National Transportation Communications for ITS Protocol
Simple Transportation Management Framework

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This publication was prepared by the NTCIP Base Standards and Protocols Working Group, which is a subdivision of the Joint Committee on the NTCIP. The Joint Committee is organized under a Memorandum of Understanding among the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the National Electrical Manufacturers Association (NEMA). The Joint Committee on the NTCIP consists of six representatives from each of the standards organizations, and provides guidance for NTCIP development.

At the time that this document was prepared, the following individuals were active members of the NTCIP Base Standards and Protocols Working Group:

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In addition to the many volunteer efforts, recognition is also given to those organizations who supported the efforts of the working groups by providing comments and funding for the standard, including:

- ARINC, Inc.
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- Peek Traffic Systems, Inc.
- Southwest Research Institute
- Vanasse, Hagen, & Brustlin, Inc.
FOREWORD

This document uses only metric units.

This publication describes the Simple Transportation Management Framework used for managing and communicating information between management stations and transportation devices. It presents the rules by which information is described and encoded for transmission. It also describes the Simple Transportation Management Protocol that is used to transfer information across communication links.

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

For more information about NTCIP standards, visit the NTCIP Web Site at [http://www.ntcip.org](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:

- ITE – Software Standard; 1997
- NEMA – Standard; 1996

History

From 1994 to 1999, this document was referenced as NEMA TS 3.2. However, to provide an organized numbering scheme for the NTCIP documents, this document is now referenced as NTCIP 1101. The technical specifications of NTCIP 1101 are identical to the former reference, except as noted in the development history below:


- NTCIP 1101 Amendment 1, version 98.01.08. October 1998 – Version 98.01.07 accepted as a Recommended Amendment by the Joint Committee on the NTCIP, and referred for balloting and approval by NTCIP Standards Bulletin B0030 in May 1999. Amendment approved by AASHTO in October 1999; approved by ITE in January 2001; and approved by NEMA in December 1999.
NTCIP 1101:1996 v01.12, December 2001. January 2002 – Formatted for printing: incorporated Amendment 1 v08 into text; updated title page date and version number; revised front matter to conform to NTCIP 8002; edited Introduction; and updated headers, footers, and page numbers.
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.

In 1992, the NEMA 3-TS 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 executed among AASHTO, ITE, and NEMA to jointly develop, approve, and maintain the NTCIP standards. In 1998, the Joint AASHTO/ITE/NEMA Committee on NTCIP formed the Base Standards and Protocols Working Group (BSP WG) to take over management of the original NEMA TS 3.2 standard and develop other base standards. The first meeting of the working group was in January 1999.

The BSP WG is concerned with the identification of applicable standards to address a transportation need, the definition of base standards and protocols in case existing standards do not address the identified need, and their documentation in Standards Publications. This standard, originally developed by NEMA as TS 3.2, contains both the definition of several base standards and an application profile that uses the base standards and others. As such, the intention of the BSP WG is maintain the standard as originally written and decompose it into its constituent parts. NTCIP 1101 will be replaced by three documents: (a) NTCIP 1102, which defines the Octet Encoding Rules (OER); (b) NTCIP 1103, which defines the Simple Transportation Management Protocol (STMP); and (c) NTCIP 8004, which defines the Structure and Identification of Management Information (SMI). The NTCIP Profiles Working Group will also develop NTCIP 2301, which defines the Simple Transportation Management Framework - Application Profile (AP-STMF).
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Joint AASHTO, ITE, and NEMA
NTCIP Management Information Base and Data Dictionary

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Section 1
GENERAL

1.1 SCOPE
The scope covers integrated management of transportation networks, networking devices and transportation specific equipment attached to NTCIP-based networks. This encompasses previous scopes addressed by other networking management frameworks within the Internet community, including the network management applications. It extends the scope beyond the Internet network management by addressing transportation equipment, networks and transportation management applications.

This includes the structure and identification of transportation information within transportation equipment, the protocols that act on defined information entities and the management applications used for controlling the transportation equipment. An extension to the Internet-standard Network Management Framework, called Simple Transportation Management Framework (STMF), allows for the operation, control, monitoring and configuration of NTCIP networks and the transportation equipment participating on the network. This includes networks utilizing legacy communication mediums such as 1200 bps FSK. This framework also details differences between Simple Transportation Management Framework (STMF) and the original Internet-Network Management Framework.

1.2 REFERENCES
For approved revisions, contact:

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For draft revisions, 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.

The following publications are adopted in part, by reference in this publication, and are available from the organizations below.

1.2.1 Normative References
The following normative documents contain provisions, which through reference in this text, constitute provisions of this Standards Publication. By reference herein these publications are adopted, in whole or in part as indicated, in this SP.

International Organization for Standardization (ISO)
Case postale 56
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Switzerland

ISO 8824  Specification of Abstract Syntax Notation One (ASN.1), December 1987
ISO 8825  Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1), December 1987