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Packet-Switched Data Communication Services – Performance Parameters, Measurements Methods, and Objectives

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American National Standard
for Telecommunications –

Packet-Switched Data Communication Service – Performance Parameters, Measurements Methods, and Objectives

Secretariat

Alliance for Telecommunications Industry Solutions

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Foreword (This foreword is not part of American National Standard T1.504-1998.)

This standard defines a set of performance parameters for packet-switched data communication services. The parameters may be used to specify or measure the performance of any virtual connection (or section of a virtual connection) delimited by the interfaces described in two ITU-T Recommendations: 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),* and X.75 *(Packet-switched signalling systems between public networks providing data transmission services).* The parameters address both virtual call and permanent virtual circuit services. They describe performance relative to three primary data communication functions: access, user information transfer, and disengagement. Each function is considered with respect to three general performance criteria: speed, accuracy, and dependability. The defined parameters are of two types: primary parameters and availability parameters. The primary parameters provide a relatively detailed description of performance that encompasses each of the three functions and criteria. The availability parameters are derived from observations of the primary parameter values and provide a more macroscopic, long-term view of performance. The parameters are defined on the basis of standard interface events to facilitate their measurement with stand-alone test equipment.

This standard evolved from, and is complementary to, a number of other national and international standards. In *American National Standard for Information systems - Data communications systems and services - User-oriented performance parameters,* ANSI X3.102-1992, parameters are defined that may be used to describe the performance of data communication services from the point of view of the end user in a protocol-independent manner. Many of the parameters defined in this T1 standard are protocol-specific counterparts to the parameters in ANSI X3.102. In *American National Standard for Information systems - Data communication systems and services - Measurement methods for user-oriented performance evaluation,* ANSI X3.141-1987 (R1992), measurement methods for the parameters described in ANSI X3.102 are defined. In *General quality of service parameters for communications via Public Data Networks,* ITU-T Recommendation X.140, protocol-independent quality-of-service parameters are defined that are similar to those defined in ANSI X3.102. Finally, packet switched service performance parameters, apportionment boundaries and worst-case performance values for international packet switched services are defined in ITU-T Recommendations X.134, X.135, X.136, and X.137.

This standard contains five annexes. Annexes A through E are informative and are not considered part of the standard.

Suggestions for improvement of this standard are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, 1200 G Street, NW, Suite 500, Washington, DC 20005

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American National Standard
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Packet-Switched Data Communication Service – Performance Parameters, Measurement Methods, and Objectives

1 Introduction

The purpose of this standard is to define a set of parameters that may be used in specifying and measuring the performance of packet switched data communication services provided in accordance with ITU-T Recommendations X.25 and X.75.

The defined parameters are applicable to switched virtual-call services. Some parameters pertain to permanent virtual-circuit services as well. They describe four general service performance characteristics: speed, accuracy, dependability, and availability.

The parameters defined in this standard may be used to specify or measure the performance of any entity delimited by the boundaries defined in ITU-T Recommendations X.25 and X.75. This standard specifies the boundaries, described in ITU-T Recommendations X.25 and X.75, at which performance can be measured. The specification of these boundaries is not intended to imply any specific allocation of performance responsibility.

The organization of this standard is summarized in figure 1. For comparability and completeness, packet switched network performance is considered in the context of the 3x3 performance matrix defined in *American National Standard for Information systems - Data communication systems and services - User-oriented performance parameters,* ANSI X3.102-1992. Three protocol-independent data communication functions are identified in the matrix: access, user information transfer, and disengagement. Each function is considered with respect to three general performance concerns (or "performance criteria"): speed, accuracy, and dependability. A two-state model provides a basis for describing service availability.

Clause 2 presents normative references.

Clause 3 defines sections of a virtual connection whose boundaries are associated with the interfaces described in ITU-T Recommendations X.25 and X.75, and defines a set of packet layer reference events (PEs) that provide a basis for performance parameter definition.

Clause 4 defines protocol-specific speed-of-service parameters associated with each of the three data communication functions.

Clause 5 defines protocol-specific accuracy and dependability parameters associated with each function.

Clause 6 specifies the availability function and defines availability parameters.

Clause 7 defines measurement methods to be used in assessing and comparing the performance of packet-switched data communications services.

Clause 8 specifies worst-case design objectives for the packet-switched performance parameters defined in clauses 4, 5, and 6.