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SERIES X: DATA NETWORKS AND OPEN SYSTEM
COMMUNICATIONS

Public data networks – Network aspects

Frame Relay network availability

ITU-T Recommendation X.147

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ITU-T Recommendation X.147

Frame Relay network availability

Summary

This Recommendation defines network performance parameters, objectives and measurement methods for describing the availability of Frame Relay networks. The specified parameters and objectives apply to international Frame Relay connection portions – National Portions, International Transit Network Portions and International Interoperator Portions. The objectives, which are worst-case values, are intended to assist service providers with network planning by limiting the aggregate effect of network impairments, including congestion, equipment failures and transmission errors.

A set of network objectives is specified which define the overall network performance based on a statistical sample of Frame Relay connections. The objectives do not apply to or define the performance of an individual Frame Relay connection.

A two-state availability model is defined along with criteria for determining if the service during specific periods of time should be declared to be either available or unavailable. A number of procedures are defined in order to assess the availability performance of virtual connections. An expression for determining a value for overall network availability is presented. Information for estimating availability from a minimal set of observations is also presented.

Source

ITU-T Recommendation X.147 was approved by ITU-T Study Group 17 (2001-2004) under the ITU-T Recommendation A.8 procedure on 29 October 2003.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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ITU-T Recommendation X.147

Frame Relay network availability

1 Scope

The purpose of this Recommendation is to define network performance parameters, worst-case objectives and measurement methods, for FR virtual connection availability together with allocations to national and international portions applicable to international frame relay services. The specified parameters and objectives apply to Frame Relay connection portions as defined in Figure 2.

This Recommendation applies to those networks supporting the service class options of ITU-T Recs X.36 and X.76. (Signalling and service class interworking issues are covered in ITU-T Recs X.36 and X.76.)

The 3×3 performance matrix defined in ITU-T Rec. X.134 (see Figure 1) is used as a guide to identify the applicability of this Recommendation. This Recommendation applies to both permanent and switched virtual connections.

An international Frame Relay virtual connection consists of two national portions and one international portion. The international portion may also be subdivided into a number of connection portions – transit network sections and interoperator circuit sections.

A two-state availability model is defined along with criteria for determining if the service during specific periods of time should be declared to be either available or unavailable. A number of procedures are defined in order to assess the availability performance of virtual connections. An expression for determining a value for overall network availability is presented.

Using this Recommendation, worst-case performance objectives can be derived for the national portions and the international portion of an international Frame Relay connection. Methods for estimating end-to-end availability performance are also provided.

The objectives specified in this Recommendation, which are worst-case values, are intended to assist service providers with network planning by limiting the aggregate effect of network impairments, including congestion, equipment failures and transmission errors, on Frame Relay virtual connection availability. They do not directly correspond to the level of Quality of Service to be expected by individual customers.

This Recommendation defines the availability of a Frame Relay connection in a way that is independent of user behaviour (i.e., a connection can be declared unavailable even if the user is not transmitting frame at a given time). Availability objectives need not be met on any connection that a network provider has determined to be non-compliant with the traffic contract defined by the CIR and EIR.

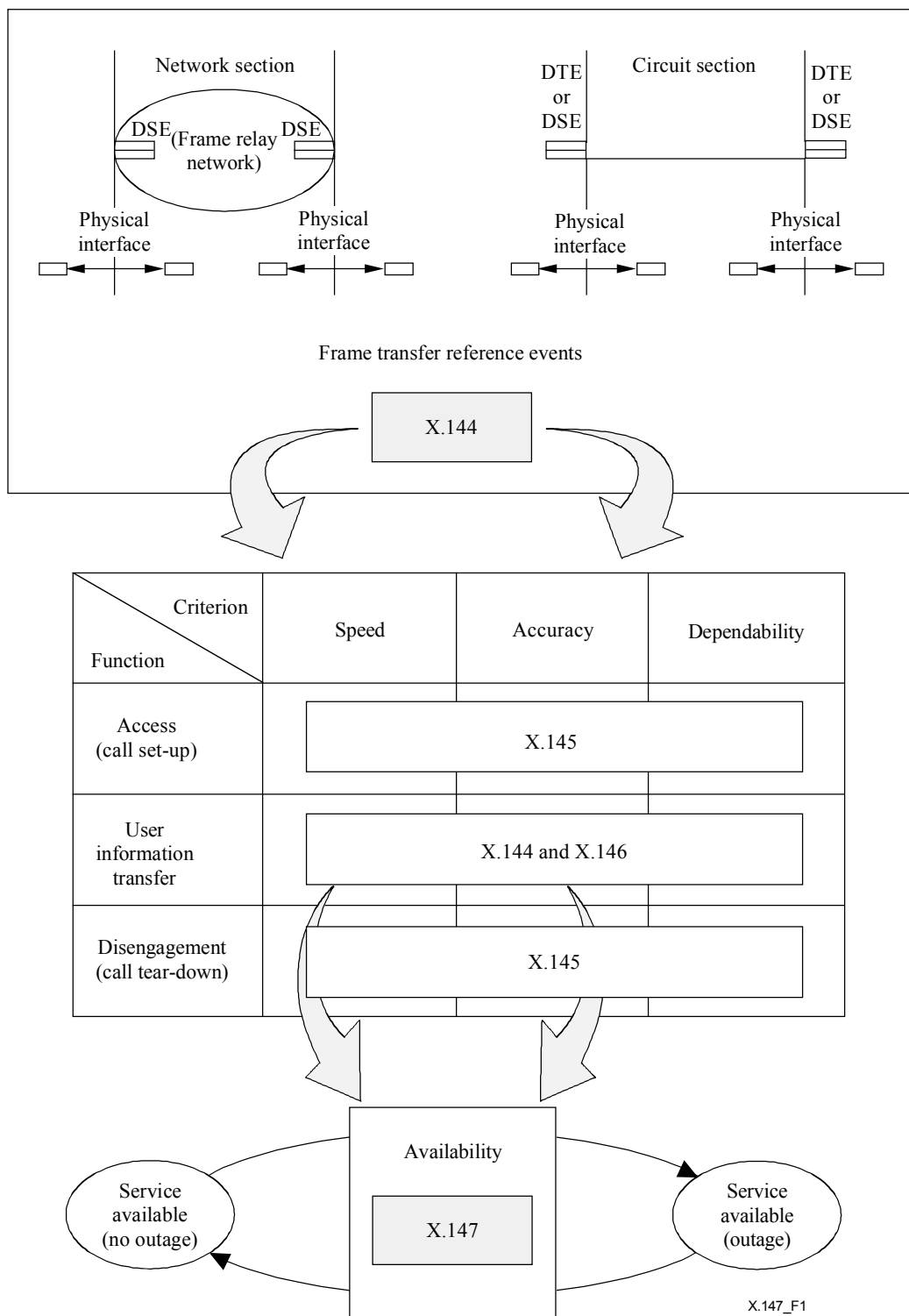


Figure 1/X.147 – Scope of this Recommendation

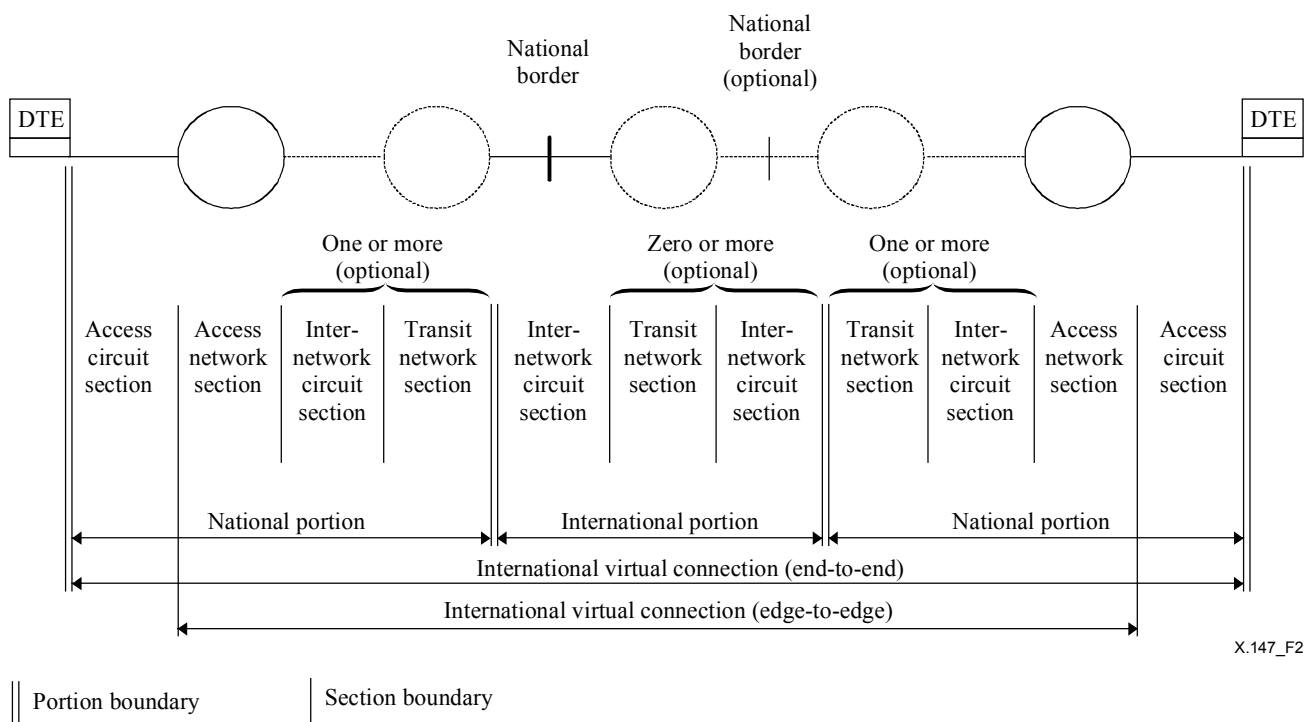


Figure 2/X.147 – General Reference model for the apportionment of national and international portions of a multiple-network international Frame Relay virtual connection

2 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; 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. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- ITU-T Recommendation X.36 (2003), *Interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for public data networks providing frame relay data transmission service by dedicated circuit.*
- ITU-T Recommendation X.76 (2003), *Network-to-network interface between public networks providing PVC and/or SVC frame relay data transmission service.*
- ITU-T Recommendation X.140 (1992), *General quality of service parameters for communication via public data networks.*
- ITU-T Recommendation X.144 (2003), *User information transfer performance parameters for public frame relay data networks.*
- ITU-T Recommendation X.145 (2003), *Connection establishment and disengagement performance parameters for public Frame Relay data networks providing SVC services.*
- ITU-T Recommendation X.146 (2000), *Performance objectives and quality of service classes applicable to frame relay.*
- ITU-T Recommendation X.148 (2003), *Procedures for the measurement of the performance of public data networks providing the international frame relay service.*