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**Power systems management and associated information exchange – Data and communications security –  
Part 7: Network and System Management (NSM) data object models**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### **POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – DATA AND COMMUNICATIONS SECURITY –**

#### **Part 7: Network and System Management (NSM) data object models**

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This edition of IEC 62351-7 cancels and replaces IEC TS 62351-7 Ed. 1 published in 2010. This new edition constitutes a technical revision and includes the following significant technical changes with respect to IEC TS 62351-7 (2010):

- a) NSM object data model reviewed and enriched;
- b) UML model adopted for NSM objects description;
- c) SNMP protocol MIBs translation included as Code Components.



The text of this International Standard is based on the following documents:

FDIS	Report on voting
57/1857/FDIS	57/1885/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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# **POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – DATA AND COMMUNICATIONS SECURITY –**

## **Part 7: Network and System Management (NSM) data object models**

### **1 Scope**

This part of IEC 62351 defines network and system management (NSM) data object models that are specific to power system operations. These NSM data objects will be used to monitor the health of networks and systems, to detect possible security intrusions, and to manage the performance and reliability of the information infrastructure. The goal is to define a set of abstract objects that will allow the remote monitoring of the health and condition of IEDs (Intelligent Electronic Devices), RTUs (Remote Terminal Units), DERs (Distributed Energy Resources) systems and other systems that are important to power system operations.

Power systems operations are increasingly reliant on information infrastructures, including communication networks, IEDs, and self-defining communication protocols. Therefore, management of the information infrastructure has become crucial to providing the necessary high levels of security and reliability in power system operations.

The telecommunication infrastructure that is in use for the transport of telecontrol and automation protocols is already subject to health and condition monitoring control, using the concepts developed in the IETF Simple Network Management Protocol (SNMP) standards for network management. However, power system specific devices (like teleprotection, telecontrol, substation automation, synchrophasors, inverters and protections) need instead a specific solution for monitoring their health.

The NSM objects provide monitoring data for IEC protocols used for power systems (IEC 61850, IEC 60870-5-104) and device specific environmental and security status. As a derivative of IEC 60870-5-104, IEEE 1815 DNP3 is also included in the list of monitored protocols. The NSM data objects use the naming conventions developed for IEC 61850, expanded to address NSM issues. For the sake of generality these data objects, and the data types of which they are comprised, are defined as abstract models of data objects.

In addition to the abstract model, in order to allow the integration of the monitoring of power system devices within the NSM environment in this part of IEC 62351, a mapping of objects to the SNMP protocol of Management Information Base (MIBs) is provided.

The objects that are already covered by existing MIBs are not defined here but are expected to be compliant with existing MIB standards.

### **2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC TS 62351-1, *Power systems management and associated information exchange – Data and communications security – Part 1: Communication network and system security – Introduction to security issues*

IEC TS 62351-2, *Power systems management and associated information exchange – Data and communications security – Part 2: Glossary of terms*

IEC 62351-3, *Power systems management and associated information exchange – Data and communications security – Part 3: Communication network and system security – Profiles including TCP/IP*

IEC 62351-4, *Power systems management and associated information exchange – Data and communications security – Part 4: Profiles including MMS<sup>1</sup>*

IEC TS 62351-5, *Power systems management and associated information exchange – Data and communications security – Part 5: Security for IEC 60870-5 and derivatives*

IEC TS 62351-8, *Power systems management and associated information exchange – Data and communications security – Part 8: Role-based access control*

IEC 62351-9, *Power systems management and associated information exchange – Data and communications security – Part 9: Cyber security key management for power system equipment*

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IETF RFC 5132, *IP Multicast MIB*, December 2007, <http://tools.ietf.org/rfc/rfc5132>

IETF RFC 5905, *Network Time Protocol Version 4: Protocol and Algorithms Specification*, June 2010, <http://tools.ietf.org/rfc/rfc5905>

IETF RFC 5590, *Transport Subsystem for the Simple Network Management Protocol (SNMP)*, June 2009, <http://tools.ietf.org/rfc/rfc5590>

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IETF RFC 5591, *Transport Security Model for the Simple Network Management Protocol (SNMP)*, June 2009, <http://tools.ietf.org/rfc/rfc5591>

IETF RFC 5592, *Secure Shell Transport Model for the Simple Network Management Protocol (SNMP)*, June 2009, <http://www.rfc-editor.org/rfc/rfc5592>

IETF RFC 5953, *Transport Layer Security (TLS) Transport Model for the Simple Network Management Protocol (SNMP)*, August 2010, <http://www.rfc-editor.org/rfc/rfc5953>

IETF RFC 6347, *Datagram Transport Layer Security Version 1.2*, January 2012, <http://tools.ietf.org/rfc/rfc6347>

IETF RFC 6353, *Transport Layer Security (TLS) Transport Model for the Simple Network Management Protocol (SNMP)*, July 2011, <http://tools.ietf.org/rfc/rfc6353>

IETF RFC 7860, *HMAC-SHA-2, Authentication Protocols in User-Based Security Model (USM) for SNMPv3*, April 2016, <http://tools.ietf.org/rfc/rfc7860>