A Joint Standard of AASHTO, ITE, and NEMA

NTCIP 1103 version v03

National Transportation Communications for ITS Protocol

Transportation Management Protocols (TMP)

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At the time that NTCIP 1103 v03 was prepared, the following individuals were voting members of the NTCIP BSP2 WG:

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FOREWORD

NTCIP 1103 v03 defines a composite application layer protocol for the management of transportation equipment. The composite protocol consists of three component protocols: the Internet-standard Simple Network Management Protocol (SNMP), the Simple Fixed Message Protocol (SFMP), and the Simple Transportation Management Protocol (STMP). The protocols are concerned with the procedures for exchanging information as well as the format in which the information is exchanged, and each of the three protocols provide the same base services, but are designed with different needs in mind. NTCIP 1103 v03 also defines a limited number of data elements necessary to manage these protocols. The data elements are defined according to the rules of NTCIP 8004 v02. Data elements in NTCIP 1103 v03 have been updated in accordance with and to reflect changes introducted in NTCIP 8004 v02. When related to the ISO OSI Reference model, these protocols are concerned with the upper three layers (application, session, and presentation layer). NTCIP 1103 v03 contains two normative and two informative annexes. NTCIP 1103 v03 uses only metric units.

NTCIP 1103 v03 is also an NTCIP Base Standard. NTCIP Base Standards provide definitions of the procedures and data formats for use within NTCIP systems. For more information about NTCIP standards, visit the NTCIP Web Site at www.ntcip.org. NTCIP 1103 v03 defines requirements that are applicable to all NTCIP environments and also contains optional and conditional sections that are applicable to specific environments for which they are intended.

The following keywords apply to NTCIP 1103 v03: AASHTO, ITE, NEMA, NTCIP, protocol, message, transportation, simple, TMP, SNMP, SFMP, STMP, trap, traps.

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Approvals

NTCIP 1103 v03 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; September 2016
ITE—Software Standard; [month, year]
NEMA—Standard; August 2016

History

In 1992, the NEMA 3TS Transportation Management Systems and Associated Control Devices Section began the effort to develop the NTCIP. The Transportation Section's purpose was to respond to user needs to include standardized systems communication in the NEMA TS 2 standard, Traffic Controller Assemblies. 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 Intelligent Transportation Systems (ITS) network.

In September 1996, an agreement was reached among AASHTO, ITE, and NEMA to jointly develop, approve, and maintain NTCIP standards. In late 1998, the Base Standards and Protocols Working Group was tasked with the effort to develop and maintain base standards for the NTCIP. In late 2003, the Joint Committee on the NTCIP merged the Base Standards and Protocols Working Group with the Profiles Working Group and the new group was designated the Base Standards, Protocols, and Profiles Working Group. The first meeting of the merged working group was held in January 2004.

From 1996 to 2004, parts of NTCIP 1103 v02, including the definition of STMP, were defined in NTCIP 1101:1996 / NEMA TS 3.2. However, to provide a more organized and modular set of standards, NTCIP 1101:1996 was separated into three distinct standards: NTCIP 1103 v02, which includes the definition of STMP; NTCIP 1102:2004, which defines the Octet Encoding Rules (OER); and NTCIP 8004 v02, which defines the Structure and Management of Transportation Information (SMI). These three standards completely replace NTCIP 1101:1996 / NEMA TS 3.2.

NTCIP 1103 v01.27, January 2009—In October 2004, v01.25 was Accepted as a Recommended Standard by the Joint Committee on the NTCIP. In June 2005, pre-ballot comments on community name were addressed and v01.26 was sent for SDO balloting. In November 2005, NTCIP 1103 v01 was Jointly Approved. In December 2008, NTCIP 1103 v01.27 was edited and published.

NTCIP 1103 v02.10, May 2006—Developed and incorporated the NTCIP Trap mechanism and proposed as version 02 User Comment Draft. December 2006—Standards Bulletin B0117 sent v02.10b for review.

In December 2007, the NTCIP Joint Committee agreed to remove the trap mechanism from NTCIP 1103 v02, and to increment to a proposed new major version NTCIP 1103 v03 to define traps. January 2008—Addressed user comments in v02.14.

NTCIP 1103 v02.17, July 2010—In January 2008, the NTCIP 1103 v02.14 was revised as a proposed Recommended Standard, which in February 2008 was accepted by the NTCIP Joint Committee as a Recommended Standard. From 2008 to April 2009, NTCIP 1103 v02.16 was

edited for SDO balloting and approval. After June 2010 Joint Approval, the NTCIP 1103 v02.17 was edited for publication.

Compatibility of Versions

To distinguish NTCIP 1103 v03 (as published) from previous drafts, NTCIP 1103 v03 also includes NTCIP 1103 v03.52 on each page header. All NTCIP standards publications have a major and minor version number for configuration management. The version number syntax is "v00.00a," with the major version number before the period, and the minor version number and edition letter (if any) after the period.

NTCIP 1103 v03 is designated and should be cited as NTCIP 1103 v03. Anyone using NTCIP 1103 v03 should seek information about the version number that is of interest to them in any given circumstance. The MIB, the PRL, and the PICS should all reference the version number of the standards publication that was the source of the excerpted material.

Compliant systems based on later, or higher, version numbers MAY NOT be compatible with compliant systems based on earlier, or lower, version numbers. Anyone using NTCIP 1103 v03 should also consult NTCIP 8004 v02 for specific guidelines on compatibility.

STMP, as defined within NTCIP 1103 v03, is consistent with the definition contained in NTCIP 1101:1996 / NEMA TS 3.2; however, the protocol is extended to support Simple Fixed Message Protocol. NTCIP 1103 v03 has also been expanded to address several other issues and to incorporate some of the protocol-specific data originally defined in NTCIP 1201:2005.

NTCIP 1103 v03 supports traps (event-driven reporting); however, neither of its predecessors (NTCIP 1103 v01, nor NTCIP 1103 v02) did so. In early 2005, the WG decided on an approach to address the capability of event-driven device management and/or exception reporting via the trap mechanism, which are included in NTCIP 1103 v03. The trap mechanism allows the management station to configure the remote station to report varying status information at varying intervals without being polled.

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Section 1
General

1.1 Scope

The Transportation Management Protocol (TMP) specifies an NTCIP Application Layer service. TMP defines a set of rules and procedures for exchanging transportation management information between transportation management applications and transportation equipment such that they interoperate with each other. The transportation management information that is exchanged using TMP is defined elsewhere according to the rules defined in NTCIP 8004 v02. Messages conforming to TMP may be exchanged using any appropriate transport mechanism.

> Note: TMP was carefully designed to provide 100% interoperability with the Internet-standard Simple Network Management Protocol (SNMP), but extends SNMP structure to meet the needs of the transportation environment. Analysis of the transportation environment has revealed the need for protocol *simplicity*, *flexibility*, and *minimal data packet size*; however, in many cases, these three requirements are at odds.

After a careful review of existing protocols, it was decided to pursue the development of TMP, which combines the capabilities of three component protocols. Each component protocol has been designed to maximize two of the three requirements at the expense of the third requirement.