

# **SLOVENSKI STANDARD**

## **SIST ETS 300 399-1 E1:2003**

**01-december-2003**

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### **Storitev blokovnega posredovanja – 1. del: Splošni opis**

Frame relay services; Part 1: General description

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## Contents

Foreword .....	7
Introduction .....	7
1 Scope .....	9
2 Normative references .....	9
3 Definitions .....	10
4 Symbols and abbreviations .....	13
5 General definition .....	13
6 Description of the frame relay service .....	13
6.1 General description .....	13
6.1.1 Characteristics of the frame relay service .....	13
6.1.2 Core functions .....	14
6.2 Applications .....	15
7 Service classes .....	15
7.1 Layer 2 characteristics .....	15
7.1.1 Layer 2 permanent .....	15
7.1.2 Layer 2 on-demand case A .....	15
7.1.3 Layer 2 on-demand case B .....	15
7.2 Layer 1 characteristics .....	16
7.2.1 Layer 1 permanent .....	16
7.2.2 Layer 1 on-demand .....	16
8 Procedures .....	16
8.1 Provision/withdrawal .....	16
8.2 Normal procedures, invocation and operation .....	16
8.2.1 On-demand virtual circuit procedures .....	16
8.2.1.1 Originating the service (call set-up) .....	17
8.2.1.2 Indications during call set-up .....	17
8.2.1.3 Terminal selection/identification .....	17
8.2.1.4 Call notification .....	17
8.2.1.5 Synchronization between C-plane and U-plane .....	17
8.2.1.6 Terminating the virtual circuit (call clearing) .....	18
8.2.2 Permanent virtual circuit procedures .....	18
8.2.2.1 Layer 1 activation/establishment .....	18
8.2.2.2 Terminal selection/identification .....	18
8.2.2.3 Virtual circuit establishment .....	18
8.2.2.4 Terminating the virtual circuit .....	18
8.2.3 Data transfer .....	18
8.2.3.1 Regular procedures .....	18
8.2.3.2 Congestion management and control .....	19
8.3 Exceptional procedures, invocation and operation .....	20
8.3.1 On-demand virtual circuit .....	20
8.3.2 Permanent virtual circuit .....	20
9 Network capabilities for charging .....	20
10 Interworking .....	20
11 Attributes and values of attributes .....	20

12	Dynamic description .....	21
13	Numbering plan .....	21
Annex A (normative): Support of the OSI network layer service .....		22
A.1	General .....	22
A.2	Connection establishment and release .....	22
A.3	Data transfer .....	23
A.4	Interworking .....	23
A.5	Co-ordination of C-plane and U-plane .....	23
Annex B (normative): Core service description .....		24
Introduction .....		24
B.1	Definitions .....	24
B.1.1	OSI reference model definitions .....	24
B.1.2	Service conventions definitions .....	24
B.2	Definition of the core service .....	25
B.2.1	Scope .....	25
B.2.2	Overview of the core service .....	25
B.2.3	Features of the core service .....	25
B.2.4	Model of the core service .....	26
B.2.4.1	Core connection endpoint identification .....	26
B.2.4.2	Model of the core connection .....	26
B.2.4.3	Queue model concepts .....	26
B.2.4.4	Core connection establishment .....	27
B.2.4.5	Data transfer .....	27
B.2.4.6	Core connection release .....	27
B.2.5	Sequence of primitives at one core connection endpoint .....	27
B.2.6	Data transfer primitives .....	27
B.2.6.1	Service primitives and parameters .....	28
B.2.6.1.1	Primitives: Core-DATA-request and Core-DATA-indication .....	28
B.2.6.1.2	Parameters .....	28
B.2.6.1.2.1	Core-user-data .....	28
B.2.6.1.2.2	Congestion .....	28
B.2.6.1.2.3	Discard eligibility .....	28
B.2.6.1.2.4	Core service user protocol control information .....	29
B.2.6.1.3	Sequence of primitives .....	29
B.2.7	Quality of service .....	29
B.2.7.1	Throughput .....	30
B.2.7.2	Transit delay .....	30
Annex C (normative): Congestion management for the frame relay service .....		31
C.1	Congestion management principles .....	31
C.1.1	Scope .....	31
C.1.2	Objectives of congestion management .....	31
C.1.3	Requirements of congestion control mechanisms .....	32
C.1.4	Congestion management strategy .....	32
C.1.4.1	Congestion control mechanisms .....	33
C.1.4.1.1	Explicit congestion notification .....	33
C.1.4.1.2	Discard eligibility .....	33
C.1.4.2	Network response to congestion .....	33
C.1.4.3	User response to congestion .....	34

C.1.4.3.1	Terminals employing destination controlled transmitters.....	35
C.1.4.3.2	Terminals employing source controlled transmitters .....	35
Annex D (informative):	Bibliography .....	38
History.....		39

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## Foreword

This European Telecommunication Standard (ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

The content of this ETS is adapted from the CCITT Recommendation I.233.1 [2].

This ETS consists of 4 parts as follows:

**Part 1: "Part 1: General description".**

Part 2: "Part 2: Integrated Services Digital Network (ISDN); Frame relay bearer service; Service definition".

Part 3: "Part 3: Integrated Services Digital Network (ISDN); Frame relay data transmission service; Service definition".

Part 4: "Part 4: Broadband Integrated Services Digital Network (B-ISDN); Frame relay bearer service; Service definition".

Transposition dates	
Date of latest announcement of this ETS (doa):	30 June 1995
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 December 1995
Date of withdrawal of any conflicting National Standard (dow):	31 December 1995

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## Introduction

The purpose of this ETS is to describe the frame relay service. The definition and description of this service forms the basis to define the network capabilities required for the support of the service. The prose description begins with clause 5, the static description begins with clause 11. No dynamic description is provided.

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## 1 Scope

This European Telecommunication Standard (ETS) specifies the general aspects of the frame relay service that is common to all frame relay services independent of the network on which the service is offered.

This ETS is applicable for all network-specific frame relay service definitions.

This ETS should be complemented with standards for the network-specific part of the frame relay service.

## 2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] CCITT Recommendation E.164: "Numbering plan for the ISDN era".
- [2] CCITT Recommendation I.233.1: "ISDN frame relaying bearer service".
- [3] ITU-T Recommendation I.500: "General structure of the ISDN Interworking Recommendations".
- [4] CCITT Recommendation Q.922: "ISDN data link layer specification for frame mode bearer services".
- [5] ITU-T Recommendation Q.933: "Layer 3 signalling specification for frame mode bearer service".
- [6] ITU-T Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [7] ITU-T Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".
- [8] CCITT Recommendation X.121: "International numbering plan for public data networks".
- [9] ITU-T Recommendation X.134: "Portion boundaries and packet layer reference events: basis for defining packet-switched performance parameters".
- [10] ITU-T Recommendation X.140: "General quality of service parameters for communication via public data networks".
- [11] CCITT Recommendation X.200: "Reference Model of Open Systems Interconnection for CCITT applications".
- [12] ITU-T Recommendation X.210: "Open Systems Interconnection layer service definition conventions".
- [13] ITU-T Recommendation X.213: "Information technology - Network service definition for Open Systems Interconnection".
- [14] CCITT Recommendation X.300: "General principles for interworking between public networks and between public networks and other networks for the provision of data transmission services".
- [15] Addendum 1 to ISO 8348 (1987): "Connectionless mode transmission".

- [16] ISO 8473: "Information processing systems - Data communications - Protocol for providing the connectionless-mode network service".

### 3 Definitions

For the purposes of this ETS, the following definitions apply:

**access rate:** The data rate of the physical connection at the user-network interface. The speed of the physical connection determines how much data (maximum rate) the end-user can inject into the network.

**Forward Explicit Congestion Notification (FECN):** See CCITT Recommendation Q.922 [4] for the full definition.

**Backward Explicit Congestion Notification (BECN):** See CCITT Recommendation Q.922 [4] for the full definition.

**Consolidated Link Layer Management Message (CLLM):** See CCITT Recommendation Q.922 [4] for the full definition.

**Committed Burst size ( $B_C$ ):** The maximum committed amount of data a user may offer to the network during a time interval  $T_C$ .  $B_C$  is negotiated at virtual circuit establishment.

**Committed rate measurement interval ( $T_C$ ):** The time interval during which the user is allowed to send only the committed amount of data ( $B_C$ ) and the excess amount of data ( $B_E$ ).  $T_C$  is computed.

**Committed Information Rate (CIR):** The information transfer rate which the network is committed to transfer under normal conditions. The rate is averaged over a minimum increment of time  $T_C$ . CIR is negotiated at virtual circuit establishment.

**congestion management:** This includes: network engineering, Operation, Administration and Maintenance (OAM) procedures to detect the onset of congestion; and real time mechanisms to prevent or recover from congestion. Congestion management includes, but is not limited to; congestion control, congestion avoidance and congestion recovery, as defined below:

- **congestion control:** this refers to real-time mechanisms to prevent and recover from congestion during periods of coincidental peak traffic demands or network overload conditions (e.g. resource failures). Congestion control includes both congestion avoidance and congestion recovery mechanisms;
- **congestion avoidance:** congestion avoidance procedures refer to procedures initiated at or prior to the onset of mild congestion in order to prevent congestion from becoming severe. Congestion avoidance procedures operate around and within the regions of mild congestion and severe congestion;
- **congestion recovery:** congestion recovery procedures refer to procedures initiated to prevent congestion from severely degrading the end-user perceived Quality of Service (QoS) delivered by the network. These procedures are typically initiated when the network has begun to discard frames due to congestion. Congestion recovery procedures operate around and within the region of severe congestion.

**core service:** See CCITT Recommendation Q.922 [4], annex A for the full definition.

**C-plane:** The C-plane refers to the data exchanged across a user-network interface for establishment, release, monitoring, etc. of virtual circuits that are carried out outside the virtual circuits' data transmission.

**delivered duplicated frames:** A frame D received by a particular destination user is defined to be a duplicated frame if both of the following conditions are true:

- frame D was not generated by the source user;
- frame D is exactly the same as a frame that was previously delivered to that destination.

**delivered errored frames:** A delivered frame is defined to be an errored frame when the values of one or more of the bits in the frame is in error, or when some, but not all, bits in the frame are lost bits or extra bits (i.e. bits which were not present in the original signal) have been inserted (see ITU-T Recommendation X.140 [10]).

**delivered out-of-sequence frames:** Consider a sequence of frames  $F_1, F_2, F_3, \dots, F_n$  and assume that  $F_1$  is transmitted first,  $F_2$  second,  $\dots, F_n$  last.

A delivered frame  $F_i$  is defined to be out-of-sequence if it arrives at the destination after any of the frames  $F_{(i+1)}, F_{(i+2)}, \dots, F_n$ .

**discard eligibility indicator:** This indicates that a frame should be discarded in preference to other frames in a congestion situation, when frames need to be discarded to ensure safe network operation and to maintain the committed level of service within the network.

**egress node:** The node that supports the destination user-network interface.

**Excess Burst size ( $B_E$ ):** The maximum allowed amount of data by which a user can exceed  $B_C$  during a time interval  $T_C$ . This data ( $B_E$ ) is delivered in general with a lower probability than  $B_C$ .  $B_E$  is negotiated at virtual circuit establishment.

**fairness:** An attempt by the network to maintain the committed call parameters which the end-user negotiated at call set-up time. An example of this would be first discarding the frames in excess of the CIR and refusing to allow new call set-ups to occur prior to discarding committed data traffic.

**information integrity:** Information integrity is preserved when for all frames delivered by the network no transmission errors have been detected.

**ingress node:** The node that supports the source user-network interface.

**lost frames:** A transmitted frame is declared to be a lost frame when the frame is not delivered to the intended destination user within a specified timeout period, and the network is responsible for the non-delivery (see ITU-T Recommendation X.140 [10]).

**misdelivered frames:** A misdelivered frame is a frame transferred from a source to a destination user other than the intended destination user. It is considered inconsequential whether the information is correct or incorrect in content (see ITU-T Recommendation X.140 [10]).

**offered load:** Refers to the frames offered to the network, by an end-user, to be delivered to the selected destination. The information rate offered to the network could exceed the negotiated class of service parameters.

**residual error rate:** The residual error rate is defined for frame relay services and the corresponding layer services. The layer services corresponding to the frame relay services are characterized by the exchange of Service Data Units (SDUs). For frame relay, SDUs are exchanged at the functional boundary between the core functions of CCITT Recommendation Q.922 [4] and the end-to-end protocol implemented above them. The network participates in this exchange by means of FPDUs.

The residual error rate for the frame relay layer service is defined as:

$$R_{fr} = 1 - \frac{\text{Total correct SDUs delivered}}{\text{Total offered SDUs}}$$

The residual error rate for frame relay is defined as:

$$R_{fr} = 1 - \frac{\text{Total correct SDUs delivered}}{\text{Total offered FPDUs}}$$

**statistical guarantee on traffic parameters:** The QoS level for committed traffic characterized by the CIR,  $B_C$ , and  $T_C$  parameters may be guaranteed with a certain probability. The QoS level for excess traffic characterized by the supplementary parameter  $B_E$  may also be guaranteed with a certain probability.