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European Standard (Telecommunications series)

**Integrated Services Digital Network (ISDN);
User Signalling Bearer Service (USBS);
Digital Subscriber Signalling System No. one (DSS1) protocol;
Part 1: Protocol specification**



European Telecommunications Standards Institute

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ETSI Secretariat

Postal address

F-06921 Sophia Antipolis Cedex - FRANCE

Office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16
Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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c= fr; a=atlas; p=etsi; s=secretariat

Internet

secretariat@etsi.fr
<http://www.etsi.fr>

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocols and Switching (SPS), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure (TAP).

The present document is part 1 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) User Signalling Bearer Service (USBS), as described below:

Part 1: "Protocol specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";

Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 5: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network";

Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".

In accordance with CCITT Recommendation I.130 [1], the following three level structure is used to describe the telecommunications services as provided by European public telecommunications operators under the pan-European Integrated Digital Network (ISDN):

- Stage 1: is an overall service description, from the user's standpoint;
- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and
- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

This EN details the stage 3 aspect (signalling system protocols and switching functions) to support the user signalling bearer service. The stage 1 is detailed in ETS 300 716 [11]; it has been decided that no stage 2 is required for this service.

The protocol supporting the user signalling bearer service is based on the basic call protocol specified in ETS 300 403-1 [2] and therefore references are made to that standard, where appropriate, instead of repeating text.

The USBS is different from, and should not be confused with, the user-to-user signalling supplementary service. The user-to-user signalling supplementary service is used in conjunction with a circuit switched telecommunications service.

Furthermore, the USBS makes use of the DSS1 protocol for connection establishment and exchange of information, and is therefore not to be confused with the packet mode bearer service on the D-channel which makes use of the X.25 layer 3 protocol.

Proposed national transposition dates

Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

1 Scope

The present document specifies the stage three of the User Signalling Bearer Service (USBS) for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators at the T reference point or coincident S and T reference point (as defined in CCITT Recommendation I.411 [3] by means of the Digital Subscriber Signalling System No. one (DSS1). Stage three identifies the protocol procedures and switching functions needed to support a telecommunications service (see CCITT Recommendation I.130 [1]).

In addition, the present document specifies the protocol requirements at the T reference point where the service is provided to the user via an intermediate private ISDN.

The present document does not specify the additional protocol requirements where the service is provided to the user via a telecommunications network that is not an ISDN.

The USBS provides the unrestricted transfer (without alteration) of user information, on the D-channel of the user access, in a packetized manner over a virtual circuit between reference points via the basic and primary rate access. Each of the reference points can be either a T reference point or coincident S and T reference point.

Further part(s) of the present document specify the method of testing required to identify conformance to the present document.

The present document is applicable to equipment supporting the USBS, to be attached at either side of a T reference point or coincident S and T reference point when used as an access to the public ISDN.

2 References

References may be made to:

- a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or
- b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or
- c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or
- d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] CCITT Recommendation I.130 (1988): "Methods for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [2] ETS 300 403-1 (1995): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for the basic call control".
- [3] CCITT Recommendation I.411 (1988): "ISDN user-network interfaces Reference configurations".
- [4] CCITT Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".
- [5] ETS 300 286-1 (1996): "Integrated Services Digital Network (ISDN); User-to-User Signalling (UUS) supplementary services. Digital Subscriber Signalling System No. one (DSS1) protocol".
- [6] ETS 300 196-1 (1993): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services".
- [7] ETS 300 402-1 (1995): "Integrated Services Digital Network (ISDN); User-network interface data link layer specification; Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441".

- [8] ETS 300 403-2 (1995): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1); Specification and Description Language (SDL) for signalling-network layer protocol for circuit-mode basic call control".
- [9] CCITT Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".
- [10] CCITT Recommendation X.219 (1988): "Remote operations: Model, notation and service definition".
- [11] ETS 300 716: "Integrated Services Digital Network (ISDN); User Signalling Bearer Service (USBS); Service description".

3 Definitions

For the purposes of the present document, the following definitions apply:

Bearer service: See CCITT Recommendation I.112 [4] § 2.2, definition 202.

Integrated Services Digital Network (ISDN): See CCITT Recommendation I.112 [4] § 2.3 definition 308.

Network: The DSS1 protocol entity at the network side of the user-network interface.

Network determined user busy: A condition for an incoming call where the maximum number of USBS calls has been reached.

Receiving entity: An entity receiving USER INFORMATION messages.

Service Data Unit (SDU): Information whose content is preserved from the sending user to the receiving user; contained in a User-user information element carried by a USER INFORMATION message.

Sending entity: An entity sending USER INFORMATION messages.

Served user: The user which invokes the USBS.

Service; telecommunications service: See CCITT Recommendation I.112 [4] § 2.2 definition 201.

User: The DSS1 protocol entity at the user side of the user-network interface when a coincident S and T reference point applies.

4 Abbreviations

For the purposes of the present document, the following abbreviations apply:

DSS1	Digital Subscriber Signalling System No. one
ISDN	Integrated Services Digital Network
MSN	Multiple Subscriber Number
SDU	Service Data Unit
USBS	User Signalling Bearer Service

5 Description

The USBS allows users to exchange information, Service Data Units (SDUs), on virtual packet-mode connections established on the D-channel. No circuit-mode B-channel connection is involved in this bearer service.

The connection is established on a per call basis from an originating user to a destination user identified by an ISDN number. When the connection is established, the users can exchange SDUs by using USER INFORMATION messages as defined within the DSS1 layer 3 protocol.

SDUs are passed transparently through the network. The probability of SDUs being delivered in sequence is expected to be high and the probability of mutilation or duplication is expected to be very low. However, the network does not provide mechanisms that guarantee recovery in the case of loss of SDUs.

NOTE: Such mechanisms should be part of end-to-end high layer protocols.

SDUs transmitted by this bearer service are limited to 252 octets.

As a network option, the USBS can be provided as a preregistered on demand mode. In this case the destination number of the USBS call is registered in the network. The size of the list of preregistered numbers is a network option.

Limitation is placed on the number of SDUs a user is permitted to transfer in a given time period and also on the maximum allowable number of simultaneous USBS calls per D-channel.

Furthermore, the network provides a congestion control mechanism.

6 Operational requirements

6.1 Provision and withdrawal

The service either shall be provided on a subscription basis or, as a network option, may be generally available on basic or primary rate accesses.

If subscription to the service is required, both users shall subscribe to the service.

The service may be withdrawn at the request of the customer or for administrative reasons.

Table 1 summarises the network options that have impact on the DSS1 protocol.

NOTE: Further network options related to service issues may be part of stage 1.

Table 1: Network options

Network option	Value
Provision applicability	Whole access ISDN number basis Both (note)
Maximum number of simultaneous USBS calls (incoming and outgoing) per D-channel (see subclause 9.1.1)	No limitation Maximum number
Preregistered on demand mode applicable (see subclauses 9.1.1, 9.1.2 and 9.1.3)	Yes No
Size of list of preregistered numbers	Number
Congestion control timer T1-USBS	Timer value (maximum 15 minutes)
NOTE: If the network option has the value "Both", the provision applicability is a subscription option (see table 2).	

Table 2 summarises the subscription options.

Table 2: Subscription options

Subscription option	Value
Subscribed provision	Whole access ISDN number basis

6.2 Requirements at the originating network side

The requirements at the originating network side are covered in clause 9.

6.3 Requirements at the destination network side

The requirements at the destination network side are covered in clause 9.

7 Coding requirements

7.1 Definition of messages

Table 3 summarises the messages for the USBS.

Table 3: Messages for the USBS

Message type	Reference
Call establishment messages:	
ALERTING	7.1.1
CALL PROCEEDING	7.1.2
CONNECT	7.1.3
CONNECT ACKNOWLEDGE	7.1.4
SETUP	7.1.13
SETUP ACKNOWLEDGE	7.1.14
Information transfer phase messages:	
USER INFORMATION	7.1.17
Call clearing messages:	
RELEASE	7.1.8
RELEASE COMPLETE	7.1.9
Miscellaneous messages:	
FACILITY	7.1.5
INFORMATION	7.1.6
NOTIFY	7.1.7
RESTART	7.1.10
RESTART ACKNOWLEDGE	7.1.11
SEGMENT	7.1.12
STATUS	7.1.15
STATUS ENQUIRY	7.1.16

7.1.1 ALERTING

The ALERTING message specified in subclause 3.1.1 of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) the Bearer capability information element is not applicable;
- b) the Channel identification information element is not applicable;
- c) the Progress indicator information element is not applicable;
- d) the High layer compatibility information element is not applicable.

7.1.2 CALL PROCEEDING

The CALL PROCEEDING message specified in subclause 3.1.2 of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) the Bearer capability information element is not applicable;
- b) the Channel identification information element is not applicable;
- c) the Progress indicator information element is not applicable;
- d) the High layer compatibility information element is not applicable.

7.1.3 CONNECT

The CONNECT message specified in subclause 3.1.3 of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) the Bearer capability information element is not applicable;
- b) the Channel identification information element is not applicable;
- c) the Progress indicator information element is not applicable;
- d) the High layer compatibility information element is not applicable;
- e) the Low layer compatibility information element is not applicable.

7.1.4 CONNECT ACKNOWLEDGE

The CONNECT ACKNOWLEDGE message specified in subclause 3.1.4 of ETS 300 403-1 [2] shall apply.

7.1.5 FACILITY

The FACILITY message specified in subclause 11.1.1.1 of ETS 300 196-1[6] shall apply.

7.1.6 INFORMATION

The INFORMATION message specified in subclause 3.1.6 of ETS 300 403-1 [2] shall apply.

7.1.7 NOTIFY

The NOTIFY message specified in subclause 3.1.7 of ETS 300 403-1 [2] shall apply.

7.1.8 RELEASE

This message is sent by the user to request the network to clear the end-to-end connection or is sent by the network to indicate that the end-to-end connection is cleared.

The message structure specified in subclause 3.1.9, table 3.10 of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) the significance is "global";
- b) the Cause information element is mandatory.

7.1.9 RELEASE COMPLETE

This message is sent by the user or the network to indicate that the entity sending the message has released the call reference and the receiving entity has released the call reference.

The message structure specified in subclause 3.1.10, table 3.11 of ETS 300 403-1 [2] shall apply.

7.1.10 RESTART

The RESTART message specified in subclause 3.4.1 of ETS 300 403-1 [2] shall apply with the exception that the Channel identification information element is not applicable.

7.1.11 RESTART ACKNOWLEDGE

The RESTART ACKNOWLEDGE message specified in subclause 3.4.2 of ETS 300 403-1 [2] shall apply with the exception that the Channel identification information element is not applicable.

7.1.12 SEGMENT

The SEGMENT message specified in subclause 3.5.1 of ETS 300 403-1 [2] shall apply.

7.1.13 SETUP

The SETUP message specified in subclause 3.1.14 of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) ETSI note 2 is not applicable;
- b) the Channel identification information element is applicable in the user-to-network direction only and is mandatory;
- c) the Progress indicator information element is not applicable;
- d) the Low layer compatibility information element is not applicable.

7.1.14 SETUP ACKNOWLEDGE

The SETUP ACKNOWLEDGE message specified in subclause 3.1.15 of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) the Channel identification information element is not applicable;
- b) the Progress indicator information element is not applicable.

7.1.15 STATUS

The STATUS message specified in subclause 3.1.16 of ETS 300 403-1 [2] shall apply.

7.1.16 STATUS ENQUIRY

The STATUS ENQUIRY message specified in subclause 3.1.17 of ETS 300 403-1 [2] shall apply.

7.1.17 USER INFORMATION

The USER INFORMATION message specified in subclause 7.2.1 of ETS 300 286-1 [5] shall apply with the exception that the User-user information element shall have a maximum length of 255 octets.

7.2 Definition of information elements

The general message format and information element coding specified in ETS 300 403-1 [2], clause 4 and subclauses 4.1, 4.2, 4.3 and 4.4 shall apply.

The coding rules specified in subclause 4.5.1 of ETS 300 403-1 [2] shall apply with the exception that table 4 shall replace table 4.3 of ETS 300 403-1 [2] concerning the applicable information elements.

The extensions of codesETS and the shift procedures specified in subclauses 4.5.2, 4.5.3 and 4.5.4 shall apply.

The information elements listed in table 4 shall be structured as specified in the indicated references.

Table 4: Information elements

Information element	Reference
Bearer capability	ETS 300 403-1 [2], 4.5.5
Call state	ETS 300 403-1 [2], 4.5.7
Called party number	ETS 300 403-1 [2], 4.5.8
Called party subaddress	ETS 300 403-1 [2], 4.5.9
Calling party number	ETS 300 403-1 [2], 4.5.10
Calling party subaddress	ETS 300 403-1 [2], 4.5.11
Cause	ETS 300 403-1 [2], 4.5.12
Channel identification	ETS 300 403-1 [2], 4.5.13
Date/time	ETS 300 403-1 [2], 4.5.15
Display	ETS 300 403-1 [2], 4.5.16
Facility	ETS 300 196-1 [6], 11.2.2.1
High layer compatibility	ETS 300 403-1 [2], 4.5.17
Keypad facility	ETS 300 403-1 [2], 4.5.18
More data	ETS 300 286-1 [5], 7.3.2
Network-specific facilities	ETS 300 403-1 [2], 4.5.21
Notification indication	ETS 300 403-1 [2], 4.5.22 and ETS 300 196-1 [6], 11.2.2.2
Restart indicator	ETS 300 403-1 [2], 4.5.25
Segmented message	ETS 300 403-1 [2], 4.5.26
Sending complete	ETS 300 403-1 [2], 4.5.27
Transit network selection	ETS 300 403-1 [2], 4.5.28
User-user	ETS 300 286-1 [5], 7.3.3

7.3 Coding of the Facility information element components

Table 5 shows the definitions of the operations and errors required for the USBS using ASN.1 as specified in CCITT Recommendation X.208 [9] and using the OPERATION and ERROR macro as defined in figure 4/X.219 of CCITT Recommendation X.219 [10].

The formal definition of the component types to encode these operations and errors is provided in ETS 300 196-1 [9], annex D, clause D.1.

The inclusion of components in Facility information elements is defined in ETS 300 196-1 [9], subclause 11.2.2.1.

All components (invoke, return result, return error and reject) shall be included within a Facility information element. This Facility information element may be included in appropriate message as specified in ETS 300 196-1 [9], subclause 11.2.2.1, unless a more restrictive specification is given in clause 9.

Table 5: Definition of operations and errors for USBS

```

User-Signalling-Bearer-Service-Operations-and-Errors {ccitt identified-organization etsi(0) xxx operations-and-errors(1)}
DEFINITIONS EXPLICIT TAGS::=
BEGIN
EXPORT      FlowControl,
             CongestionControl;
IMPORTS     OPERATION, ERROR
            FROM Remote-Operation-Notation
             {joint-iso-ccitt remote-operations(4) notation(0)};
FlowControl ::= OPERATION
             ARGUMENT ENUMERATED {
               FlowRestricted (0),
               FlowUnrestricted (1)}
CongestionControl ::= OPERATION
                  ARGUMENT ENUMERATED {
                    Congestion (0),
                    CongestionRecovered (1)}
uSBSOID OBJECT IDENTIFIER ::= {ccitt identified-organization etsi(0) xxx operations-and-errors(1)}
flowControl      FlowControl      ::= globalValue {uSBSOID 1}
congestionControl CongestionControl ::= globalValue {uSBSOID 2}

```

8 State definition

The user side call states defined in subclause 2.1.1 of ETS 300 403-1 [2] shall apply, except the following call states:

- Disconnect request (U11);
- Disconnect indication (U12);
- Suspend request (U15); and
- Resume request (U17).

The network side call states defined in subclause 2.1.2 of ETS 300 403-1 [2] shall apply, except the following call states:

- Disconnect request (N11);
- Disconnect indication (N12);
- Suspend request (N15); and
- Resume request (N17).

The call states associated with the global call reference as defined in subclause 2.4 of ETS 300 403-1 [2] shall apply.

9 Signalling procedures at the coincident S and T reference point

To establish a USBS connection, layer 3 signalling procedures based on the basic call signalling procedures specified in ETS 300 403-1 [2] shall be used.

When a USBS connection is established between the users, SDUs can be transferred within USER INFORMATION messages which make use of the same call reference as the call establishment messages.

Layer 3 shall make use of the layer 2 Service Access Point (SAP) identified by the Service Access Point Identifier (SAPI) = 0.

9.1 Call establishment at the originating interface

Before a USBS call can be established, the user shall establish a data link connection to the network according to the procedures described in ETS 300 402 [7]. After successful establishment, all layer 3 messages shall be sent to the data link layer using the DL-DATA-REQUEST primitive.

9.1.1 Call request

The procedures of ETS 300 403-1 [2] subclause 5.1.1 shall apply with the following exceptions:

- a) the Bearer capability information element shall be encoded according to table 6;
- b) the Channel identification information element shall be encoded according to table 7;
- c) the procedures related to the handling of B-channels are not applicable;
- d) if the user knows that the maximum number of USBS calls has been reached, it shall not send a SETUP message to the network. If a user having no such knowledge sends a SETUP message and the maximum number of USBS calls has been reached, the network shall respond with a RELEASE COMPLETE message with cause #47 "resources unavailable, unspecified".

Table 6: Coding of the Bearer capability information element

Octet	Information element field	Field value
3	Coding standard	CCITT standardised coding
3	Information transfer capability	unrestricted digital information
4	Transfer mode	packet mode
4	Information transfer rate	00000: packet
5	User information layer 1 protocol	----- note
6	User information layer 2 protocol	Recommendation Q.921
7	User information layer 3 protocol	Recommendation Q.931

NOTE: Octet 5 shall not be included.

Table 7: Coding of the Channel identification information element

Octet	Information element field	Field value
3	Interface identifier present	interface implicitly identified
3	Interface type	basic interface or other interface
3	Preferred/exclusive	exclusive
3	D-channel indicator	D-channel
3	Information channel selection	No channel

In addition, if the network option "preregistered on demand mode" is set to "yes", the Called party number information element shall contain an ISDN number which is preregistered in the network.

9.1.2 Overlap sending

The procedures of ETS 300 403-1 [2] subclause 5.1.3 shall apply with the following exceptions:

- a) procedures related to the sending of dial tone are not applicable;
- b) the inclusion of the Progress indication information element is not applicable.

In addition, if the network option "preregistered on demand mode" is set to "yes", the Called party number information element shall contain an ISDN number which is preregistered in the network.

9.1.3 Invalid call information

The procedures of ETS 300 403-1 [2] subclause 5.1.4 shall apply.

In addition, if the network option "preregistered on demand mode" is set to "yes" and the user indicates an ISDN number which is not preregistered, the network shall reject the call request with cause #1 "unassigned (unallocated) number".

Furthermore, before accepting the call request, the network shall check whether provision to USBS applies on the whole access (i.e. the network option "Provision applicability" is set to "whole access" or set to "both" in conjunction with the subscription option "Subscribed provision" set to "whole access") or on an ISDN number basis (i.e. the network option "Provision applicability" is set to "ISDN number basis" or set to "both" in conjunction with the subscription option "Subscribed provision" set to "ISDN number basis"):

- a) if the subscription applies on the whole access, the network shall accept the call request;
- b) if subscription applies on an ISDN number basis and MSN is not provided to the access, the network shall accept the call request;
- c) if subscription applies on an ISDN number basis and MSN is provided to the access, two cases exist:
 - 1) if the SETUP message contains a Calling party number information element indicating a calling party number for which subscription applies, the network shall accept the call request;
 - 2) if the SETUP message contains a Calling party number information element indicating a calling party number for which subscription does not apply, or if a Calling party number information element is not included, the network shall reject the call request with cause #57 "bearer capability not authorized".

9.1.4 Call proceeding

The procedures of ETS 300 403-1 [2] subclause 5.1.5 shall apply with the exception that note 2 of subclause 5.1.5.1 and note 3 of subclause 5.1.5.2 are not applicable.

9.1.5 Call confirmation indication

The procedure of ETS 300 403-1 [2] subclause 5.1.7 shall apply with the following exceptions:

- a) procedures related to the sending of in-band ringing tone are not applicable;
- b) procedures related to the handling of B-channels are not applicable.

9.1.6 Call connected

The procedures of ETS 300 403-1 [2] subclause 5.1.8 shall apply with the exception that the procedures related to the handling of ringing tone are not applicable.

9.1.7 Call rejection

The procedures of ETS 300 403-1 [2] subclause 5.1.9 shall apply.

9.1.8 Transit network selection

The procedures of ETS 300 403-1 [2] subclause 5.1.10 shall apply with the following exception that reference to annex C of ETS 300 403-1 [2] shall be replaced by reference to annex C of the present document.

9.2 Call establishment at the destination interface

9.2.1 Incoming call

The procedures of ETS 300 403-1 [2] subclause 5.2.1 shall apply with the following exceptions:

- a) the procedures related to the handling of B-channels are not applicable;
- b) the network shall not send the SETUP message to the user if the maximum number of USBS calls has been reached. In this case, the network shall consider the user as network determined user busy.

9.2.2 Compatibility checking

The procedures of ETS 300 403-1 [2] subclause 5.2.2 shall apply with the exception that reference to annex B of ETS 300 403-1 [2] shall be replaced by reference to annex B of the present document.

9.2.3 Overlap receiving

The procedures of ETS 300 403-1 [2] subclause 5.2.4 shall apply with the exception that reference to annex B of ETS 300 403-1 [2] shall be replaced by reference to annex B of the present document.

9.2.4 Call confirmation

The procedures of ETS 300 403-1 [2] subclause 5.2.5 shall apply with the following exceptions:

- the DISCONNECT message shall be replaced by the RELEASE message and call clearing shall occur according to subclause 9.4;
- reference to annex B of ETS 300 403-1 [2] shall be replaced by reference to annex B of the present document.

9.2.5 Call accept

The procedures of ETS 300 403-1 [2] subclause 5.2.7 shall apply with the exception that procedures related to handling of B-channels are not applicable.

9.2.6 Active indication

The procedures of ETS 300 403-1 [2] subclause 5.2.8 shall apply with the following exceptions:

- a) the procedures related to the handling of B-channels and to circuit switched paths/connections are not applicable;
- b) when the called user has sent the CONNECT message to the network, the information transfer path is available.

9.2.7 Non selected user clearing

The procedures of ETS 300 403-1 [2] subclause 5.2.9 shall apply.

9.3 Information transfer

9.3.1 Transfer of SDUs

9.3.1.1 Normal operation

When the USBS connection is established, the users can exchange information using the D-channel by including SDUs in User-user information elements contained in USER INFORMATION messages.

The More data information element may also be included in the USER INFORMATION message by the sending user to indicate to the receiving user that another USER INFORMATION message containing a SDU belonging to the same block will follow. The use of the More data information element is not supervised by the network; in particular, integrity of fragmented blocks using this procedure is not guaranteed.

Each SDU can have a maximum length of 252 octets.

9.3.1.2 Exceptional procedures

If the network receives a USER INFORMATION message with a User-user information element exceeding 255 octets, the network shall discard the USER INFORMATION message and send a STATUS message with cause #43 "access information discarded" to the user.

9.3.2 Flow control

The network shall limit the flow of USER INFORMATION messages in both directions within a given time period.

The flow control shall be managed by the network and shall apply for each individual USBS connection established on the D-channel. It shall restrict the maximum throughput to approximately 1,6 kbit/s in each direction.

9.3.2.1 Normal operation

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 T2-UUS3 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 $Y = 8$.

If the network within the period T3-USBS 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 FACILITY message including a Facility information element with a FlowControl invoke component indicating "FlowRestricted", according to the procedures in subclause 8.3.1.1 of ETS 300 196-1 [9]. 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 T3-USBS expires) then, if a USER INFORMATION message has been discarded due to that restriction, a FACILITY message including a Facility information element with a FlowControl invoke component indicating "FlowUnrestricted", according to the procedures in subclause 8.3.1.1 of ETS 300 196-1 [9]. If no USER INFORMATION has been discarded no indication shall be sent.

9.3.2.2 Exceptional procedures

If the network receives a reject component, no protocol action shall be taken.

9.3.3 Congestion control

The network shall use a congestion control mechanism to restrict the flow of USER INFORMATION messages received from the user to a limit less than the one provided by the flow control mechanism, when it encounters congestion. Consequently, the congestion control overrides the flow control. In addition, the user shall restrict the flow of USER

INFORMATION messages received from the network when it encounters congestion by making use of the same congestion control mechanism.

9.3.3.1 Normal operation

If the receiving entity encounters congestion it shall send a FACILITY message including a Facility information element with a CongestionControl invoke component indicating "Congestion", according to the procedures in subclause 8.3.1.1 of ETS 300 196-1 [9], and start timer T1-USBS. If the receiving entity is the network, congestion may be encountered due to local congestion or due to a congestion indication received from the remote network.

When the sending entity receives the "Congestion" indication, it shall suspend the sending of USER INFORMATION messages and start timer T2-USBS. If the sending entity is the network, an indication of congestion shall be sent to the remote network.

When the receiving entity recovers from congestion and wants to continue the receiving of USER INFORMATION messages, the entity shall send a FACILITY message including a Facility information element with a CongestionControl invoke component indicating "CongestionRecovered", according to the procedures in subclause 8.3.1.1 of ETS 300 196-1 [9]. Timer T1-USBS shall continue to run.

When the sending entity receives the "CongestionRecovered" indication, it shall stop timer T2-USBS and may resume the sending of USER INFORMATION messages. If the sending entity is the network, an indication of recovery shall be sent to the remote network.

If the receiving entity receives a USER INFORMATION message after having sent a "CogestionRecovered" indication but before timer T1-USBS expires, it shall stop timer T1-USBS.

If timer T1-USBS expires, because no USER INFORMATION message has been received after recovery from congestion, no action shall be taken.

9.3.3.2 Exceptional procedures

If the receiving entity has indicated "Congestion" and receives a USER INFORMATION messages before timer T1-USBS expires, it shall respond with a FACILITY message including a Facility information element with a CongestionControl invoke component indicating "Congestion", according to the procedures in subclause 8.3.1.1 of ETS 300 196-1 [9]. If the receiving entity is the network, the received USER INFORMATION message shall be retained until the receiving entity recovers from congestion, and then be passed to the remote end. Subsequent received USER INFORMATION messages shall be discarded without any indication to the other entity. If the receiving entity is the user, the received USER INFORMATION messages shall be discarded.

If the sending entity does not receive a "CongestionRecovered" indication before timer T2-USBS expires, it may attempt to resume the sending of USER INFORMATION messages.

If the receiving entity receives a USER INFORMATION message after timer T1-USBS has expired, it shall respond with a FACILITY message including a Facility information element with a CongestionControl invoke component indicating "Congestion" if congestion still exists or "No Congestion" if congestion no longer exists. The procedures in subclause 8.3.1.1 of ETS 300 196-1 [9] shall be followed. If congestion still exists, the received USER INFORMATION message shall be discarded.

9.4 Call clearing

Clearing of a USBS connection can be initiated by either user.

The clearing shall be initiated by sending a RELEASE message.

9.4.1 Exception conditions

The procedures of ETS 300 403-1 [2] subclause 5.3.2 shall apply with the exception that items d) and f) are not applicable.

9.4.2 Clearing initiated by the user

The user shall initiate clearing by sending a RELEASE message to the network. The clearing procedure followed is the same as specified in ETS 300 403-1 [2] subclause 5.3.4.2.

9.4.3 Clearing initiated by the network

The network shall initiate clearing by sending a RELEASE message to the user. The clearing procedure followed is the same as specified in ETS 300 403-1 [2] subclause 5.3.3.

9.4.4 Absence of response during call clearing

If the entity which sent the RELEASE message has not received a RELEASE COMPLETE message when timer T308 expires the first time, the RELEASE message shall be retransmitted and timer T308 restarted.

If the entity which sent the RELEASE message has not received a RELEASE COMPLETE message when timer T308 expires the second time, the entity shall release the call reference and enter the Null (N0, U0) state. The user or the network may use the restart procedures specified in subclause 9.5 taking into consideration other usage of the interface.

9.5 Restart procedure

The restart procedure may be used by the user or the network to return a USBS connection to the Null (N0, U0) state. For a specific interface, a USBS connection can be restarted only if the entire interface is restarted.

NOTE: The restart of a USBS connection will imply that all connections on that interface (e.g. circuit switched connections and other D-channel based signalling connections) will be restarted.

9.5.1 Sending RESTART message

The procedures of ETS 300 403-1 [2] subclause 5.5.1 shall apply with the following exceptions:

- a) the RESTART message shall contain a Restart indicator information element indicating "single interface" or "all interfaces";
- b) the entity sending the RESTART message shall release the call reference for reuse and enter the Null (N0, U0) state for all USBS connections related to that interface.

9.5.2 Receipt of RESTART message

The procedures of ETS 300 403-1 [2] subclause 5.5.2 shall apply with the following exceptions:

- a) the entity receiving a RESTART message with the Restart indicator information element indicating "single interface" or "all interfaces" shall release the call reference for reuse and enter the Null (N0, U0) state for all USBS connections related to that interface.

NOTE: The entity receiving the RESTART message will respond according to the handling of restart of B-channels specified in ETS 300 403-1, subclause 5.5. This implies that it is not possible explicitly to indicate in the RESTART ACKNOWLEDGE message if the USBS connections are restarted.

9.5.3 Restart error handling procedures

The procedures of ETS 300 403-1 [2] subclause 5.5.3 shall apply.

9.6 Call collision

Call collision as such cannot occur at the network. Any simultaneous incoming or outgoing calls are dealt with separately and assigned different call references.

9.7 Handling of error conditions

The procedures of ETS 300 403-1 [2] subclause 5.8 shall apply with the following exceptions:

- a) the procedures related to the handling of messages excluded in subclause 7.1 are not applicable. An entity receiving one of those messages shall act according to subclause 5.8.4 of ETS 300 403-1 [2] using cause #97 "message type non-existent or not implemented";
- b) an entity receiving an information element excluded in subclause 7.2 shall act according to subclause 5.8.7.1 of ETS 300 403-1 [2];
- c) procedures related to handling of B-channels are not applicable.

9.8 User notification procedures

The procedures of ETS 300 403-1 subclause 5.9 and ETS 300 196-1 [6], clause 9 shall apply. However, the use of the procedures to notify suspension or resumption of a call is not applicable.

10 Procedures for interworking with private ISDNs

The procedures described in clause 9 shall apply with the exception that the network shall not flow control USER INFORMATION messages received from the private network, i.e. the procedures described in subclause 9.3.2 are not applicable. However, the congestion control procedure specified in subclause 9.3.3 shall apply at the T reference point.

NOTE: The requirement not to perform the flow control procedure at the T reference point is in line with the requirements at the T reference point for the user-to-user signalling supplementary service.

11 Interactions with other networks

Call requests toward other networks than ISDN shall be rejected according to the procedures specified in subclause 9.4 with cause #65 "bearer service not implemented".

12 Interaction with supplementary services

The protocol interaction between the USBS and supplementary services is specified in the individual supplementary service stage 3 standards.

13 Parameter values (timers)

Timer T1-USBS (see subclause 9.3.3): The timer value is a network option with a maximum of 15 minutes.

Timer T2-USBS (see subclause 9.3.3): The timer value shall be the same as for timer T1-USBS.

Timer T3-USBS (see subclause 9.3.2): 10 seconds.

The parameter values defined in ETS 300 403-1, clause 9 shall apply with the following exceptions:

- a) the user side timers T305, T318, T319 and T321 are not applicable;
- b) the network side timers T305, T306, T307, T320 and T321 are not applicable.

14 Dynamic description (SDLs)

14.1 Network side SDL process

The SDLs of ETS 300 403-2 [8], subclause 9.1 are used as a basis. The following subclauses specify the SDL requirements to USBS by means of exception text related to ETS 300 403-2 [8], subclause 9.1.

14.1.1 Null (N0) state

ETS 300 403-2 [8], subclause 9.1, state N0 shall apply with the following exceptions:

- channel selection when receiving a SETUP message is not applicable. The actions followed shall be as for successful channel selection;
- the RESUME message is not applicable. If received, it shall be handled according to subclause 9.7;
- channel selection when receiving a SETUP-REQUEST primitive is not applicable, the actions followed shall be as for successful channel selection.

14.1.2 Call Initiated (N1) state

ETS 300 403-2 [8], subclause 9.1, state N1 shall apply with the following exceptions:

- actions related to B-channel control are not applicable;
- actions related to connecting dial tone are not applicable;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- if a DL-ESTABLISH-INDICATION primitive is received, the network shall stop any timer, send a RELEASE-INDICATION primitive, send a RELEASE message with cause #41 "temporary failure" to the user, start timer T308 and enter the Release Request (N19) state.

14.1.3 Overlap Sending (N2) state

ETS 300 403-2 [8], subclause 9.1, state N2 shall apply with the following exceptions:

- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall stop timer T302, send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- the PROGRESS-REQUEST primitive is not applicable;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- actions B-channel control are not applicable;
- actions related to connecting dial tone are not applicable;
- in the case of timer T302 expiry and complete call information is received, the network shall send a RELEASE message, start timer T308 and enter the Release Request (N19) state.

14.1.4 Outgoing Call Proceeding (N3) state

ETS 300 403-2 [8], subclause 9.1, state N3 shall apply with the following exceptions:

- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall send a RELEASE message, start timer T308 and enter the Release Request (N19) state;

- the PROGRESS-REQUEST primitive is not applicable;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- actions related to B-channel control are not applicable.

14.1.5 Call Delivered (N4) state

ETS 300 403-2 [8], subclause 9.1, state N4 shall apply with the following exceptions:

- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- the PROGRESS-REQUEST primitive is not applicable;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- actions related to B-channel control are not applicable.

14.1.6 Call Present (N6) state

ETS 300 403-2 [8], subclause 9.1, state N6 shall apply with the following exceptions:

- channel selection when receiving a SETUP ACKNOWLEDGE, ALERTING, CONNECT or CALL PROCEEDING message is not applicable. The actions followed shall be as for successful channel selection;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall, in the case of point-to-point SETUP, send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- in the case of T303 expiry and in the case of point-to-point SETUP, the network shall send a RELEASE message start timer T308 and enter the Release Request (N19) state.

14.1.7 Call Received (N7) state

ETS 300 403-2 [8], subclause 9.1, state N7 shall apply with the following exceptions:

- channel selection when receiving a SETUP ACKNOWLEDGE, CALL PROCEEDING, ALERTING or CONNECT message is not applicable. The actions followed shall be as for successful channel selection;
- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall, in the case of point-to-point SETUP, send a RELEASE message, stop timer T301, if running, start timer T308 and enter the Release Request (N19) state;
- actions related to releasing a B-channel are not applicable.

14.1.8 Individual Call Received (N7I) state

ETS 300 403-2 [8], subclause 9.1, state N7I shall apply with the following exceptions:

- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

14.1.9 Connect Request (N8) state

ETS 300 403-2 [8], subclause 9.1, state N8 shall apply with the following exceptions:

- actions related to B-channel control are not applicable;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall, in the case of point-to-point SETUP, send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the INT-PROGRESS-INDICATION primitive is not applicable.

14.1.10 Individual Connect Request (N8I) state

ETS 300 403-2 [8], subclause 9.1, state N8I shall apply with the following exceptions:

- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

14.1.11 Incoming Call Proceeding (N9) state

ETS 300 403-2 [8], subclause 9.1, state N9 shall apply with the following exceptions:

- channel selection when receiving an ALERTING, CALL PROCEEDING, CONNECT or SETUP ACKNOWLEDGE message is not applicable. The actions followed shall be as for successful channel selection;
- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall, in the case of point-to-point SETUP, send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- if T310 expires, the network shall, in the case of point-to-point SETUP, send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- the INT-PROGRESS-INDICATION primitive is not applicable;
- actions related to B-channel control are not applicable.

14.1.12 Individual Incoming Call Proceeding (N9I) state

ETS 300 403-2 [8], subclause 9.1, state N9I shall apply with the following exceptions:

- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

14.1.13 Active (N10) state

ETS 300 403-2 [8], subclause 9.1, state N10 shall apply with the following exceptions:

- the SUSPEND message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- actions related to B-channel control are not applicable.

In addition, the SDLs in figure 1 shall apply for the information transfer procedures.

14.1.14 Release Request (N19) state

ETS 300 403-2 [8], subclause 9.1, state N19 shall apply with the following exceptions:

- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- actions related to releasing a B-channel are not applicable.

14.1.15 Individual Release Request (N19I) state

ETS 300 403-2 [8], subclause 9.1, state N19I shall apply with the following exceptions:

- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- actions related to B-channel control are not applicable.

14.1.16 Call Abort (N22) state

ETS 300 403-2 [8], subclause 9.1, state N22 shall apply.

14.1.17 Overlap Receiving (N25) state

ETS 300 403-2 [8], subclause 9.1, state N25 shall apply with the following exceptions:

- channel selection when receiving an ALERTING, CONNECT, CALL PROCEEDING or SETUP ACKNOWLEDGE message is not applicable. The actions followed shall be as for successful channel selection;
- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the network shall, in the case of point-to-point SETUP, send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- when T304 expires, the network shall, in the case of point-to-point SETUP, send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- the INT-PROGRESS-INDICATION primitive is not applicable;
- actions related to B-channel control are not applicable;
- if a DL-ESTABLISH-INDICATION primitive is received, the network shall stop any timer, send a RELEASE INDICATION primitive, send a RELEASE message to the user, start timer T308 and enter the Release Request (N19) state.

14.1.18 Individual Overlap Receiving (N25I) state

ETS 300 403-2 [8], subclause 9.1, state N25I shall apply with the following exceptions:

- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

14.2 User side SDL process

The SDLs of ETS 300 403-2 [8], subclause 9.2 are used as a basis. The following subclauses specify the SDL requirements to USBS by means of exception text related to ETS 300 403-2 [8], subclause 9.2.

14.2.1 Null (U0) state

ETS 300 403-2 [8], subclause 9.2, state U0 shall apply with the following exceptions:

- channel selection when receiving a SETUP message is not applicable. The actions followed shall be as for successful channel selection;
- the RESUME-REQUEST primitive is not applicable;
- channel selection when receiving a SETUP-REQUEST primitive is not applicable.

14.2.2 Call Initiated (U1) state

ETS 300 403-2 [8], subclause 9.2, state U1 shall apply with the following exceptions:

- channel selection when receiving a SETUP ACKNOWLEDGE or CALL PROCEEDING message is not applicable. The actions followed shall be as for successful channel selection;
- actions related to B-channel control are not applicable;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall stop timer T303, send a RELEASE message, start timer T308 and enter the Release Request (U19) state.

14.2.3 Overlap Sending (U2) state

ETS 300 403-2 [8], subclause 9.2, state U2 shall apply with the following exceptions:

- actions related to B-channel control are not applicable;
- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall stop timer T304, if running, send a RELEASE message, start timer T308 and enter the Release Request (U19) state;
- if timer T304 expires, the user shall send a SETUP CONFIRM primitive, send a RELEASE message, start timer T308 and enter the Release Request (U19) state;
- if a DL-ESTABLISH-INDICATION primitive is received, the user shall stop timer T304, send a RELEASE INDICATION primitive, send a RELEASE message to the user, start timer T308 and enter the Release Request (N19) state.

14.2.4 Outgoing Call Proceeding (U3) state

ETS 300 403-2 [8], subclause 9.2, state U3 shall apply with the following exceptions:

- actions related to B-channel control are not applicable;
- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall send a RELEASE message, start timer T308 and enter the Release Request (U19) state.

14.2.5 Call Delivered (U4) state

ETS 300 403-2 [8], subclause 9.2, state U4 shall apply with the following exceptions:

- the PROGRESS message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall send a RELEASE message, start timer T308 and enter the Release Request (U19) state.

14.2.6 Call Present (U6) state

ETS 300 403-2 [8], subclause 9.2, state U6 shall apply with the following exception:

- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

14.2.7 Call Received (U7) state

ETS 300 403-2 [8], subclause 9.2, state U7 shall apply with the following exceptions:

- the PROGRESS-REQUEST primitive is not applicable;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall send a RELEASE message, start timer T308 and enter the Release Request (U19) state;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

14.2.8 Connect Request (U8) state

ETS 300 403-2 [8], subclause 9.2, state U8 shall apply with the following exceptions:

- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall stop timer T313, send a RELEASE message, start timer T308 and enter the Release Request (U19) state.

14.2.9 Incoming Call Proceeding (U9) state

ETS 300 403-2 [8], subclause 9.2, state U9 shall apply with the following exceptions:

- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall stop timer T313, send a RELEASE message, start timer T308 and enter the Release Request (U19) state;
- the PROGRESS-REQUEST primitive is not applicable;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

14.2.10 Active (U10) state

ETS 300 403-2 [8], subclause 9.2, state U10 shall apply with the following exceptions:

- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall send a RELEASE message, start timer T308 and enter the Release Request (U19) state;
- the SUSPEND-REQUEST primitive is not applicable;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

In addition, the SDLs in figure 2 shall apply for the information transfer procedures.

14.2.11 Release Request (U19) state

ETS 300 403-2 [8], subclause 9.2, state U19 shall apply with the following exceptions:

- actions related to B-channel control are not applicable;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7.

14.2.12 Overlap Receiving (U25) state

ETS 300 403-2 [8], subclause 9.2, state U25 shall apply with the following exceptions:

- the DISCONNECT-REQUEST primitive shall be replaced by the RELEASE-REQUEST primitive. When this primitive is received, the user shall stop timer T302, if running, send a RELEASE message, start timer T308 and enter the Release Request (U19) state;
- actions related to B-channel control are not applicable;
- the PROGRESS-REQUEST primitive is not applicable;
- the DISCONNECT message is not applicable. If received, it shall be handled according to subclause 9.7;
- when T302 expires and the call information is incomplete, the user shall send a RELEASE INDICATION primitive, send a RELEASE message, start timer T308 and enter the Release Request (N19) state;
- if a DL-ESTABLISH-INDICATION primitive is received, the user shall stop timer T302, send a RELEASE-INDICATION primitive, send a RELEASE message to the user, start timer T308 and enter the Release Request (N19) state.

14.3 Restart SDL process

The SDLs of ETS 300 403-2 [8], subclause 9.3 are used as a basis. The following subclauses specify the SDL requirements to USBS by means of exception text related to ETS 300 403-2 [8], subclause 9.3.

14.3.1 Null (REST 0) state

ETS 300 403-2 [8], subclause 9.3, state REST 0 shall apply with the following exceptions:

- when a RESTART message with a Restart indicator information element indicating "single interface" or "all interfaces" is received, the receiving entity shall send a RESTART REQUEST primitive to the USBS call control entities;
- when a RESTART message with a Restart indicator information element not indicating "single interface" or "all interfaces" is received, the USBS call control entities shall not be affected.

14.3.2 Restart Request (REST 1) state

ETS 300 403-2 [8], subclause 9.3, state REST 1 shall apply with the following exception:

- when a RESTART-CONFIRM primitive is received, the check for "all responses" shall also include response from USBS call control entities.

14.3.3 Restart (REST 2) state

ETS 300 403-2 [8], subclause 9.3, state REST 2 shall apply with the following exception:

- when a RESTART-CONFIRM primitive is received, the check for "all responses" shall also include response from USBS call control entities.

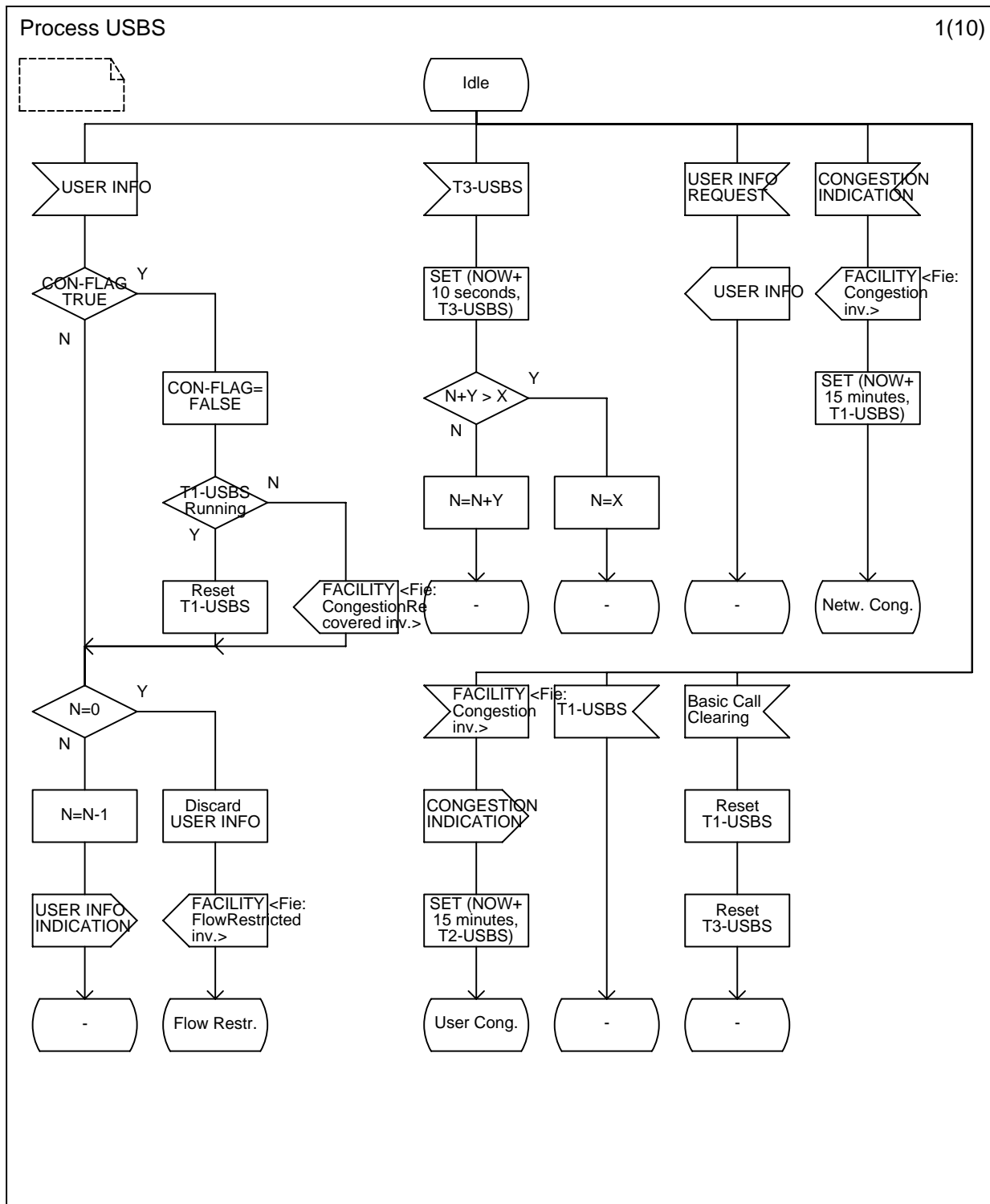


Figure 1 (sheet 1 of 10): Network side - information transfer - idle

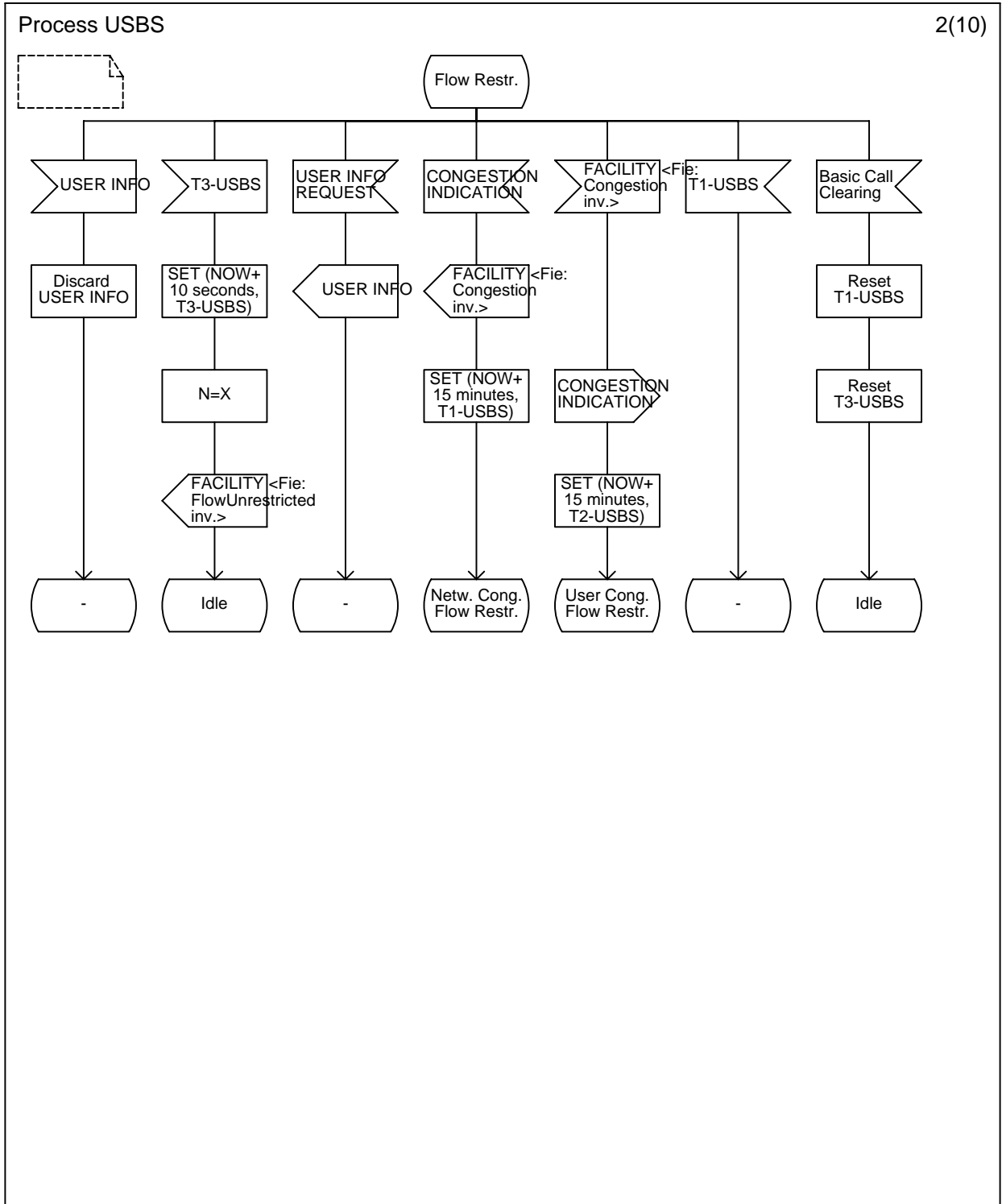


Figure 1 (sheet 2 of 10): Network side - information transfer - flow restricted

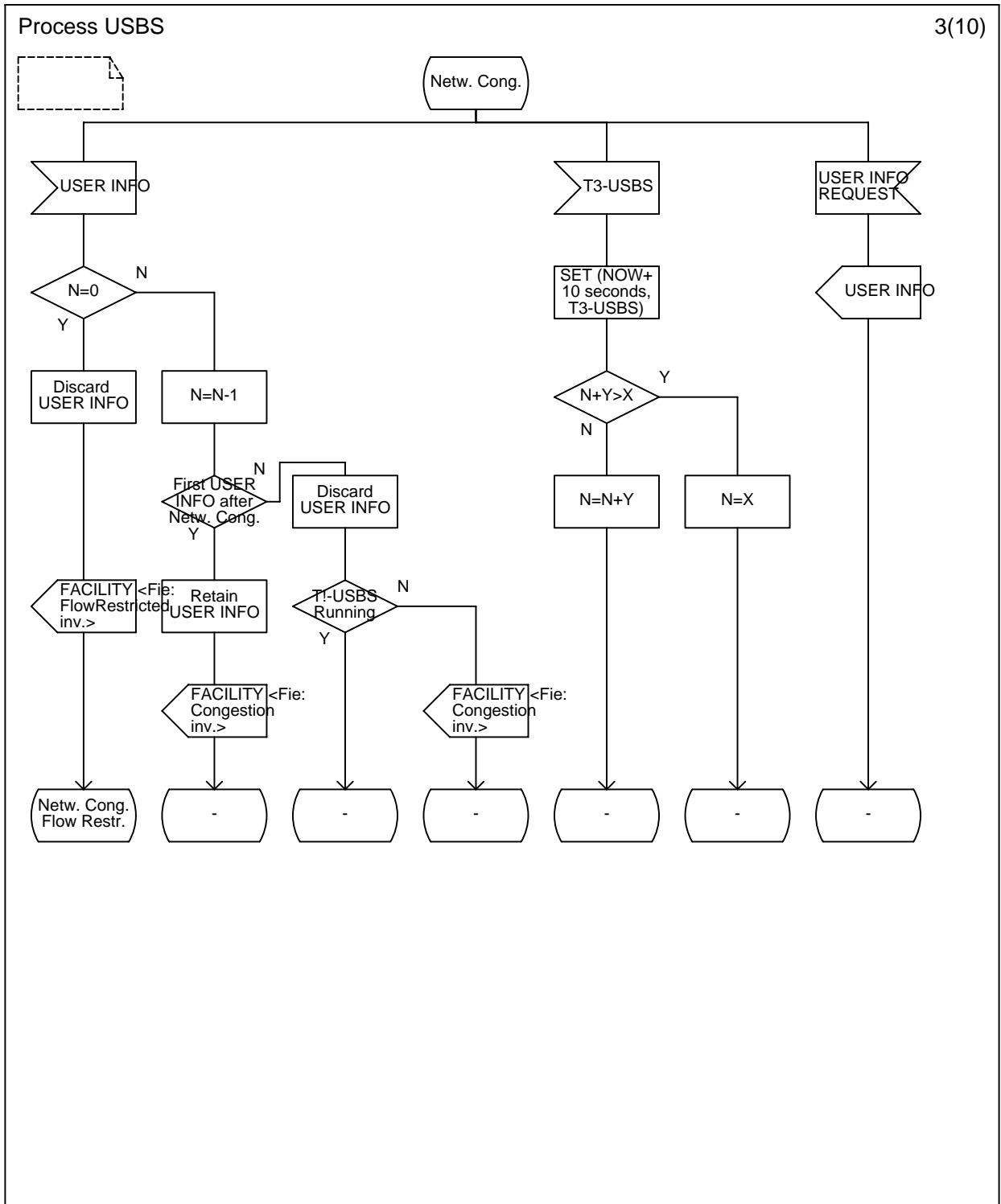


Figure 1 (sheet 3 of 10): Network side - information transfer - network congestion

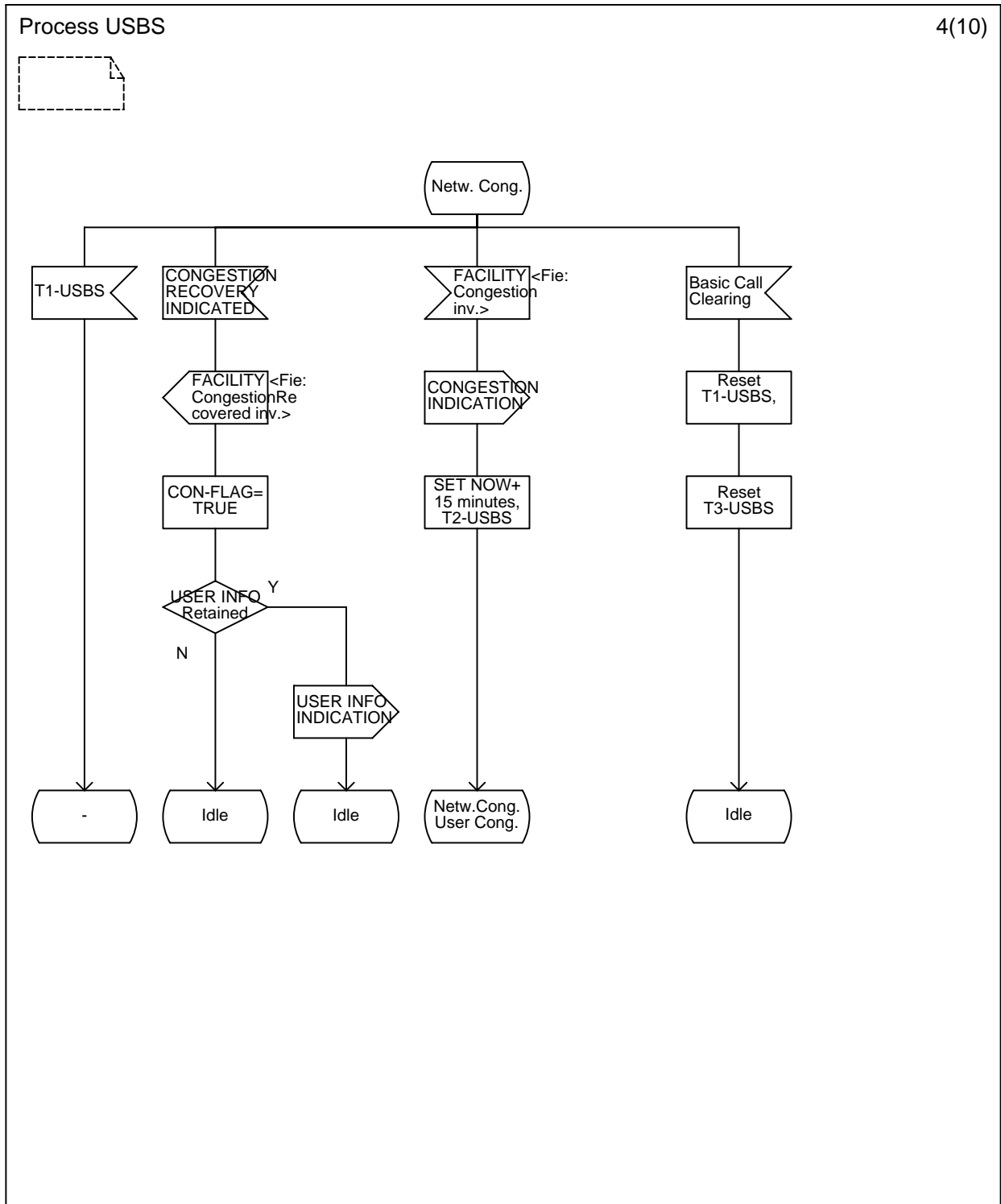


Figure 1 (sheet 4 of 10): Network side - information transfer - network congestion

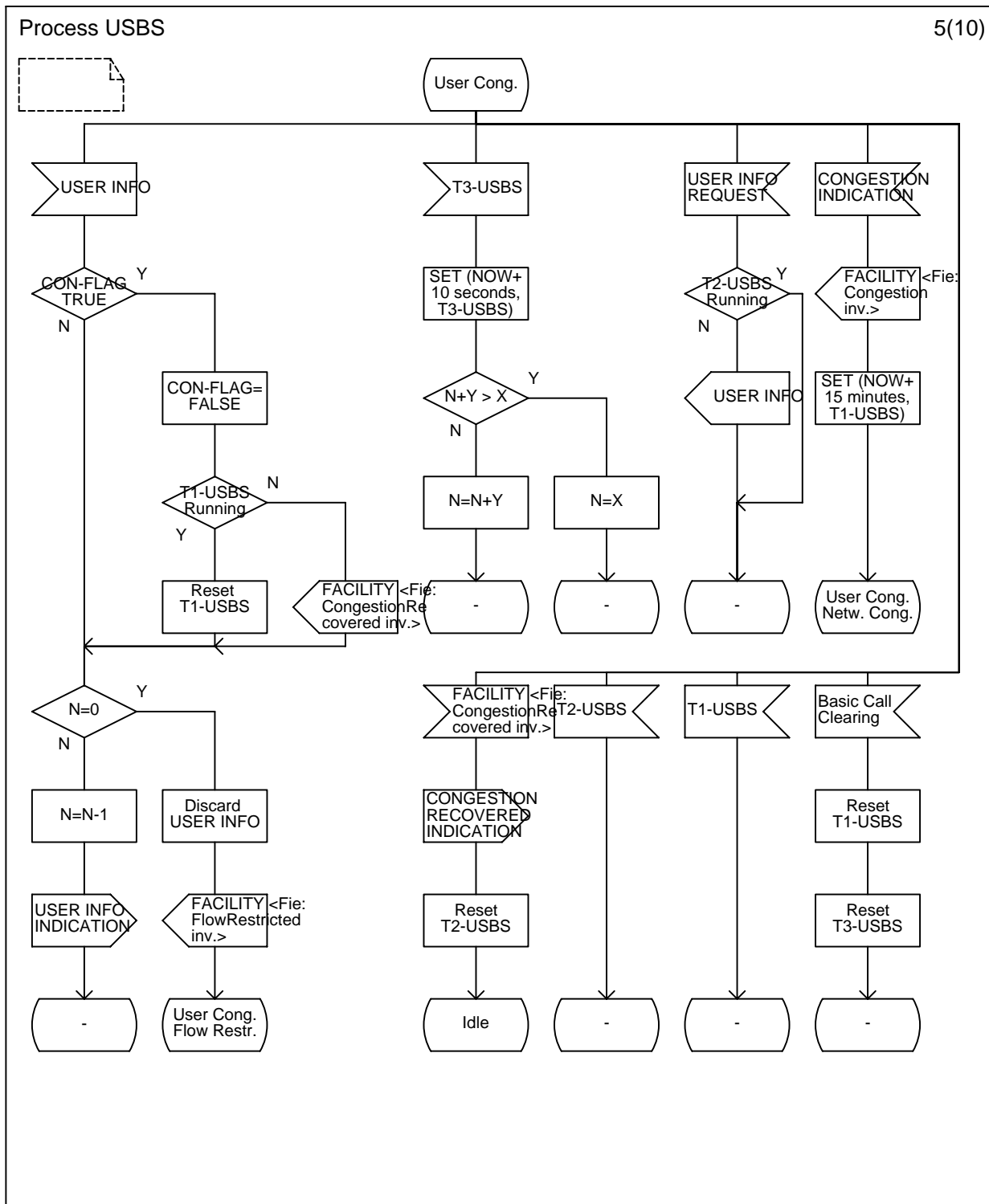


Figure 1 (sheet 5 of 10): Network side - information transfer - user congestion

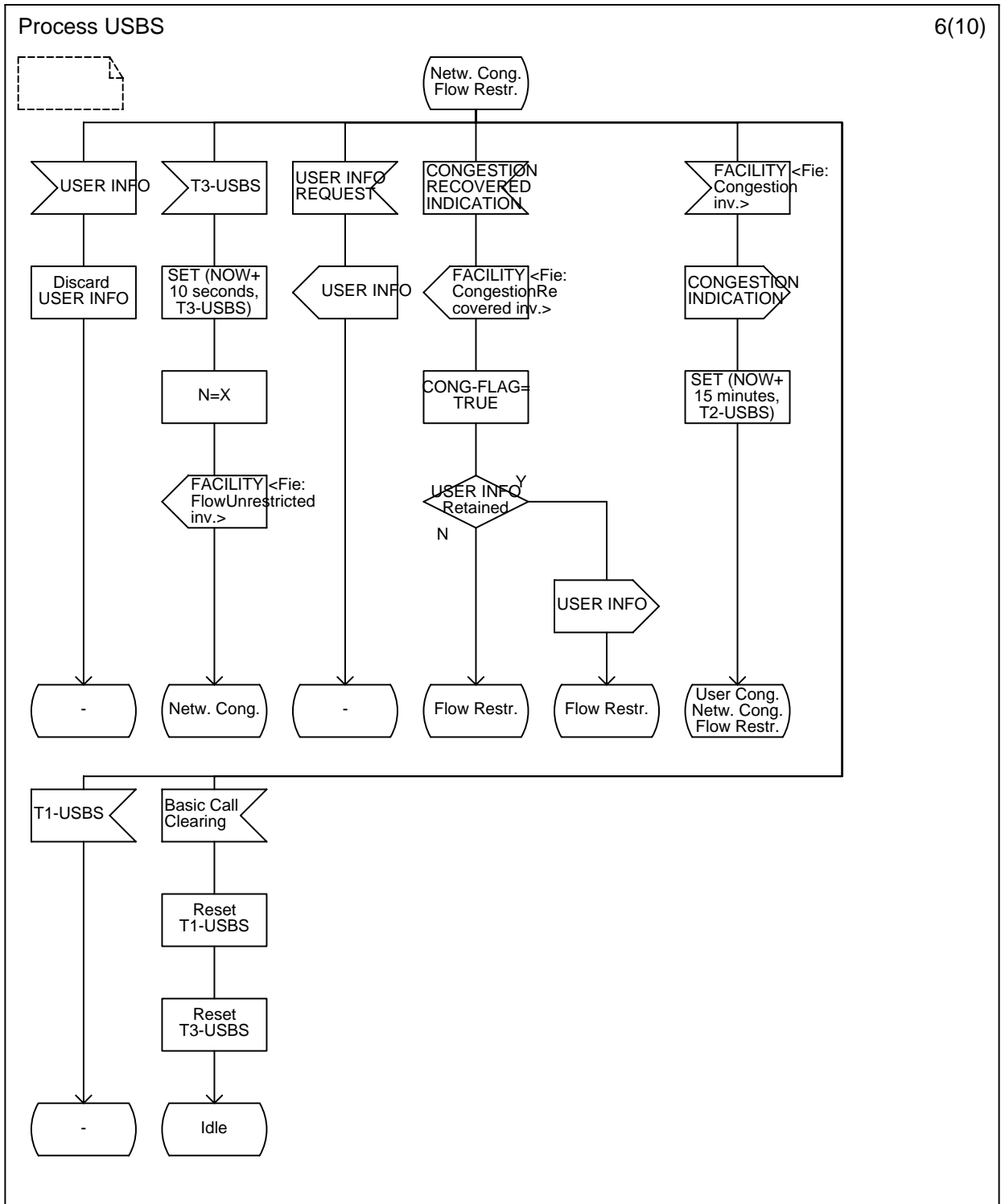


Figure 1 (sheet 6 of 10): Network side - information transfer - network congestion and flow restricted

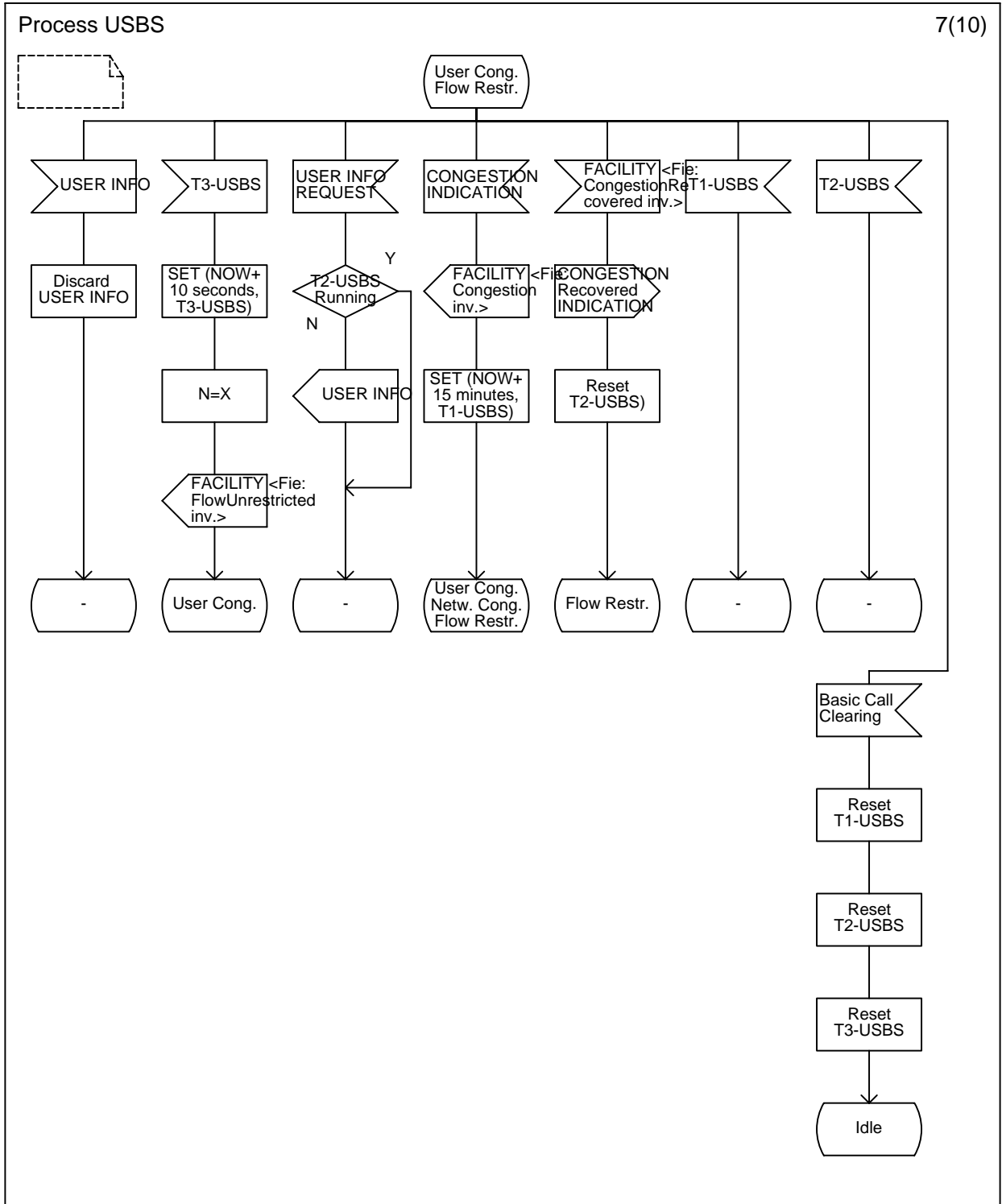


Figure 1 (sheet 7 of 10): Network side - information transfer - user congestion and flow restricted

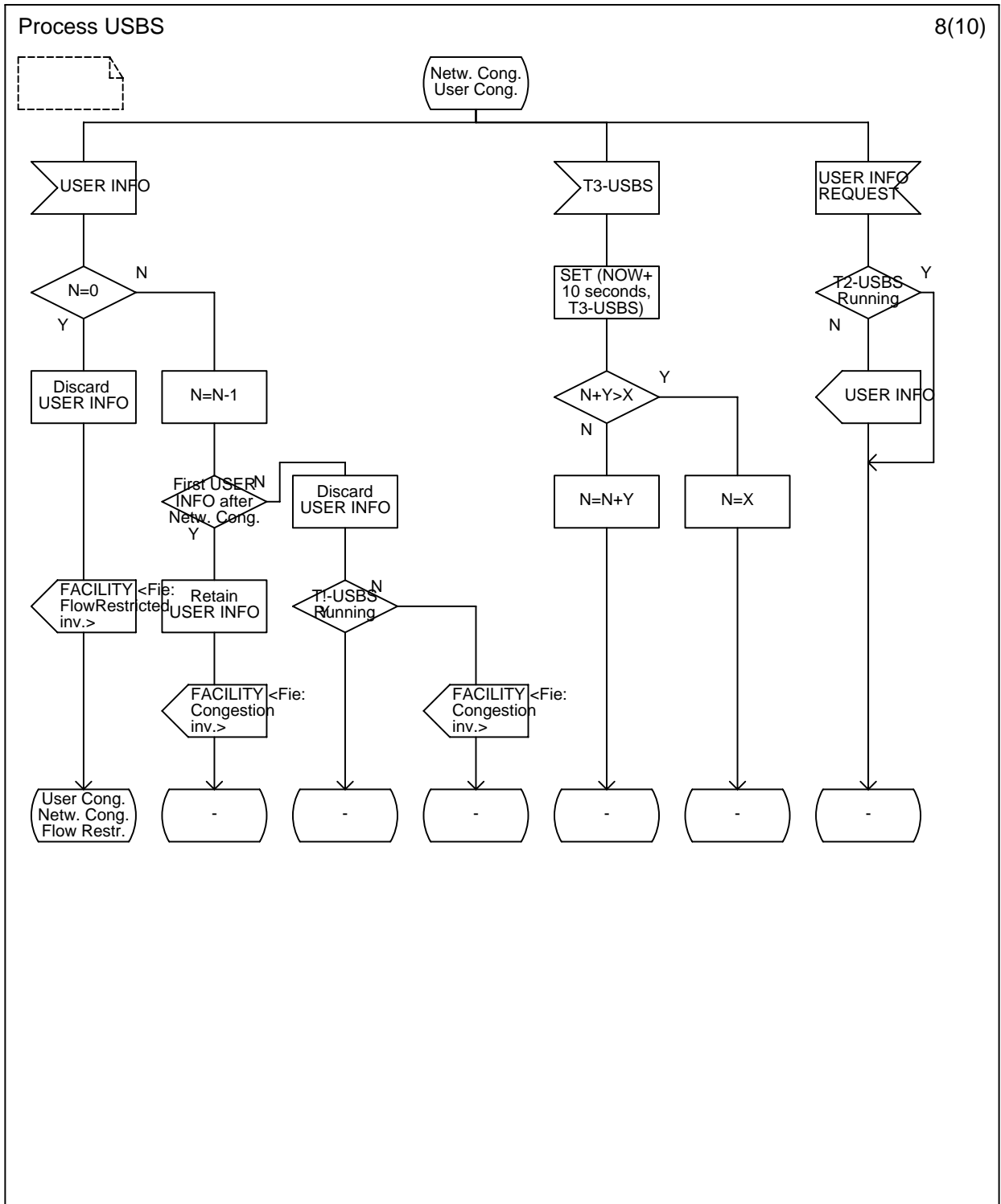


Figure 1 (sheet 8 of 10): Network side - information transfer - network and user congestion

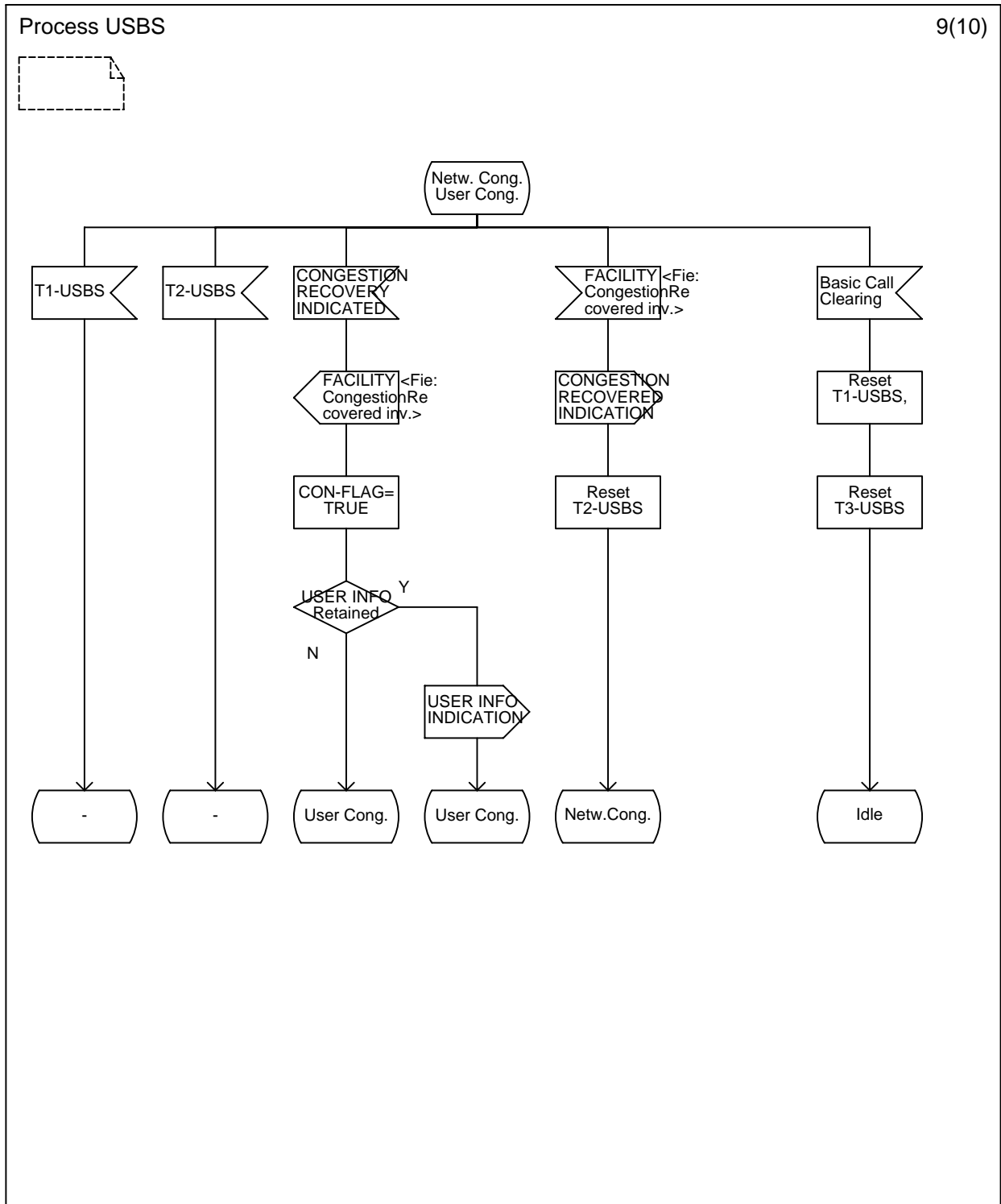


Figure 1 (sheet 9 of 10): Network side - information transfer - network and user congestion

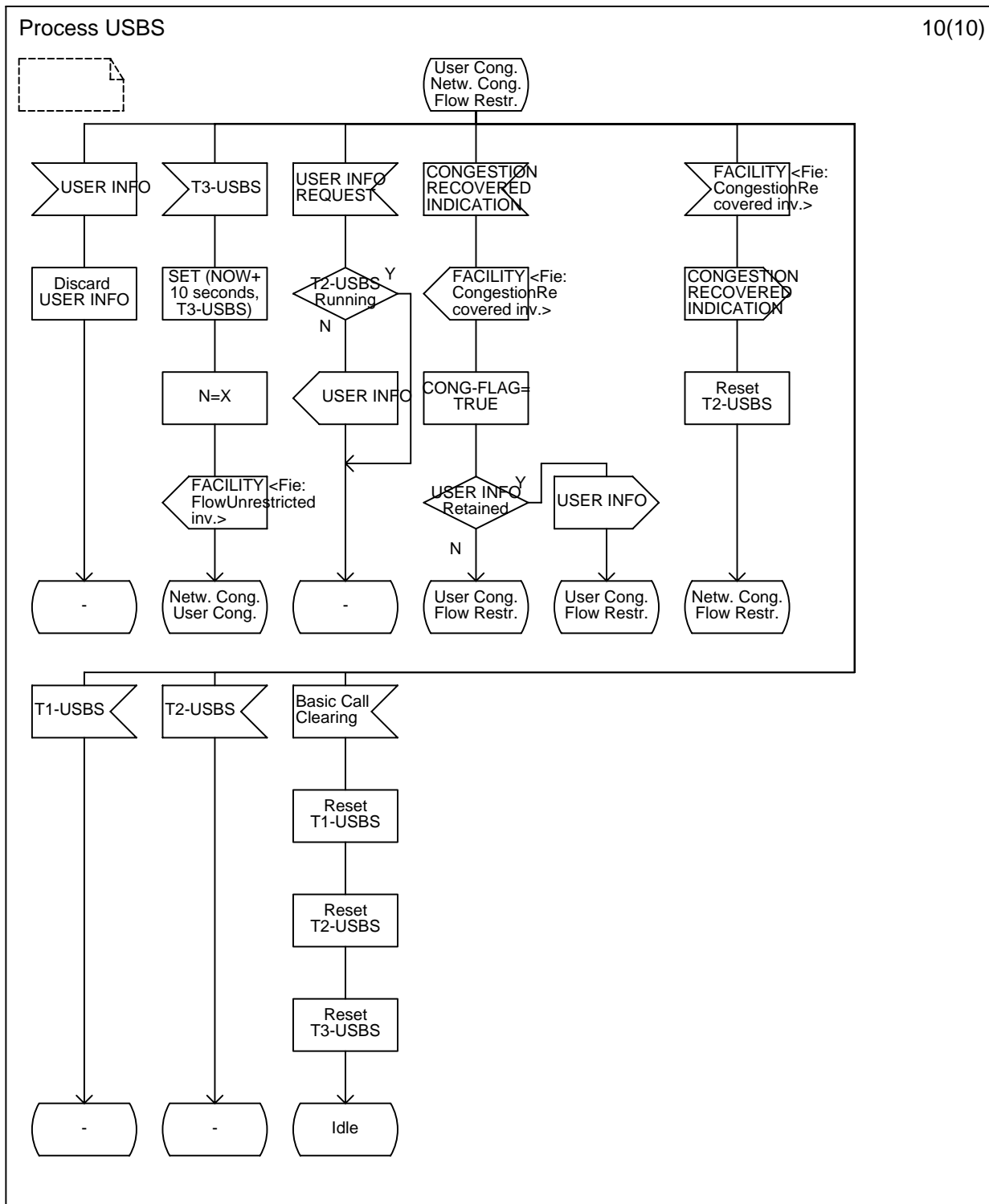


Figure 1 (sheet 10 of 10): Network side - information transfer - user and network congestion and flow restricted

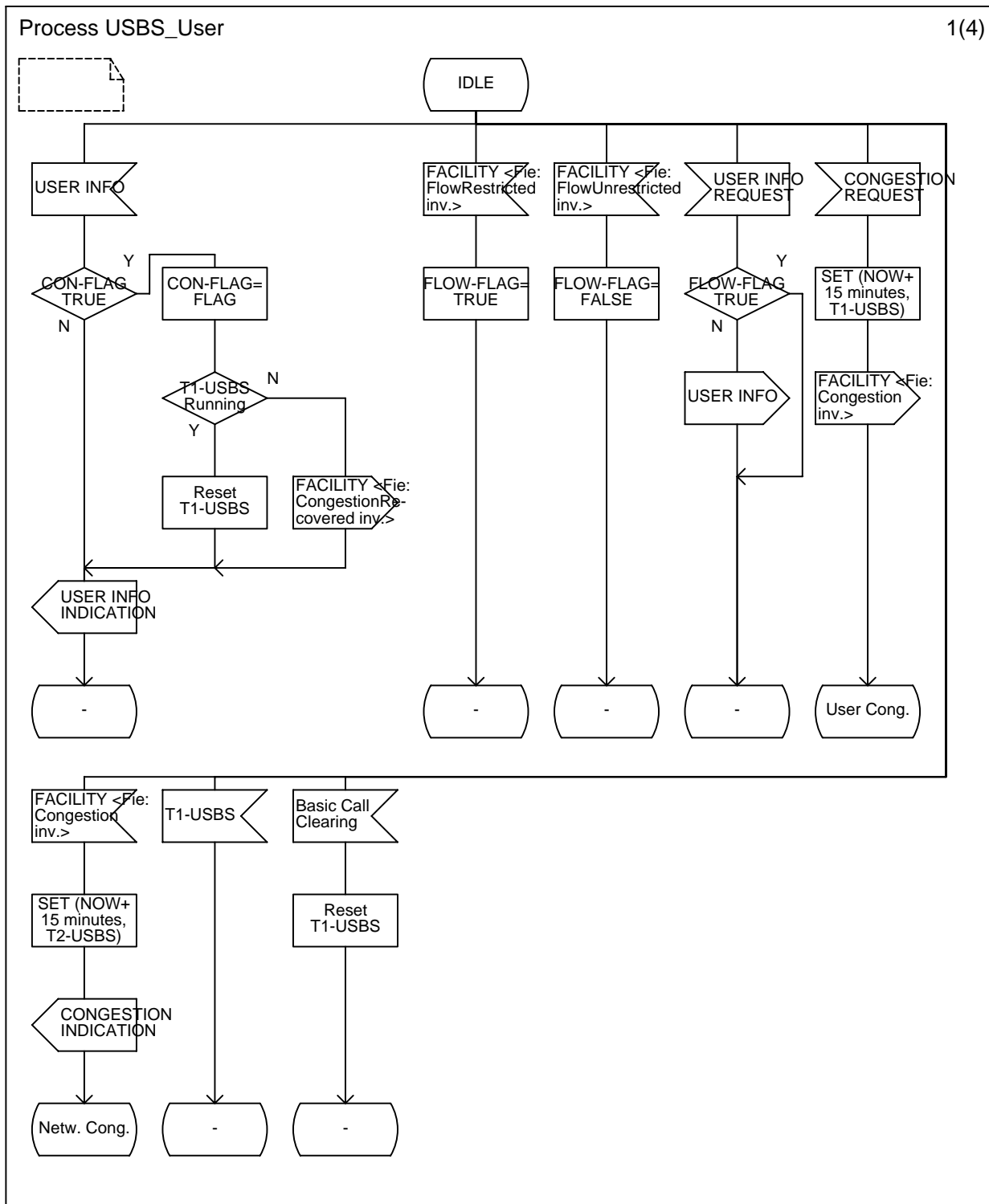


Figure 2 (sheet 1 of 4): User side - information transfer - idle

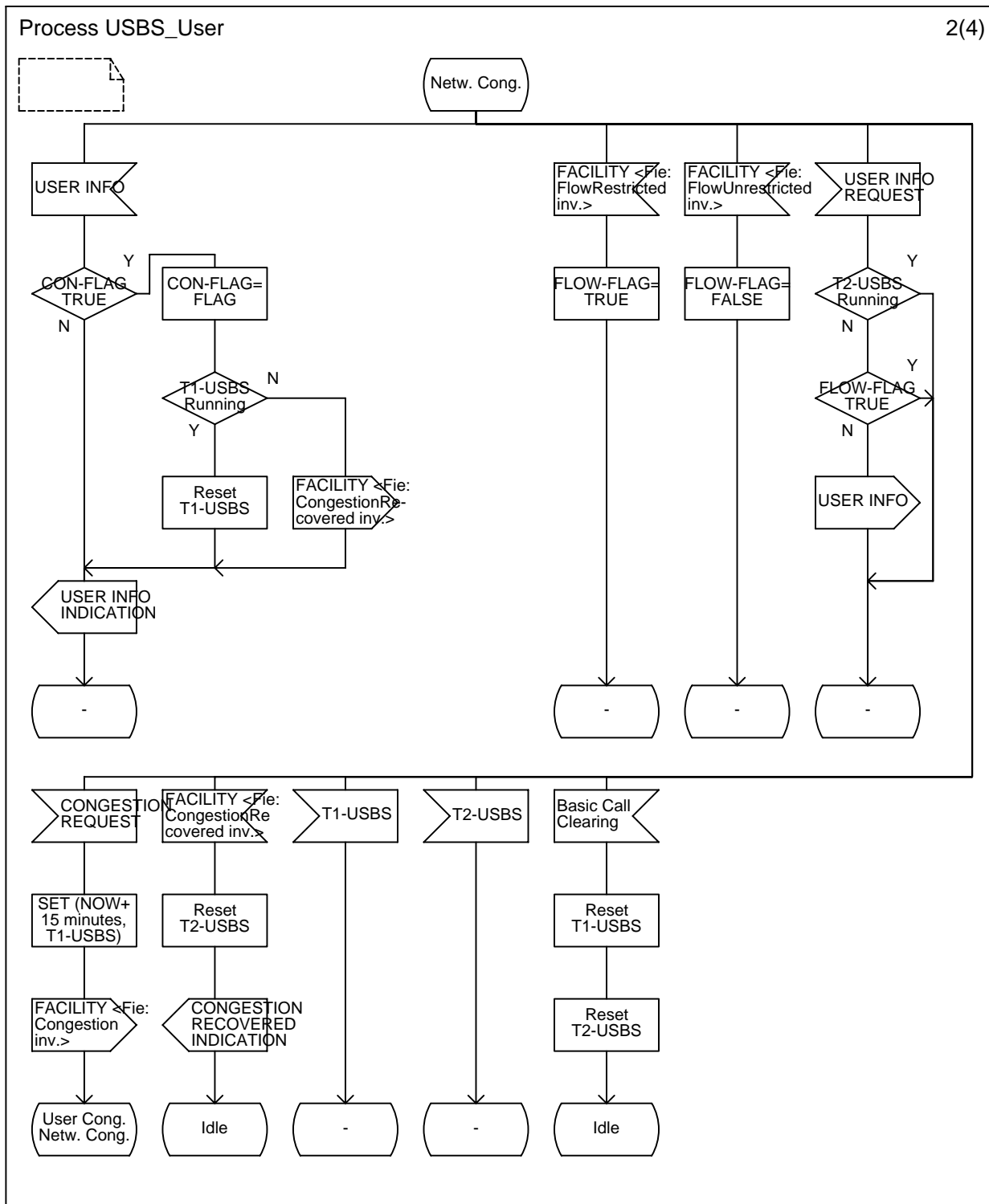


Figure 2 (sheet 2 of 4): User side - information transfer - network congestion

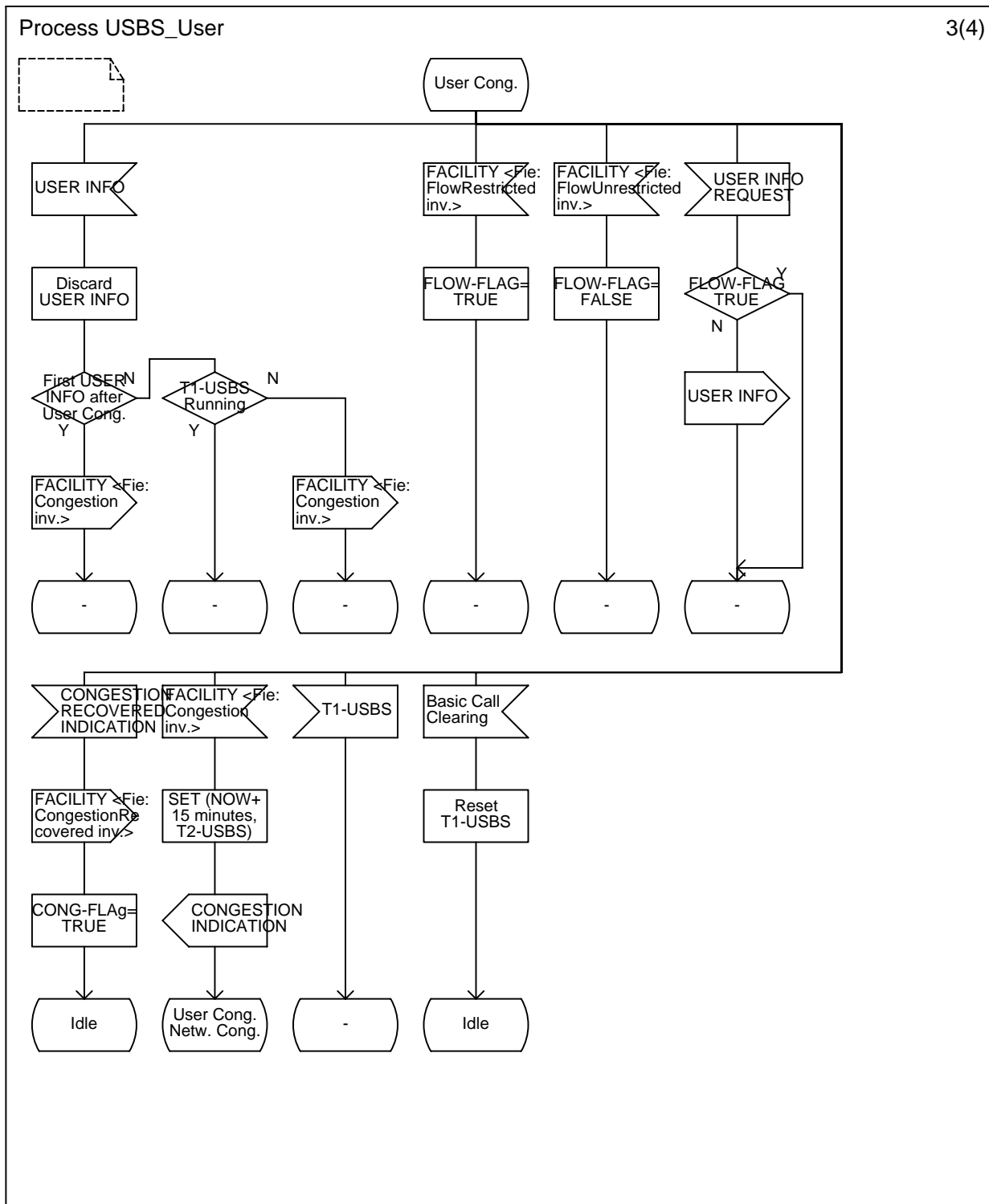


Figure 2 (sheet 3 of 4): User side - information transfer - user congestion

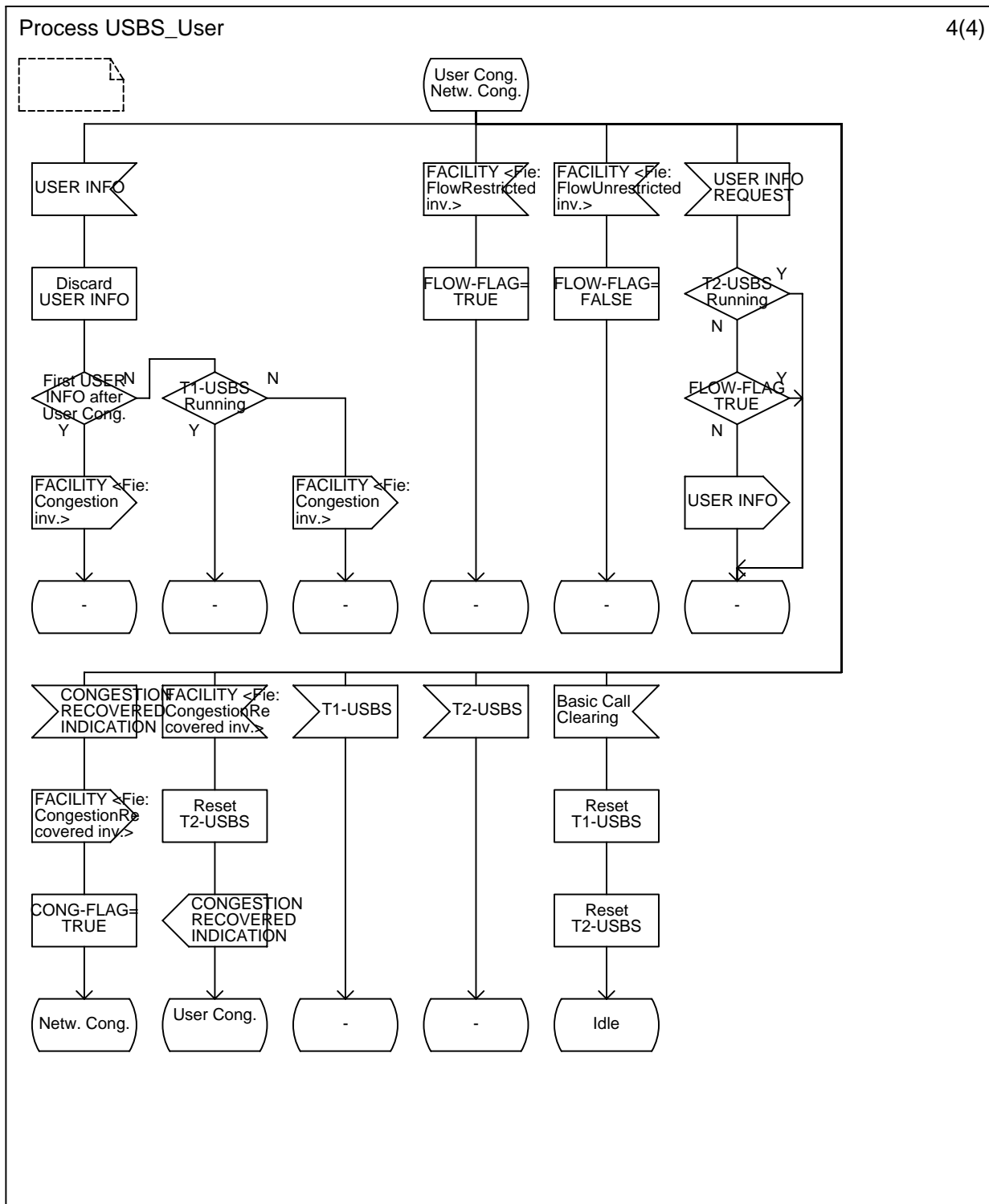


Figure 2 (sheet 4 of 4): User side - information transfer - user and network congestion

Annex A (normative): Signalling flows

This annex contains arrow diagrams showing the DSS1 signalling for different cases of USBS.

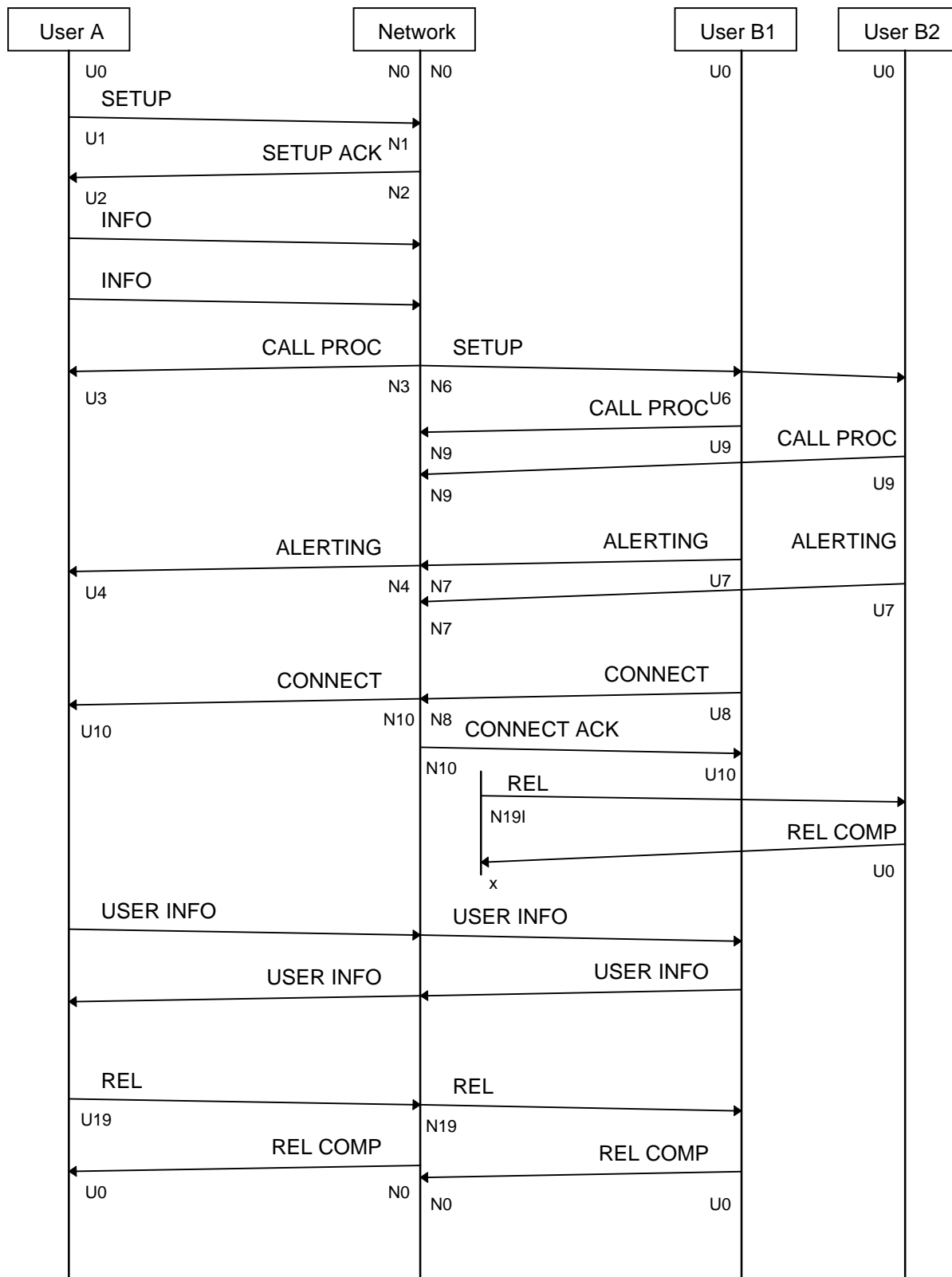


Figure A.1: Successful call establishment and call release

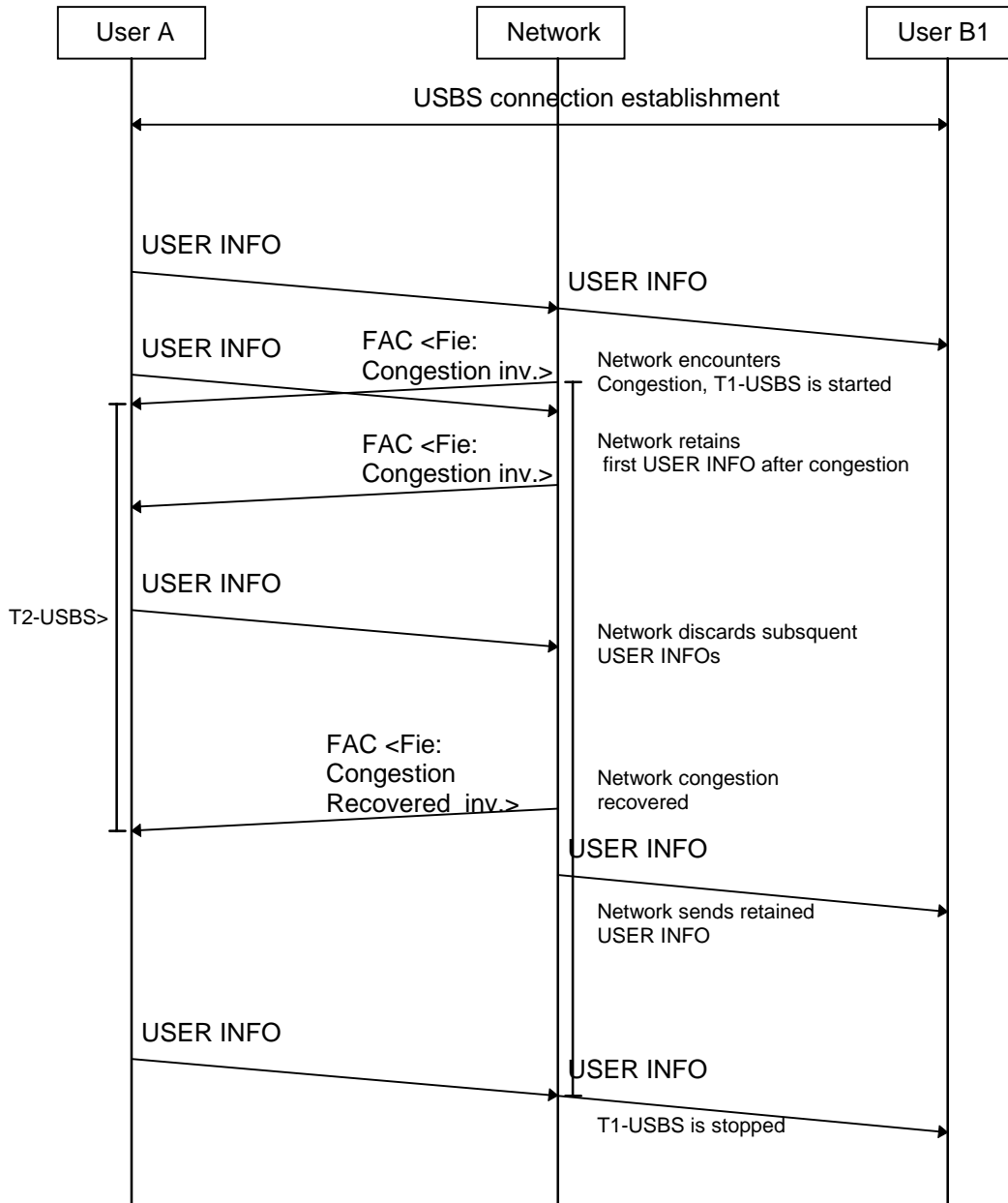


Figure A.2: Congestion control procedure

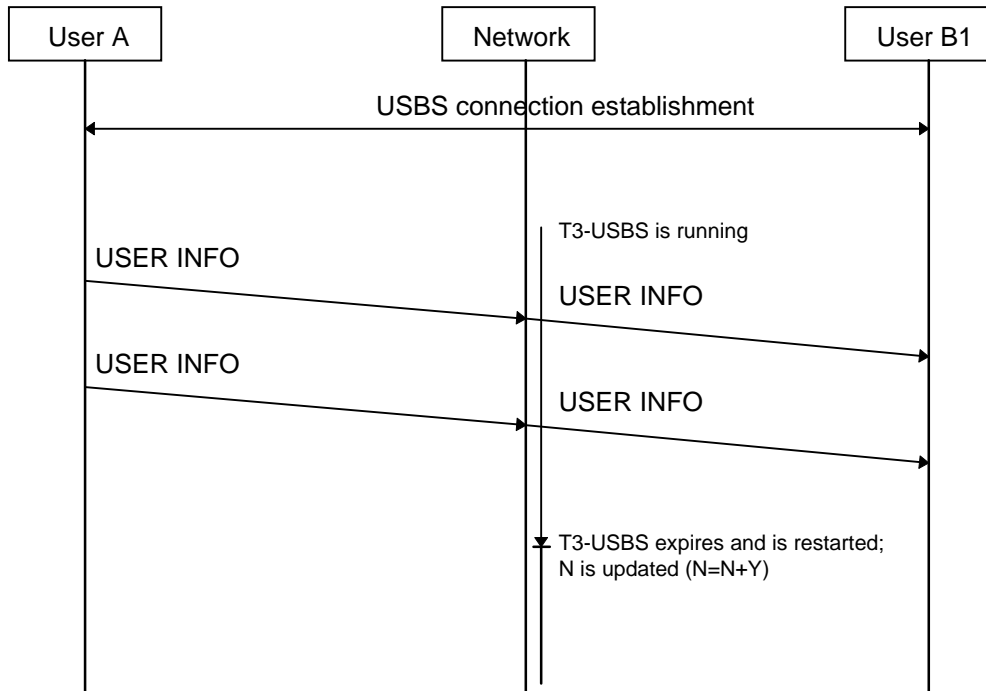


Figure A.3: Flow control procedure, maximum number of USER INFO messages is not exceeded

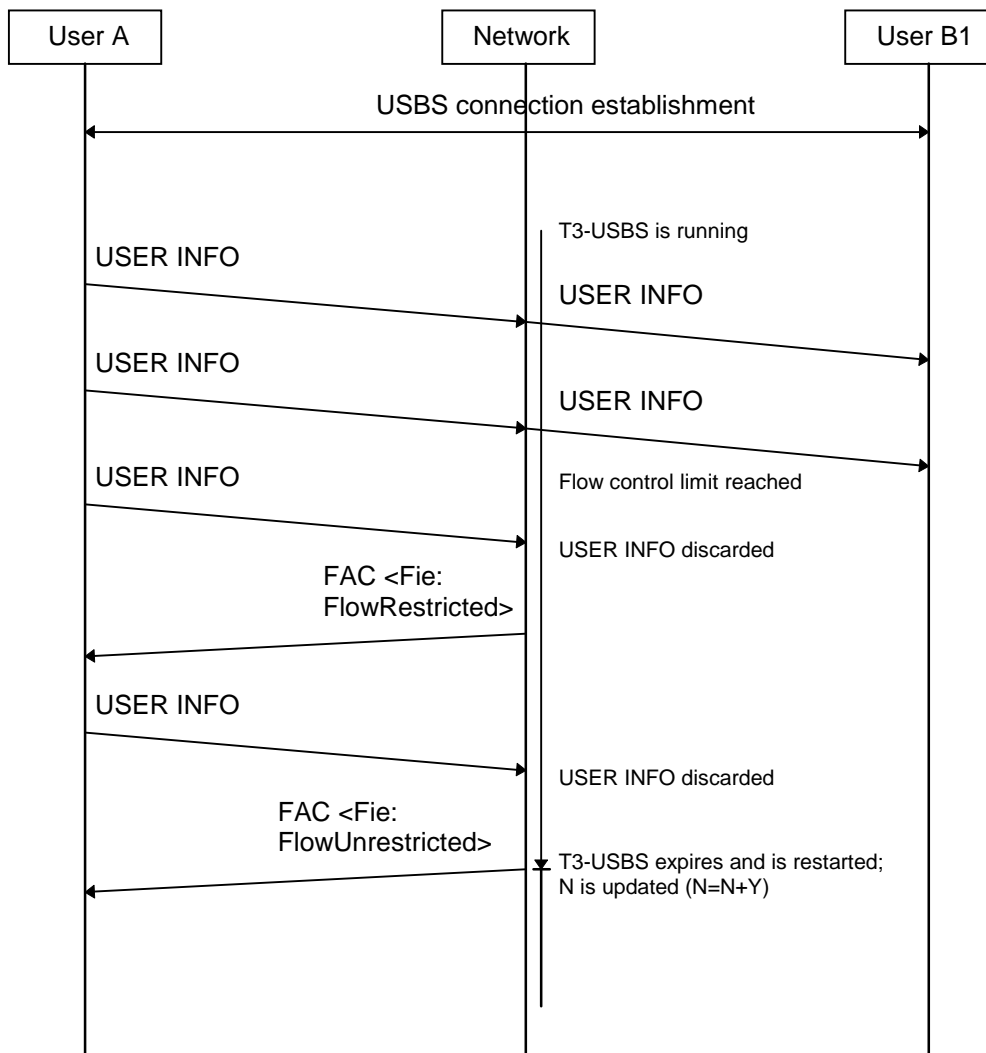


Figure A.4: Flow control procedure, maximum number of USER INFO messages is exceeded

Annex B (normative): Compatibility and address checking

The procedures of annex B of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) clause B.4 shall not apply.
- b) procedures related to the check of the Low layer information element are not applicable.

Annex C (normative): Transit network selection

The procedures of annex C of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) if the network cannot route the call because the route is busy, the network shall initiate call clearing according to subclause 9.4 with cause #47 "resources unavailable, unspecified";
- b) any clearing of the USBS call shall be according to subclause 9.4.

Annex D (normative): Network specific facility selection

The procedures of annex E of ETS 300 403-1 [2] shall apply.

Annex E (normative): Message segmentation procedures

The procedures of annex H of ETS 300 403-1 [2] shall apply.

Annex F (informative): Usage of cause values

The procedures of annex M of ETS 300 403-1 [2] shall apply with the following exceptions:

- a) the messages excluded in subclause 7.1 shall not apply;
- b) the DISCONNECT message shall be replaced by the RELEASE message.

History

Document history		
V1.1.1	January 1998	Public Enquiry PE 9822: 1998-01-30 to 1998-05-29