A Joint Standard of AASHTO, ITE, and NEMA

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National Transportation Communications for ITS Protocol

Internet (TCP/IP and UDP/IP) Transport Profile

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The Internet (TCP/IP and UDP/IP) Transport Profile is based upon a Department of Defense Standardized Profile for the specification and implementation of the TCP/IP and UDP/IP Protocols; MIL-STD-2045-14502-1A: 27 July 1995. NTCIP 2202 borrows heavily from that work and special credit is due the Data Communications Protocol Standards Technical Management Panel for publishing the standard and placing it in the public domain.

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FOREWORD

This document uses only metric units.

This publication defines a transport profile that is a combination of standards intended to meet specific requirements for transport services in transportation devices and management centers in a networked environment. The scope covers the transport and network layers of the OSI Reference Model. This publication contains mandatory requirement statements that are applicable to all devices claiming conformance to this standard. This publication also contains optional and conditional requirements that may be applicable to a specific environment in which a device is used.

The text includes mandatory requirements in Annex A that are defined as normative.

For more information about NTCIP standards, visit the NTCIP Web Site at http://www.ntcip.org. For a hardcopy summary of NTCIP information, contact the NTCIP Coordinator at the address below.

In preparation of this NTCIP document, input of users and other interested parties was sought and evaluated. Inquires, comments, and proposed or recommended revisions should be submitted to:

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Approvals

This document was separately balloted and approved by AASHTO, ITE, and NEMA after recommendation by the Joint Committee on the NTCIP. Each organization has approved this standard as the following standard type, as of the date:

AASHTO – Standard Specification; May 2000
ITE – Software Standard; May 2001
NEMA – Standard; January 2001

History

From 1998 to 1999, this document was referenced as TS 3.TP-INTERNET or TS 3.TUI. However, to provide an organized numbering scheme for the NTCIP documents, this document is now referenced as NTCIP 2202. The technical specifications of NTCIP 2202 are identical to the former reference, except as noted in the development history below:

TS 3.TP-INTERNET v98.01.09. October 1998 – Accepted as a User Comment Draft by the Joint Committee on the NTCIP.

NTCIP 2202 v99.01.04. July 1999 – Version 01.03 accepted as a Recommended Standard by the Joint Committee on the NTCIP. NTCIP Standards Bulletin B0043 reported typographic corrections from the prior version. Approved by AASHTO in May 2000, approved by ITE in May 2001, and approved by NEMA in January 2001.

NTCIP 2202:2001 v01.05. December 2001 – Reformatted for printing: Incremented version number and updated date; added and revised front matter to conform to NTCIP 8002, and updated headers, footers, and page numbers.

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INTRODUCTION

The context of the NTCIP is one part of the Intelligent Transportation Systems standardization activities covering base standards, profiles, and registration mechanisms.

- Base Standards define procedures and rules for providing the fundamental operations associated with communications and information that is exchanged over fixed-point communications links.

- Profiles define subsets or combinations of base standards used to provide specific functions or services. Profiles prescribe particular subsets or options available in base standards necessary for accomplishing a particular function or service. This provides a basis for the development of uniform, nationally recognized conformance.

- Registration Mechanisms provide a means to specify and uniquely identify detailed parameters within the framework of base standards and/or profiles.

The Profiles Working Group is concerned with the methodology of defining profiles, and their documentation in Standards Publications. This standard defines a transport profile that provides connectionless and connection-oriented transport services over a connectionless network service and is based upon the Internet TCP/IP Protocol Suite. The objective is to facilitate the specification of ITS characterized by a high degree of interoperability and interchangeability of its components.

In 1992, the NEMA 3-TS Transportation Management Systems and Associated Control Devices Section began the effort to develop the NTCIP. Under the guidance of the Federal Highway Administration's NTCIP Steering Group, the NEMA effort was expanded to include the development of communications standards for all transportation field devices that could be used in an ITS network.

In September 1996, an agreement was executed among AASHTO, ITE, and NEMA to jointly develop, approve, and maintain the NTCIP standards.

After research into how national and international standards organizations combine protocols and standards to address all seven layers of the ISO-OSI Reference Model, the committee adopted the approach defined in the *NTCIP Profile Framework.* Following that approach, a protocol stack is specified by application, transport, and subnetwork profiles. An application profile addresses the application, presentation, and session layers. A transport profile addresses the transport and network layers. A subnetwork profile addresses the data link and physical layers. The *NTCIP Internet (TCP/IP and UDP/IP) Transport Profile* (TP-Internet) is a transport profile for use in center-to-roadside and center-to-center communications.

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Section 1
GENERAL

1.1 SCOPE

This standard is applicable to transportation devices and management systems that must operate in Intelligent Transportation Systems. As a transport profile, it specifies a set of protocols and standards applicable to the transport and network layers of the ISO - OSI Reference Model. The set of protocols provides a connectionless or connection-oriented transport service over a connectionless network service. This standard is intended to provide message transport and delivery services between transportation devices and a management station or among multiple centers. This standard applies to end systems concerned with implementing the TCP/IP protocol suite.

1.2 PROFILE-PROTOCOL-LAYER RELATIONSHIP

This transport profile specifies the provision for connectionless or connection-oriented transport service between an end system connected to a subnetwork and another compatible end system through the IP connectionless network service. The interoperable end system may use mutually agreed upon access methods contained within this TP, or may conform to a mutually agreed upon alternative access method. An end system is compatible only if the suboptions (e.g., TCP) are compatible. A complete transport profile requires knowledge of the subnetwork type, access method, circuit type, and service type. The layers, base standards and profile taxonomy that make up this profile are shown in Figure 1.

ISO Layers	Base Standards	Profile
TRANSPORT LAYER	IAB STD 7 (TCP) IAB STD 6 (UDP)	NTCIP 2202 (Internet Transport Profile)
NETWORK LAYER	IAB STD 5 (IP and ICMP)	

Figure 1
TCP/IP and UDP/IP - Transport Profile Relationship

1.3 REFERENCES

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For draft revisions of this document, which are under discussion by the relevant NTCIP Working Group, and recommended revisions of the NTCIP Joint Committee, visit the World Wide Web at http://www.ntcip.org.

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