ATIS-0300245.2019

Directory Service for Telecommunications Management Network (TMN) and Synchronous Optical Network (SONET)

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American National Standard for Telecommunications

Directory Service for Telecommunications Management Network (TMN) and Synchronous Optical Network (SONET)

Alliance for Telecommunications Industry Solutions

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Abstract

This standard specifies the usage of the X.500 Directory, protocols, and services for communications between Directory Users and Directory Servers. These specifications are for use of the Directory in support of management communications within the Telecommunications Management Network (TMN), and for specific technologies, such as Synchronous Optical Network (SONET).

Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

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ANSI guidelines specify two categories of requirements: mandatory and recommendation. The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages.

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

At the time of consensus on this document, TMOC, which was responsible for its development, had the following leadership:

P. Galarza, TMOC Chair (iconectiv)
T. Barrett, Technical Editor (AT&T)

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Directory Service for Telecommunications Management Network (TMN) and Synchronous Optical Network (SONET)

1 Scope

Directory Service provides a means for locating essential information about network resources and their attributes. A directory service can avoid the cumbersome task of locating resources and services needed to handle the growth of interconnected networks, which are increasing in size, complexity, and diverse requirements. The ITU-T Recommendation X.500 Directory provides a general information sharing service utilizing a set of communication protocol facilities and a global name management infrastructure.

This standard specifies the usage of the ITU-T Recommendation X.500 Directory Service within the *Telecommunications Management Network* (TMN). The ITU-T Recommendation X.500 Directory operates in an *Open Systems Interconnection* (OSI) environment and uses the *Association Control Service Element* (ACSE) and *Remote Operations Service Element* (ROSE) of the OSI application layer. Additionally, implementations supporting replication use the Reliable Transfer Service Element (RTSE) of the OSI application layer.

This standard identifies the Directory Services needs of the TMN and addresses the Directory Service support for name to address mapping, specifically for an *Application Entity* (AE) title to facilitate association set up. This standard also examines some requirements for the *Synchronous Optical Network* (SONET) as a specific technology example in particular, including SONET transmission network elements (e.g., broadband cross-connects, wideband cross-connects, lightwave systems, add-drop multiplexers, repeaters, digital loop carriers, etc.) and SONET management systems (e.g., operation systems, mediation devices, element managers, etc.), that connect to the SONET *Data Communications Network* (DCN). Additional Directory Services needs for SONET and other specific technologies may be identified in the future. This standard serves as a basis for future extension of the usage of ITU-T Recommendation X.500 Directory Service for sharing information needed in the TMN for management of networks. This standard specifies Directory replication and use of *Back-Up Directory Server* (B-DS) as alternate methods for enhancing the reliability of the Directory Service.

This standard for Directory Service for TMN does not rely on any other profile, as no suitable *International Standardized Profile* (ISP) yet exists for the ITU-T X.500 series of Recommendations upon which this standard is based. The model for the Directory Service for TMN is the model in *International Telecommunication Union – Telecommunication Standardization Sector* (ITU-T) Recommendation X.501, with the addition of a *Registration Manager* (RM) and *Registration Agent* (RA) to handle automatic registration of *Network Element* (NE) entries into the Directory under certain conditions.

The protocols for the TMN Directory Service are the *Directory Access Protocol* (DAP), *Directory System Protocol* (DSP), *Directory Information Shadowing Protocol* (DISP), and *Directory Operational Binding Management Protocol* (DOP) protocols specified in the X.500 series of ITU-T Recommendations. These protocols are to be used in conformance to the ITU-T X.500 Recommendations. Only the DAP is fully

addressed in this standard, and its profile is provided in Annex B.[1] The profiles for DSP, DISP, and DOP are planned to be added to this TMN Directory standard as needed in future expansions. A *Registration Request Protocol* (RRP) has been added for automatic registration. The application and profiling of DISP and DOP are for further study. This standard also does not fully address security.

The Directory object classes and attributes profiled for use in TMN are a subset of those defined in ITU-T Recommendations X.521 and X.520, plus a small number of TMN-specific objects and attributes defined here for the purposes of representing Network Elements and Operations Systems. This standard also identifies a set of structural object classes, their naming rules, and their naming attributes specified in the X.500 Recommendations. This is the minimum that shall be supported within the *Directory Information Tree* (DIT) commonly used within the TMN.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ATIS-0300208, *Operations, Administration, Maintenance, and Provisioning (OAM&P) – Upper-Layer Protocols for Telecommunications Management Network (TMN) Interfaces, Q and X Interfaces*.[2]

ITU-T Recommendation M.3010, *Principles for a telecommunications management network*.[3]

ITU-T Recommendation M.3100, *Generic network information model*.[3]

ITU-T Recommendation X.200, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model. (same as ISO 7498-1: Information Technology – Open Systems Interconnection – Basic Reference Model: The Basic Model)*.[3]

ITU-T Recommendation X.247 | ISO/IEC 8650-2: *Information technology – Open Systems Interconnection – Protocol specification for the association control service element (ACSE): Protocol Implementation Conformance Statement (PICS) proforma*.[3]

ITU-T Recommendation X.249 | ISO/IEC 9072-3: *Information Technology – Open Systems Interconnection – Remote Operations: Protocol Implementation Conformance Statement (PICS) Proforma.*[3]

ITU-T Recommendation X.500 | ISO/IEC 9594-1: *Information technology – Open Systems Interconnection – The Directory: Overview of concepts, models and services*.[3]

ITU-T Recommendation X.501 | ISO/IEC 9594-2: *Information technology – Open Systems Interconnection – The Directory: Models*.[3]

ITU-T Recommendation X.509 | ISO/IEC 9594-8: *Information technology – Open systems interconnection – The Directory: Public-key and attribute certificate frameworks*.[3]

ITU-T Recommendation X.511 | ISO/IEC 9594-3: *Information Technology – Open Systems Interconnection – The Directory: Abstract service definition*.[3]

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[1] The profile is based on a draft *Protocol Implementation Conformance Statement* (PICS) for DAP currently being worked on by *OSI Implementor's Workshop* (OIW). When the draft PICS become standardized, this TMN Directory standard is planned to align with the PICS.

[2] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=24609 >.

[3] This document is available from the International Telecommunications Union. < http://www.itu.int/ITU-T/ >