NTCIP SMI

https://ite-org.github.io/NTCIP-8005/latest/

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National Transportation Communications for ITS Protocol

Procedures for Creating Management Information Base (MIB) Files

June 19, 2025

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Acknowledgements

This document was prepared though an open-source standards development process with the following active contributors:

contributors 1

Check out the full list of contributors here.

In addition, the following submitted comments during the process:

- k-vaughn

The resultant document is maintained by the NTCIP Open-Source Process (OPS) Working Group (WG), a subdivision of the Joint Committee on the NTCIP. The Joint Committee on the NTCIP 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 development organizations (SDOs) and provides guidance for NTCIP development.

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Foreword

Overview

This document is an NTCIP Open-Source NTCIP Process, Control, and Information Management document provided as Interim for Field Release (IFR).

Open-source documents are developed using the ITS Open-Source Process, as defined in NTCIP 8008. This process provides an open standards development process that accepts issues reported by the community and resolved by peer-reviewed contributions from the community. The open source process concludes with the resultant material being approved by the defined approval process.

IFR documents are approved through a streamlined process focused on the technical experts of the community (e.g., those participating in the open-source development process) rather than through a formal ballot of industry managers.

NTCIP Process, Control, and Information Management documents define the practices and policies used by the NTCIP Joint Committee and its working groups in developing and maintaining NTCIP publications.

This document provides the policies and procedures for development and maintenance of NTCIP Management Information Base (MIB) files (modules). It defines requirements that are applicable to all NTCIP WGs that develop NTCIP standards containing MIB modules, including NTCIP device data dictionary standards. This document also defines requirements that are applicable to NTCIP Data Stewards in checking MIB modules, in coordinating all NTCIP device data dictionaries, and in liaison with other outside groups or entities using NTCIP MIB modules.

Approvals

IFRs are peer reviewed within the open-source process with final approval by an associated WG established by the NTCIP Joint Committee.

Approval information is provided within the online environment.

For more information about NTCIP standards, visit the NTCIP Web Site at www.ntcip.org.

User Comment Instructions

Comments can be submitted at any time. In preparation of this NTCIP standards publication, input of users and other interested parties was sought and evaluated.

Comments on open-source projects can be submitted either on the discussions or issues tab of the project.

Discussions can be initiated at any time and anyone in the community can respond, all within a public environment. Responses to discussion comments are strictly informative and may not be accurate. Discussion comments can lead to the submittal of issues that need to be resolved to clarify the standard.

Issues can be submitted at any time. Issues are triaged by the project maintainer, who will evaluate their merit, classify them (e.g., as a bug, documentation issue, omission), and in most cases respond to the submitter. Once ready, issues will be available for contributors to volunteer to address. When a volunteer has a proposed solution, it can be submitted to the project and approved in a relatively short period (when compared to the traditional standards approval process). However, updates to the projects are still version controlled so that users can reference a specific version of the project without fear of it changing.

Comments should use the templates provided on the website; otherwise they may be ignored.

History

For a history of the project, see the projects releases page.

🕐June 19, 2025

Introduction

This document defines processes to verify the correctness of a Management Information Base (MIB) module contained in NTCIP data dictionary standards and to prepare a stand-alone version of the MIB module. These processes are used by the NTCIP Joint Committee, its Working Groups (WGs), and NTCIP Data Stewards.

This document contains mandatory requirements that are always applicable and optional and conditional requirements, which may be applicable, for the specification of transportation management information.

This document contains one informative annex.

The following keywords apply to NTCIP 8005: AASHTO, ITE, NEMA, NTCIP, SMI, SNMP, process and control standard.

This document only uses metric units.

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Section 1 General

1.1 Scope

This document defines processes to verify the correctness of a Management Information Base (MIB) module contained in NTCIP data dictionary standards and to prepare a stand-alone version of the MIB module. These processes are used by the NTCIP Joint Committee, its Working Groups (WGs), and NTCIP Data Stewards.

> ✏️ **Note**
>
> MIB modules created prior to NTCIP 8005 v2.0.0 were developed using the Structure and Identification of Management Information (SMI) version 1, as defined in IAB STD 16, and were based on a different syntax checker than what is identified in NTCIP 8005 v2.0.0.

1.2 References

The following documents are referenced by this document. At the time of publication, the editions indicated were valid.

1.2.1 Normative References

Normative references contain provisions that, through reference in this text, constitute provisions of this document. All standards are subject to revision, and parties to agreements

based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard listed.

Identifier	Title
AASHTO / ITE / NEMA NTCIP 8004 v3.0.0-a.1	*Structure and Identification of Management Information (SMI)*

1.2.2 Other References

Other references are included to provide a more complete understanding of this document and its relationship to other documents.

1.2.2.1 Other Resources for Contributors

This document standardizes and tailors certain aspects of the information contained in open-sauced; however, it is not a complete replacement of that material. If you wish to learn more about open-source development, the following materials may be of interest:

Identifier	Title
AASHTO / ITE / NEMA NTCIP 8001 v2.0.0-a.1	*NTCIP Joint Standardization Policies, Processes and Procedures*
IAB STD 58	(RFC 2578, Structure of Management Information Version 2 (SMIv2), 1999; RFC 2579, Textual Conventions for SMIv2, 1999; RFC 2580, Conformance Statements for SMIv2, 1999)
RFC 4181	Guidelines for Authors and Reviewers of MIB Documents, Internet Engineering Task Force (IETF), September 2005

1.2.3 Contact Information

1.2.3.1 Internet Documents

Obtain Request for Comment (RFC) and Internet Architecture Board (IAB) Standards (STD) from:

> www.rfc-editor.org
> www.rfc-editor.org/repositories.html

1.2.3.2 NTCIP Standards

Copies of NTCIP standards may be obtained from:

> NTCIP Coordinator
> National Electrical Manufacturers Association
> 1300 N.17th Street, Suite 900
> Rosslyn, Virginia 22209-3801
> www.ntcip.org
> e-mail: ntcip@nema.org

Draft amendments, which are under discussion by the relevant NTCIP Working Group, and amendments recommended by the NTCIP Joint Committee are available.

1.3 General Statements

The remainder of this document is broken into the following chapters:

- **Development Process**
- **Management Information Bases (MIBs)**
- **Annex A: MIB Header Format**

1.4 Terms

For the purposes of this document, the following terms and definitions apply. Terms not defined here are used in accordance with their definitions in ISO/IEC/IEEE 24765. Words not defined

here or in ISO/IEC/IEEE 24765 are used in accordance with their definitions in *Webster's New Collegiate Dictionary*.

Term	Definition
Data Steward	An organizational element of the ITS community responsible for ensuring that the information in the MIB module portion of any NTCIP data dictionary standard is accurate and does not duplicate information in other standards.
management information base (MIB)	A structured collection of managed information contained within a SNMP context. A MIB represents the instantiated data objects defined by one or more MIB modules and integrated into a device or management station.
MIB module	A sequence of NVT ASCII characters conforming to X.208 Abstract Syntax Notation One (ASN.1) and IAB STD 58. MIB modules are used to define the data objects that are to make up the instantiated objects of the MIB. NOTE—A MIB module can be, and within NTCIP typically is, presented as both part of a standard and as a stand-alone, computer-readable text file. When a MIB module is presented within a standard, there are usually document section headings included that are not technically part of the MIB Module.
MIB file	Stand-alone computer readable file that represents one or more MIB modules.

1.5 Abbreviations

The abbreviations and acronyms used in this document are defined as follows:

CWA	**Committee Work Area**
IEEE	Institute of Electrical and Electronics Engineers, Inc.
OID	Object Identifier
pRS	proposed Recommended Standard
pUCD	proposed User Comment Draft
SMIC	SNMP Management Information Compiler
SMICng	SNMP Management Information Compiler—next generation
SNMP	Simple Network Management Protocol
RFC	Request For Comment
RS	Recommended Standard
UCD	User Comment Draft
WG	Working Group

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Section 2 Development Process

2.1 Process Flow

There are actions defined for NTCIP MIB module creation and maintenance at specific stages of the NTCIP standards development process as defined in NTCIP 8001. The following stages of the NTCIP development process trigger actions of the Data Steward.

a. WG Prepares Proposed User Comment Draft (pUCD) Standard

b. WG Prepares Proposed Recommended Standard (pRS)

c. NTCIP SDOs Approve Standard

d. NTCIP SDOs Approve an Amendment or Revision to a Standard

e. NTCIP SDOs Approve to Rescind a Standard

2.1.1 WG Prepares Proposed User Comment Draft (pUCD) Standard

NTCIP WG submits proposed User Comment Draft (pUCD) standard to the NTCIP Joint Committee for review and acceptance as a UCD. Prior to this submission, a pUCD that contains a MIB module is to have the syntax checked as defined in NTCIP 8005 Section 3 as follows:

a. The NTCIP WG makes the MIB file (computer readable MIB module) available to the assigned Data Steward.

b. The Data Steward checks the syntax of the MIB in the context of all other NTCIP MIB files.

c. The Data Steward reviews the MIB file as to possible duplication of Object Definitions within other NTCIP standards.

d. The Data Steward submits a User Comment to the NTCIP Coordinator and WG chair and/or document editor, reporting on the Data Steward's compilation/review of the MIB file.

e. The User Comment is logged and filed, and any MIB file revisions to be made during the disposition of User Comments and subsequent revisions to the pUCD standard are identified.

f. When revisions are complete, the Data Steward posts a UCD version of the MIB file at the NTCIP MIB FTP site hosted by NEMA.

2.1.2 NTCIP SDOs Approve Standard

NTCIP WGs submit proposed Recommended Standards (pRS) to the NTCIP Joint Committee for review and acceptance as a Recommended Standard. Prior to this submission, a pRS that

contains a MIB module is to have the syntax checked as defined in NTCIP 8005 Section 3 as follows:

a. The NTCIP WG makes the MIB file available to the assigned Data Steward.

b. The Data Steward checks the syntax of the MIB in the context of all other NTCIP MIB files.

c. The Data Steward reviews the MIB file as to possible duplication of Object Definitions within other NTCIP standards.

d. The Data Steward submits a WG comment to the NTCIP Coordinator and WG chair and/or document editor, reporting on the Data Steward's compilation/review of the MIB file.

e. The Data Steward WG comment and any MIB file revisions to be made during the disposition of WG comments and subsequent revisions to the pRS standard are identified.

f. When revisions are complete, the Data Steward posts a Recommended Standard version of the MIB file at the NTCIP MIB FTP site hosted by NEMA and deletes the UCD version.

g. The Data Steward provides a summary of the syntax check and it is included in the ITE Standards Development Report.

2.1.3 Jointly Approved

Upon approval by all three NTCIP SDOs (AASHTO, ITE, and NEMA), a Data Steward updates the MIB file to indicate the Jointly Approved status of the NTCIP standard. The Data Steward posts the updated MIB file (mibFileName.mib) at the NTCIP MIB FTP site. The Data Steward does not remove the Recommended Standard version of the MIB file.

2.1.4 Amended or Revised

When an NTCIP standard is amended or revised to a higher major version number, the same procedures as those used for User Comment Drafts and Recommended Standards are used.

2.1.5 Rescinded

If an NTCIP standard containing a MIB module is rescinded, the Data Steward "retires" the applicable MIB file. "Retiring" consists of adding a "Rescinded" label to the affected MIB file and removing the name of the MIB file from the checking lists. The Data Steward revises the MIB file but does not remove the MIB file from the NTCIP MIB NEMA FTP site.

2.2 Intellectual Property Rights

The intellectual property rights of AASHTO, ITE, and/or NEMA, regarding the NTCIP standards publications, and the included works known as the MIB modules and MIB files, are claimed in the front matter notices of the standards publications, and in the header of the MIB files. AASHTO, ITE, and NEMA also extend certain MIB module and MIB file distribution permission. All MIB module and MIB file users are required to follow the instructions in the MIB Distribution

Permission notice found under "Notices" in those NTCIP standards that contain a MIB module. This includes the derivation citation.

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Section 3 Management Information Bases (MIBs)

3.1 Syntax Checker

The standard compiler for checking the syntax of an SNMP MIB file is *smilint*, which is a free tool developed by Frank Strauss of the Technical University of Braunschweig. Information about the project is available at https://www.ibr.cs.tu-bs.de/projects/libsmi/index.html?lang=de. The software can be downloaded or used online for free at https://www.simpleweb.org/ietf/mibs/validate/upload.php.

3.2 Syntax Checking

3.2.1 Compilation Switches

The tool is used with the maximum level of severity checking (i.e., "6 – Auxiliary notices").

3.2.2 Output

When syntax checked, the MIB file result of no "Errors" is required for acceptance. Any "Warnings" are to be corrected or justified in the Steward's report.

3.3 Input File

The MIB file input to *smilint* is an "ASCII (Text Only)" file that is consistent with NTCIP 8004.

To convert a Word document to an ASCII file suitable for compilation, follow these steps:

   a. Strip all text before and after the MIB (i.e., before the MIB module name and after the "END" statement.)

   b. Convert the font within the MIB to a non-proportional type such as Courier New.

   c. Replace all tabs with the appropriate number of spaces.

   d. Delete any tables or graphics or convert them to ASCII underscore, dashes, or vertical bars.

   e. While file viewers with line wrap format the text in the Description Field, users may prefer to add <CR>s and <LF>s to format the Description Field.

   f. Customize the header numbering so that entries are preceded by "dash dash."

   g. Replace all smart quotes with straight quotes.

   h. Save the text as "plain text" (i.e., rather than a Word document).

3.3.1 MIB Meta Data File

An NTCIP standard may define more than one MIB module. The MIB modules are converted to separate MIB files. Each MIB file contains a header in the form of comments. The header includes information corresponding to the following:

   a. Copyright Statement

   b. MIB Distribution Notice

The text of the Copyright Statement and MIB Distribution Notice from the current version of NTCIP 8002 is included. The coverage year of the copyright is updated to the year in which the MIB file was created or modified.

Annex A contains a sample header and the preferred header formatting style.

3.3.2 Naming Conventions

NTCIP MIB files and module names are used in multiple applications and for purposes of cross-referencing. Therefore, the following naming convention applies.

a. The File Names for MIB files is of the form:

<Standard Number><Version><Revision><Designation>.mib

b. If the NTCIP standard designation contains a year of publication, the year of publication is dropped and the specific version number is used. The designation is optional; however, when a standard contains more than one MIB module, each associated MIB file is to be stored as a separate file with a unique designation, which may be the section or annex number or a descriptive name. These examples serve as illustrations:

    i. 1201v0315rMain.mib

    ii. 1201v0315rAuxIOv.mib

    iii. 1202v0315rAuxIOv02.mib

    iv. 2103v0206CHAP.mib

    v. 2103v0206MOD.mib

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Annex A MIB HEADER FORMAT [Informative]

The following is an example of MIB header text, formatted appropriately for inclusion in any MIB module.

```
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--b)  the copies are not made part of the standard
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--or publishers or as works-for-hire not associated with commercial hardware
--or software products intended for field implementation;
--
-- Implementations of the MIB may be associated with MIB module containing an AGENT-
-- CAPABILITIES macro, which describes the specific features of the standard MIB that
-- the implementation supports.
--
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