IBM NetView
Advanced Peer-to-Peer Networking Topology and Accounting Management (APPNTAM) V2 R4 Feature Conformance to OMNI*Point* 1

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James L. Panian

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IBM

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Preface

This paper provides a technical summary of the IBM NetView Advanced Peer-to-Peer Networking Topology and Accounting Management (APPNTAM) V2 R4 feature conformance to the OMNI*Point* 1 standard. Its intended use is to assist customers with an analysis of APPNTAM conformance to OMNI*Point* 1, and to emphasize IBM's commitment to open, standard management solutions.

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1.0 Executive Overview

The APPNTAM feature of NetView V2 R4 conforms to OMNI*Point* 1 specifications.

The Network Management Forum has released a set of selected standards, implementation specifications, testing methods and tools, and object libraries that enable the development of management applications, and interoperable management systems. It defines a complete "infrastructure" that, when implemented, makes it possible for management systems to interoperate, making it possible to exchange information in a common way.

There are seven inter-related categories of technical specifications in which OMNI*Point* 1 implementations may claim conformance for OSI Management. Of the seven categories, one is mandatory and the others are optional. The first release of the APPNTAM feature of NetView V2 R4 meets the mandatory requirement, one optional requirement, and implements most of the functions specified for four of the optional requirements. An intent to meet at least one additional optional requirement in the future exists.

IBM is committed to open, standard solutions for APPN management by offering APPNTAM as an OMNI*Point* 1 conforming product. OMNI*Point* 1 provides the framework to achieve interoperability, and a common management information methodology in the multivendor, multiprotocol, heterogeneous environment.

1.1 The need for Management Interoperability

APPNTAM satisfies the need to view network logical and physical resources graphically, to account for the use of those resources, and to automate operator tasks to make management of networks efficient in an APPN networking environment. These are requirements not only for the APPN resources of a network, but for the broad spectrum of network resources produced by multiple vendors, using multiple protocols. The key to satisfying these requirements is to establish a standard way for management systems to exchange management information and to use a standard methodology for expressing management information. The OMNI*Point* 1 group of specifications provides a framework for meeting these requirements.

There are international standards that have been developed to meet these requirements. There are additional standards also under development that have not reached their completion. In an area as complex as network management, the road to full standards is long. The specification of a complete systems management framework depends on many standards, at various stages of completion.

Suppliers who want to satisfy their customer's needs are faced with a dilemma. If they wait for full standards to be developed and put into a usable form, they may lose customers to their competitors. On the other hand, proprietary interfaces present their own problems. Not only is it difficult to encourage other vendors to adopt a proprietary interface, but it represents an investment path that may terminate when standard solutions become available.

The answer to the suppliers' dilemma is one favored by their customers. That is, an industry accepted, standards-based, near term solution, that will be enhanced over time in accordance with a reasonable product life cycle. Hence, the OMNI*Point* solution.

1.2 OMNI*Point* 1

OMNI*Point* 1 is a set of selected standards, implementation specifications, testing methods and tools, and object libraries that enable the development of management applications, and interoperable management systems. OMNI*Point* 1 defines a complete "infrastructure" that, when implemented, makes it possible for management systems to interoperate, making it possible to exchange information in a common way.

OMNI*Point* 1 is based upon standards which have been generated by a large number of standards bodies and consortia in both the computing and telecommunications industries. These groups include ISO, CCITT, NM Forum, the Regional Workshops (OIW NMSIG, AOW NMSIG, EWOS EGNM), X/Open, the Internet and OMG. See Appendix A, “Definition of Terms” on page A-1 for definitions of acronyms.

The OMNI*Point* 1 specifications are largely OSI Management based with the management communications protocol of CMIP, the definition of management information with GDMO, and the management infrastructure in accordance with MIM. OMNI*Point* 1 also includes specifications for management functions such as event forwarding, logging, and alarm reporting. Managed object libraries that refer to ISO/CCITT standards, and NM Forum definitions are included. Specifications regarding conformance and interoperability tests generated by COS, SPAG, OSINET, are made available. Reference is made to specifications for the management communications protocol SNMP, as well as emerging technologies such as the CORBA application interface being developed by OMG.

OMNI*Point* 1 was released in October 1992. The full OMNI*Point* specifications can be purchased from the NM Forum by calling 1-908-766-1544.

1.3 OMNI*Point* 1 Conformance Requirements

Conformance requirements to OMNI*Point* 1 have been explicitly defined in the OMNI*Point* 1 *Conformance Requirements* document, available as part of the OMNI*Point* 1 package. The purpose of defining OMNI*Point* 1 conformance is to reduce the number of possible combinations in order to increase the likelihood that two systems that conform to OMNI*Point* 1 in complementary roles will have the capabilities to interoperate successfully.

The conformance requirements have been defined for management systems based upon the OSI Management standards for OMNI*Point* 1. Conformance requirements based upon other technologies such as the Internet SNMP, X/Open XMP, and OMG Corba will follow in later updates.

There are seven inter-related categories of technical specifications in which OMNI*Point* 1 implementations may claim conformance for OSI Management. A claim of conformance in one category might require a claim of conformance in other categories. The *Management Communications* category is the only mandatory category for a claim of conformance to OMNI*Point* 1. All other categories are optional.

1. *Data Transport* - this category defines the requirements for implementations of OSI transport functionality. Conformance in this category is optional for OMNI*Point* 1 to allow implementations the flexibility to provide alternative transports to support OMNI*Point* 1 such as SNA or TCP/IP.
2. *Management Communications* - this category defines the conformance requirements for CMIP in accordance with ISP 11183-2, and to the OSI upper layers (ACSE, Presentation, and Session) in accordance with ISP 11183-1. ISP 11183-1 and ISP 11183-2 are both profiles which are CCITT/ISO standards. A general-purpose claim to CMIP can be made where both the manager and agent roles are supported. A special-purpose claim to CMIP can also be made in either the manager and/or agent role. A special-purpose claim to CMIP is made in conjunction to a claim to another OMNI*Point* 1 document that defines a set of capabilities required of CMIP.
3. *Management Functions* - this category defines the conformance requirements to one of the ISO systems management function profiles such as Alarm Reporting Capabilities, or General Event Report Management. It also provides conformance requirements to NM Forum defined specifications such as Testing Management, Path Tracing, and Trouble Ticketing. Conformance can be claimed in the manager role, agent role, or both.
4. *Managed Object Classes* - this category defines the conformance requirements to the managed object classes defined as part of OMNI*Point* 1. The eligible managed object class definitions are defined in ISO/CCITT standards, OIW implementers agreements, and the NM Forum. A claim can be made in either agent role, manager role, or both. In the agent role, support means making one or more instances of the class available

across the interoperable interface. In the manager role, support means having the ability to access instances of the managed object class and receive events from instances of the class.

An OMNI*Point* 1 implementation may also claim conformance to compatible extensions of OMNI*Point* 1 managed object classes using the technique of *allomorphism*.

Naming of all instances of OMNI*Point* 1 specified managed object classes must conform to the OMNI*Point* 1 *Managed Object Naming* document.

5. *Management Ensembles* - For OMNI*Point* 1 conformance, an ensemble is considered a profile that specifies a set of functions, managed object definitions, and supporting management communications capabilities designed to solve a specific management problem in a very specific management context. An example of a possible ensemble is "APPN Accounting" which would require functions such as event forwarding, managed object definitions such as the *acctMgtControl* (accounting management control object) and management communications capabilities such as CMIP over an SNA transport.

   An implementation may claim to conform to an ensemble definition in the agent role, manager role or both.

6. *Cross-Layer Specifications* - this category defines the conformance requirements for two categories of capabilities; shared management knowledge and managed object naming.

   Shared management knowledge provides a common understanding of management knowledge and capabilities between an interoperating pair of systems. Such knowledge can include managed object class knowledge, managed object instance knowledge, naming knowledge, etc.

   The conformance requirements for managed object naming assure that managed objects are named in a well defined, consistent manner across multivendor, interoperable systems.

7. *Kernel* - this category defines the conformance requirements for a "kernel" implementation of OMNI*Point* 1. The kernel provides the base level of functionality for which all implementers should aim as an eventual target.

   Conformance to the kernel can be claimed in the manager role, agent role or both. The kernel includes significant elements from each of the conformance categories. Table 1-1 summarizes the conformance requirements for a claim of conformance to the kernel in the agent role.

Table 1-1. Kernel conformance requirements in the agent role

Category	**Conformance Requirement**
Data Transport	no requirement
Management Communications	implement the OSI upper layers as required by ISP 11183-1 implement CMIP as specified by management function profiles
Management Functions	Support the Object Management Function, State Management Function, Relationship Management, Alarm Reporting, and General Event Report Management Function
Ensembles	no requirement
Managed Object Classes	*system*(or subclass), *eventForwardingDiscriminator*
Cross-Category Specifications	Shared Management Knowledge, Managed Object Naming

1.4 APPNTAM Conformance to OMNI*Point* 1

The following summary positions APPNTAM capabilities relative to the OMNI*Point* 1 conformance requirements.

1. *Data Transport* - APPNTAM does not currently run CMIP over an OSI Transport. CMIP is run over the SNA transport of multiple-domain support, which is an SNA management services transport.

2. *Management Communications* - this category defines the conformance requirements for CMIP. APPNTAM implements CMIP in accordance with ISP 11183-2, and the OSI upper layers (ACSE, Presentation, and Session) in accordance with ISP 11183-1.

   APPNTAM conforms to this category as a general-purpose implementation in both the manager and agent roles.

3. *Management Functions* - APPNTAM supports a subclass of *eventForwardingDiscriminator* called *allomorphismSensitiveEFD*. The *allomorphismSensitiveEFD* functionality extends the functionality of the base *eventForwardingDiscriminator* by processing allomorphic event reports. For example, the *allomorphismSensitiveEFD* functionality allows a system playing the manager role that understands the *snaNode* class to receive notifications from a *t2-1Node* managed object acting allomorphically as a *snaNode* managed object.

   APPNTAM supports the functions required by the General Event Report Management Function profile with the exceptions of scheduling, and automatic instance naming.

4. *Managed Object Classes* - The managed object class definitions defined for APPNTAM were meticulously derived from the managed object classes defined as part of OMNI*Point* 1.

   The first APPNTAM release cannot claim conformance to this category because the APPNTAM managed objects were not fully implemented in accordance with the managed object class GDMO specifications.

   Although the first APPNTAM release cannot claim conformance to this category, it is anticipated that future releases of APPNTAM will claim conformance to OMNI*Point* 1 managed object classes such as *function*.

5. *Management Ensembles* - APPNTAM conforms to the *Allomorphism Sensitive Event Forwarding Discriminator Ensemble* which was made open and available to the NM Forum, OIW NMSIG, OSF MANSIG, OMG, and X/Open for harmonization in December 1992.

6. *Cross-Layer Specifications* - APPNTAM meets the Shared Management Knowledge conformance requirements for discovering instances of *allomorphismSensitiveEFD*.

   APPNTAM meets the Managed Object Naming conformance requirements for all managed object instances.

7. *Kernel* - The APPNTAM feature uses a general-purpose implementation of CMIP developed by IBM referred to as the "CMIP services component". The CMIP services component offers complete CMIP services, the OSI upper layers over multiple transports, and event services. The APPNTAM manager applications and agent objects are built on top of the CMIP services component. The CMIP services component is geared towards meeting the requirements of the OMNI*Point* 1 kernel as summarized in Table 1-2 on page 5. The CMIP services component will be used for future IBM implementations of CMIP. The CMIP services component is also available to other equipment manufacturers. For more information, please contact Doug Geiger at IBM at 1-919-254-5696.

Table 1-2. APPNTAM Conformance to the OMNI*Point* 1 Kernel	
Category	**Conformance Requirement**
Data Transport	no requirement
Management Communications	implements CMIP as required by the management function profiles, and the OSI upper layers as required by ISP 11183-1 as a general purpose implementation in the manager and agent roles.
Management Functions	Supports elements of the Object Management Function, State Management Function, Relationship Management, and General Event Reporting Functions within the context of the APPNTAM managed object capabilities
Ensembles	no requirement
Managed Object Classes	*eventForwardingDiscriminator* is supported through allomorphism. Scheduling and automatic instance naming support are needed for full conformance. *system* is not implemented enough to claim conformance. *system* is implemented enough to permit instances of *allomorphismSensitiveEFD* to be named under an instance of *system*.
Cross-Category Specifications	Shared Management Knowledge for *allomorphismSensitiveEFD* instances is supported. Managed Object Naming is supported for all managed objects.

IBM is committed to open, standard solutions for APPN management by offering APPNTAM as an OMNI*Point* 1 based feature. OMNI*Point* 1 provides the framework to achieve interoperability, and a common management information methodology in the multivendor, multiprotocol, heterogeneous environment.

1.5 APPNTAM SystemView Publications

To encourage the implementation of interoperable, open, OMNI*Point* 1 based APPNTAM implementations, IBM is publishing the SystemView architecture which is the basis for APPNTAM. These books are available from IBM by calling 1-800-879-2755 :

- *IBM SystemView Mapping of OSI Upper Layers to MDS for CMIP over SNA*

  Publication no. SC31-7137-00

  This book describes how transport services provided by the multiple-domain support (MDS) function of SNA Management Services are used to convey the CMIP protocol.

- *IBM SystemView Managed Resource Model Reference and Templates, Volume 1: Generic Definitions*

  Publication no. SC31-7138-00

  This book includes models and definitions that are expected to be widely applicable. The models are:

  – Operability

  – Set Theory

  – Graph Theory

  – Layered Connectivity

  – Layered Communications

- *IBM SystemView Managed Resource Model Reference and Templates, Volume 2: APPN and Subarea Management*

Publication no. SC31-7139-00

This book contains management information pertaining to the SNA APPN and subarea resources, based upon the models presented in volume 1.

Appendix A. Definition of Terms

- APPN - Advanced Peer-to-Peer Networking
- AOW NMSIG - Asian-Oceanic Workshop Network Management Special Interest Group
- ACSE - Association control service element
- CMIP - Common management information protocol
- COS - Corporation for Open Systems International
- CORBA - Common object request broker architecture
- CCITT - International Telegraph and Telephone Consultative Committee
- EWOS EG/NM - European Workshop for Open Systems Expert Group on Network Management
- GDMO - Guidelines for the Definition of Managed Objects
- ISO - International Organization for Standardization
- ISP - International Standardized Profile
- MIM - Management Information Model
- NM Forum - Network Management Forum
- OIW NMSIG - Open Systems Environment Implementers Workshop Network Management Special Interest Group
- OMG - Object Management Group
- OSF MANSIG - Open Software Foundation Management Special Interest Group
- OSI - Open Systems Interconnection
- OSINET - test network for OSI in the U.S.
- SNA - Systems Network Architecture
- SNMP - Simple Network Management Protocol
- SPAG - Standards Promotion and Applications Group
- TCP/IP - Transmission Control Protocol, Internet Protocol
- XMP - X/Open Management Protocol

Appendix B. References

1. Network Management Forum: *Forum 006, Forum Library - Volume 4: OMNIPoint 1 Definitions, Issue 1.0, August 1992.*
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9. CCITT Recommendation X.731 (1992)|ISO/IEC 10164-2: 1992, *Information technology - Open Systems Interconnection - Systems Management: State management function.*
10. CCITT Recommendation X.732 (1992)|ISO/IEC 10164-3: 1992, *Information technology - Open Systems Interconnection - Systems Management: Attributes for representing relationships.*
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    ISO/IEC 9596-1:1991, *Information technology - Open Systems Interconnection - Common management information protocol - Part 1: Specification.*

20. ISO 8822:1988, *Information processing systems - Open Systems Interconnection - Connection oriented presentation service definition.*

21. ISO 8823:1988, *Information processing systems - Open Systems Interconnection - Connection oriented presentation protocol specification.*

22. ISO/IEC 8824:1990, *Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

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26. ISO/IEC ISP 11183-1, *Information Technology - International Standardized Profiles AOM1n OSI Management - Management Communications Protocols - Part 1: Specification of ACSE, Presentation, and Session Protocols for the use by ROSE and CMISE, June 1992.*

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