**

##### **1.6.10.4.1 Procedures at the deflecting user when deflection takes place before alerting**

If the deflecting user invokes call deflection before the ALERTING message has been received by the network, the following procedures apply.

###### **1.6.10.4.1.1 Normal operation**

Any UUI and/or UUS supplementary service request that is contained in the incoming call request shall be deflected with the call.

However, as a network provider option, the deflection of the UUI and/or UUS supplementary service request can be restricted to deflecting users who subscribe to the relevant UUS supplementary service.

If the network supports this option, and the deflecting user is not subscribed to the requested UUS supplementary service, and the calling user requested the service as required, then the CD supplementary service shall not be invoked.

If the network supports this option, and the deflecting user is not subscribed to the requested UUS supplementary service, and the calling user requested the service as preferred or requested the service implicitly, the network shall not forward any UUI and/or UUS supplementary service request with the deflected call.

NOTE – In the case of explicit request, since the UUS supplementary service request is not delivered to the deflected-to user, no response is received on the request. Consequently, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.1.4.2, 1.5.2.2.4.1 or 1.5.2.3.6.1.

#### **1.6.10.4.1.2 Exceptional procedures**

If the deflecting user invokes call deflection in a situation where this is not allowed according to the procedures specified in 1.6.10.4.1.1, the network shall reject the request for invocation using the procedures described in 5.2.3.5.2/Q.952 [8] with the error value "notAvailable".

#### **1.6.10.4.2 Procedures at the deflecting user when deflection takes place after alerting**

If the deflecting user invokes call deflection after the ALERTING message has been received by the network, the following procedures apply.

##### **1.6.10.4.2.1 Service 1 implicitly requested**

###### **1.6.10.4.2.1.1 Normal operation**

The implicit service 1 request (i.e. the UUI) that is contained in the incoming call request shall be deflected with the call.

However, as a network provider option, the deflection of the UUI can be restricted to deflecting users who subscribe to the UUS service 1 supplementary service.

If the network supports this option, and the forwarding user is not subscribed to the UUS service 1 supplementary service, and the calling user requested the service implicitly, the network shall not forward any UUI with the deflected call.

NOTE – If the deflected-to user provides UUI together with the alerting indication, the UUI will be discarded and not delivered to the calling user.

###### **1.6.10.4.2.1.2 Exceptional procedures**

No impact.

##### **1.6.10.4.2.2 Service 1 explicitly requested**

###### **1.6.10.4.2.2.1 Normal operation**

If the service is requested as required, the CD supplementary service shall not be invoked for this call.

If the service is requested as preferred, the following procedures apply:

- if the deflecting user accepts the service request in the ALERTING message, then the service acceptance, received from the deflecting user, shall be delivered to the calling user and the CD supplementary service shall not be invoked for this call;
- if the deflecting user rejects the service request in the ALERTING message, then the rejection shall be delivered to the calling user and the CD supplementary service can be invoked. The call shall be deflected without the UUS supplementary service request and UUI, if any;
- if the deflecting user does not include a response related to the UUS supplementary service request in the ALERTING message, then the CD supplementary service can be invoked. The call shall be deflected without the UUS supplementary service request and UUI, if any.

NOTE – As the UUS supplementary service request is ignored, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.1.4.2.

#### **1.6.10.4.2.2 Exceptional procedures**

If the deflecting user invokes call deflection in a situation where this is not allowed according to the procedures specified in 1.6.10.4.2.2.1, the network shall reject the request for invocation using the procedures described in 5.2.3.5.2/Q.952 [8] with the error value "notAvailable".

#### **1.6.10.4.2.3 Service 2**

##### **1.6.10.4.2.3.1 Normal operation**

If the service is requested as required, the CD supplementary service shall not be invoked for this call.

If the service is requested as preferred, the following procedures apply:

- if the deflecting user accepts the service request in the ALERTING message, then the service acceptance, received from the deflecting user, shall be delivered to the calling user and the CD supplementary service shall not be invoked for this call;
- if the deflecting user rejects the service request in the ALERTING message, then the rejection shall be delivered to the calling user and the CD supplementary service can be invoked. The call shall be deflected without the UUS supplementary service request;
- if the deflecting user ignores the UUS service request in the ALERTING message, then the CD supplementary service can be invoked. The call shall be deflected without the UUS supplementary service request.

NOTE – As the UUS supplementary service request is ignored, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.2.4.1.

##### **1.6.10.4.2.3.2 Exceptional procedures**

If the deflecting user invokes call deflection in a situation where this is not allowed according to the procedures specified in 1.6.10.4.2.3.1, the network shall reject the request for invocation using the procedures described in 5.2.3.5.2/Q.952 [8] with the error value "notAvailable".

#### **1.6.10.4.2.4 Service 3**

##### **1.6.10.4.2.4.1 Normal operation**

A UUS supplementary service request that is contained in the incoming call request shall be deflected with the call.

However, as a network provider option, the deflection of the UUS supplementary service request can be restricted to deflecting users who subscribe to the UUS service 3 supplementary service.

If the network supports this option, and the deflecting user is not subscribed to the UUS service 3 supplementary service, and the calling user requested the service as required, the CD supplementary service shall not be invoked.

If the network supports this option, and the deflecting user is not subscribed to the UUS service 3 supplementary service, and the calling user requested the service as preferred, the network shall not forward the UUS service 3 supplementary service request with the deflected call.

NOTE – In this case, since the UUS service 3 supplementary service request is not given to the deflected-to user, no response is received on the request. Consequently, the network will reject the UUS supplementary service request towards the calling user according to the procedures specified in 1.5.2.3.6.1.

#### **1.6.10.4.2.4.2 Exceptional procedures**

If the deflecting user invokes call deflection in a situation where this is not allowed according to the procedures specified in 1.6.10.4.2.3.1, the network shall reject the request for invocation using the procedures described in 5.2.3.5.2/Q.952 [8] with the error value "notAvailable".

#### **1.6.10.5 Partial rerouting**

When a private network invokes the partial rerouting, the private network sends a FACILITY message to the public network including a CallRerouting invoke component according to the procedures specified in 7.2.5/Q.952 [8].

If the private network wants to divert a request for the implicitly requested UUS service 1 supplementary service along with the call, the private network shall include the UUI in the q931InfoElement parameter contained in the CallRerouting invoke component.

When the public network receives the UUI in the CallRerouting invoke component, it shall include the UUI in the call request towards the diverted-to user.

If the private network wants to divert a request for an explicitly requested UUS supplementary service along with the call, the private network shall send the UUSRequest invoke component to the public network. In order to associate the UUSRequest invoke component with the call to be diverted, the private network shall include the UUSRequest invoke component in the same FACILITY message that contains the CallRerouting component.

The UUSRequest invoke component shall include:

- in the Service parameter, the type of UUS supplementary service, i.e. service 1 (value "service1"), service 2 (value "service2") or service 3 (value "service3");
- in the Preferred parameter, whether the UUS supplementary service request is preferred (value "TRUE") or required (value "FALSE").

In addition, in the case of explicitly requested service 1, the UUI, if any, shall be included in the q931InfoElement parameter contained in the CallRerouting invoke component.

When the public network receives the UUSRequest invoke component, it shall include the request for the UUS supplementary service in the call request towards the diverted-to user.

NOTE 1 – It is the responsibility of the private network to ensure that the interaction between the relevant diversion supplementary service and the relevant UUS supplementary service is appropriate.

If the private network does not want to divert an explicit request for the UUS supplementary service, the UUSRequest invoke component shall not be sent to the public network. If the public network does not receive a UUSRequest invoke component, it shall not include an explicit request for the UUS supplementary service in the call request towards the diverted-to user.

NOTE 2 – If, in this case, the calling user has not received a response to the UUS request, the network will reject the UUS supplementary service request since no request is sent to the diverted-to user.

#### **1.6.11 Line Hunting**

No applicable interaction at this time.

#### **1.6.12 Three-Party Service**

No impact.

## **1.6.13 User-to-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**

### **1.6.18.1 Normal operation**

If the served user of the UUS supplementary service requests the TP supplementary service while UUS service 3 is active, then the network shall acknowledge this request by sending a SUSPEND ACKNOWLEDGE message to the user. The network shall maintain the flow control procedure, i.e. timer T shall continue to run. Any CONGESTION CONTROL message which should have been sent to the user while the call is suspended shall be sent when the call is resumed.

### **1.6.18.2 Exceptional procedures**

If the network receives a request for the TP supplementary service after having received a request for the UUS service 3 supplementary service but having not yet responded to that request, then the network shall reject the request for the TP supplementary service by sending a SUSPEND REJECT message with cause #29, "facility rejected", to the user.

If the remote network (i.e. the network of the user who has activated the TP supplementary service) receives a request for activating the UUS service 3 supplementary service from the network serving the UUS user, then the remote network shall reject this request towards the network serving the UUS user. This network shall then reject the UUS 3 request by sending a return error component in a FACILITY message to the served user of the UUS supplementary service, indicating the error value "rejectedByNetwork".

NOTE – The current ISUP procedures can only convey one type of reject indication for UUS service 3 from the remote network side to the originating network side. This reject indication is indicated to the originating user as the error value "rejectedByUser". Consequently, if the remote network rejects a request for UUS service 3 while the remote user is suspended, the served user of the UUS supplementary service will receive the error value "rejectedByUser" and not "rejectedByNetwork".



### **1.6.19 Completion of Calls to Busy Subscriber**

No applicable interactions at this time.

### **1.6.20 Malicious Call Identification**

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-to-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-to-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-to-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-to-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

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- [1] ITU-T Recommendation Q.931 (1993), *ISDN user-network interface layer 3 specification for basic call control*.
- [2] ITU-T Recommendation Q.932 (1993), *Generic procedures for the control of ISDN supplementary services*.
- [3] ITU-T Recommendation I.257.1 (1995), *Additional information transfer supplementary services: User-User Signalling*.
- [4] CCITT Recommendation X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1)*.
- [5] CCITT Recommendation X.219 (1988) *Remote operations: Model, notation and service definitions*.
- [6] ITU-T Recommendation X.213 (1995), *Information technology – Open Systems Interconnection: Network service definition*.
- [7] ITU-T Recommendation Q.954.1 (1993), *Stage 3 description for multiparty supplementary services using DSS 1 – Conference calling*.

- [8] ITU-T Recommendation Q.952 (1993), *Stage 3 service description for call offering supplementary services using DSS 1 – Diversion supplementary service.*
- [9] ITU-T Recommendation Q.952.7<sup>1</sup>, *Stage 3 service description for call offering supplementary services using DSS 1 – Explicit call transfer.*

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<sup>1</sup> Presently at the stage of draft.

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