U.S. Department of Transportation

Intelligent Transportation Systems Standards Fact Sheet

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NTCIP 2103 (Draft) National Transportation Communications for ITS Protocol (NTCIP) – Subnet Profile for Point-to-Point Protocol over RS-232

Overview

The National Transportation Communications for Intelligent Transportation System (ITS) Protocol (NTCIP) is a family of standards that provides both the rules for communicating (called protocols) and the vocabulary (called objects) necessary to allow electronic traffic control equipment from different manufacturers to operate with each other as a system. The NTCIP is the first set of standards for the transportation industry that allows traffic control systems to be built using a "mix and match" approach with equipment from different manufacturers. Therefore, NTCIP standards reduce the need for reliance on specific equipment vendors and customized one-of-a-kind software. To assure both manufacturer and user community support, NTCIP is a joint product of the National Electronics Manufacturers Association (NEMA), the American Association of State Highway and Transportation Officials (AASHTO), and the Institute of Transportation Engineers (ITE).

The NTCIP family of standards is a joint project of the following standards development organizations:

American Association of State Highway and Transportation Officials (AASHTO)

Institute of Transportation Engineers (ITE)

National Electrical Manufacturers Association (NEMA)

(Contact information is shown at the end of this fact sheet)

Expected Publication Date: January 2003
For current information on the status of this standard, check the Web site at the bottom of this page.

Prior to the establishment of the NTCIP, traffic management centers used a number of proprietary protocols to exchange information with field devices such as traffic signal controllers and dynamic message signs. The goal of all NTCIP standards is to identify a common set of non-proprietary communications protocols that address requirements for center-to-center and center-to-field communications and promote interoperability.

What is this standard for?

This standard, **NTCIP 2103 – Subnet Profile for Point-to-Point Protocol over RS-232**, specifies a set of requirements for the implementation of a communication protocol typically associated with isolated traffic signal controllers and closed-loop masters. It permits other isolated devices, such as dynamic message signs and ramp meters, to share a common communications access method.

This standard specifies the requirements for an implementation based upon functions and operation as defined in the Internet Advisory Board (IAB) standard for the point-to-point protocol (PPP) and a physical interface based upon the RS-232 interface. PPP provides the definition of layer 2 of the Open Systems Interconnection (OSI) Basic Reference Model services and functions. The RS-232 interface standard (now referred to as EIA/TIA-232) provides the definition of layer 1 services and functions. This subnetwork profile also provides the interface requirements between it and higher layer protocols (layers 3-7) or network profiles.

Who uses it?

This standard should be used by equipment manufacturers, systems integrators, and transportation agency personnel. Manufacturers and integrators should understand the specific implementation and operational requirements that it defines. Specification writers and acceptance testers can also find this standard useful, since it defines a profile implementation conformance specification (PICS). Manufacturers, integrators, and users can use this standard as:

a. A checklist to reduce the risk of failure to conform to the standard through oversight;
b. A detailed indication of the capabilities of the implementation;
c. A basis for initially checking the possibility of inter-operating with another implementation; and

d. The basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

How is it used?

At the data link layer, PPP is used to provide error detection, link activation and deactivation control, notification, and authentication services. It provides for connectionless delivery and is designed for operation in a single primary/secondary environment. At the physical layer, the EIA/TIA-232 interface serves as a direct-connect access method or physical connection to a dial-up modem. Direct-connect is applicable where a single secondary is in close proximity to the primary management station. Alternatively, the EIA/TIA-232 interface can serve as the interface to an external, telephone dial-up modem when long distances are involved.

Scope

This standard is applicable to transportation-related devices that must operate in a single, peer-to-peer environment. As a subnetwork profile, it specifies a combination of standards and protocols applicable to the data link (layer 2) and physical (layer 1) layers of the OSI Basic Reference Model. The primary purpose of this standard is to provide a simple data-exchange tool that uses a connectionless delivery mechanism. This subnetwork profile lists the requirements for an implementation using an a connection method for the data link layer that is defined in the PPP standard and using the physical electrical and mechanical specification defined in the EIA/TIA-232 standard. It defines the process of authentication as well as the interface between the data link layer and the network layer (layer 3).

Related documents

To accommodate the broad scope of this standardization effort, the NTCIP standard has been divided into numerous individual standards. A detailed list of related documents is available on the **NTCIP 9001 – NTCIP Guide** fact sheet. (The NTCIP Guide is available on-line at www.ntcip.org).

EIA/TIA-232-E-1997 – Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange

IAB STD – RFC 1661, Internet Architecture Board (IAB) Point-to-Point Protocol (PPP)

IAB STD – RFC 1662, PPP in HDLC-like Framing

IAB STD – RFC 1332, IAB PPP Internet Protocol Control Protocol (IPCP)

IAB STD – RFC 1570, IAB PPP LCP Extensions

IAB STD – RFC 1659, IAB Definitions of Managed Objects for RS-232 like Hardware Devices using SMIv2

IAB STD – RFC 1994, IAB PPP Challenge Handshake Authentication Protocol (CHAP)

IAB STD – RFC 2153, IAB PPP Vendor Extensions

ITU-T – Recommendations: V Series: Data Communication Over the Telephone Network.

ISO/IEC 7498-1:1994 – Information technology - Open Systems Interconnection, Basic Reference Model: The Basic Model

ISO/IEC TR 10000-1:1995 – Information Technology - Framework and Taxonomy of International Standardized Profiles, Part 1: General principles and documentation framework

NTCIP 8003 – Profile Framework

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