

IBM Network Management

Background

IBM was one of the first companies to recognize the importance of a complete, integrated network management strategy. In 1986, IBM proposed *Open Network Architecture* (ONA), a framework describing a generalized network management architecture. *NetView*, the premier product for network management on an IBM mainframe, is actually a component of ONA. NetView provides a cohesive set of centralized network management services that allow users to monitor, control, and reconfigure their *Systems Network Architecture* (SNA) networks.

Since the introduction of ONA and NetView, IBM has almost continually enhanced, expanded, and otherwise altered its network management technology base. Today, IBM network management is comprehensive and extremely complex. This chapter describes the high-level basics of some of the components of IBM network management.

Functional Areas of Management

IBM divides network management into five user-based functions:

- *Configuration management*—Identifies physical and logical system resources and allows control of their relationships.
- *Performance and accounting management*—Allows quantification, measurement, reporting, and control of the responsiveness, availability, utilization, and usage of a network component.
- *Problem management*—Provides problem detection, diagnosis, resolution, and tracking and control capabilities.
- *Operations management*—Provides the means to query and control distributed network resources from a central site.
- *Change management*—Allows planning, control, and application of additions, deletions, and modifications to system hardware, microcode, and software.

These network management functions do not correlate perfectly with those proposed by the International Organization for Standardization (ISO) in its *Open System Interconnection* (OSI) model. The OSI and the IBM network management functions are compared in Figure 33-1.

Figure 33-1 OSI and IBM Network Management Functions

OSI	IBM
Configuration management	Configuration management
Performance management	Performance and accounting management
Accounting management	
Fault management	Problem management
Security management	–
–	Operations management
–	Change management

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Configuration Management

Configuration management controls information describing both physical and logical information systems resources and their relationships to each other. This information typically consists of resource names, addresses, locations, contacts, and telephone numbers. IBM's configuration management function corresponds very closely to OSI's concept of configuration management.

Through configuration management facilities, users can maintain an inventory of network resources. Configuration management helps ensure that network configuration changes can be reflected expeditiously and accurately in the configuration management database. Configuration management data is used by problem management systems to compare version differences and to locate, identify, and check the characteristics of network resources. Change management systems can use configuration management data to analyze the effect of changes and to schedule changes at times of minimal network impact.

An SNA management service called *query product identification* retrieves software and hardware physical information from the configuration management database. The information retrieved is sometimes called *vital product data*.

Performance and Accounting Management

This SNA management function provides information about the performance of network resources. Through analysis of performance and accounting management data, users can determine whether network performance goals are being met.

Performance and accounting management includes accounting, monitoring of response times, availability, utilization, and component delay, as well as performance tuning, tracking, and control. Data from each of these functions can result in the initiation of problem determination procedures if performance levels are not being met.

Problem Management

SNA management services define a *problem* as an error condition that causes a user to lose full functionality of a system resource. SNA divides problem management into several areas:

- Problem determination—Detects a problem and completes steps necessary for problem diagnosis to begin. Problem determination intends to isolate the problem to a particular subsystem, such as a hardware device, a software product, a microcode component, or a media segment.
- Problem diagnosis—Determines the precise cause of a problem and the action required to solve the problem. If problem diagnosis is done manually, it follows problem determination. If it is done automatically, it is usually done simultaneously with problem determination so that the results can be reported together.
- Problem bypass and recovery—Attempts to bypass a problem, either partially or completely. Normally, this operation is temporary, with the intent that complete problem resolution will follow, but problem bypass may be permanent when the problem is less easily resolved.
- Problem resolution—Involves efforts required to eliminate the problem. Problem resolution usually begins after problem diagnosis is complete and often involves a corrective action that must be scheduled, such as replacement of a failed disk drive.
- Problem tracking and control—Tracks the problem until final resolution. Specifically, if external action is required to fix the problem, the vital information describing the problem (such as status monitoring data and problem status reports) are included in a problem management record that is entered into the problem database

Operations Management

Operations management involves management of distributed network resources from a central site. It entails two sets of functions, *common operations services* and *operations management services*.

Common operations services allow management of resources not explicitly addressed by the other management categories of SNA by allowing specialized communication with these resources through new, more capable applications. Two very important services providing this capability are the **execute** command and the resource management service. The **execute** command provides a standardized means of executing a remote command. Resource management services provide a way to transport information in a context-independent manner.

Operations management services provide the ability to control remote resources through resource activation, resource deactivation, command cancellation, and the setting of network resource clocks. Operations management services can be initiated automatically as a result of system problem notification forwarding, thereby allowing automatic handling of remote problems.

Change Management

Change management helps users control network or system changes by allowing the sending, retrieving, installing, and removing of change files at remote nodes. Further, change management allows node activation. Changes occur because either user requirements have changed or because a problem must be circumvented.

Although problems cause change, change can also cause problems. Change management attempts to minimize problems created by change through encouraging orderly change and by tracking changes.

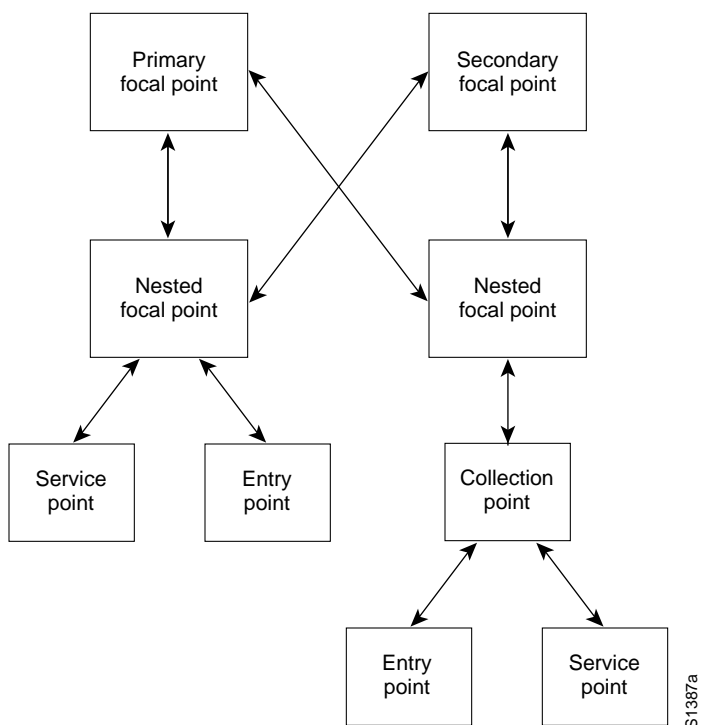
Principal Management Architectures and Platforms

IBM offers several management architectures and many important management platforms.

Open Network Architecture Framework

The basic ONA framework is shown in Figure 33-2.

Figure 33-2 ONA Framework



Focal points provide support for centralized network management operations. They are the management entities referred to in the general model described previously. Focal points respond to end station alerts, maintain management databases, and provide the user interface to the network management operator.

There are two kinds of focal points, *primary* and *secondary*. Primary focal points are as described previously. Secondary focal points provide backup for primary focal points and are used when primary focal points fail.

Nested focal points provide distributed management support for portions of large networks. They forward critical information to more global focal points.

Collection points relay information from self-contained SNA subnetworks to focal points. Collection points are commonly used to forward data from IBM peer-to-peer networks into the ONA hierarchy.

Entry points are SNA devices that can implement ONA for themselves and other devices. Most standard SNA devices are capable of being entry points.

Service points are systems that provide access into ONA for non-SNA devices. Service points are capable of sending network management information about non-SNA systems to focal points and are also capable of receiving commands from focal points, translating them into a format acceptable to non-SNA devices, and forwarding them to non-SNA devices for execution. Service points are essentially gateways into ONA.

SystemView

IBM announced SystemView in 1990. SystemView is a blueprint for the creation of management applications capable of managing multivendor information systems. Specifically, SystemView describes how applications that manage heterogeneous networks will look, feel, and cooperate with other management systems. Officially, SystemView is the systems management strategy of *Systems Application Architecture*.

NetView

NetView is IBM's most comprehensive enterprise network management platform. It has the following major parts:

- *Command control facility*—Provides the ability to control the network through basic operator and file access commands to *Virtual Telecommunications Access Method* (VTAM) applications, controllers, operating systems, and *NetView/PC* (an interface between NetView and non-SNA devices).
- *Hardware monitor*—Monitors the network and automatically issues alerts to the network operator when a hardware error occurs.
- *Session monitor*—Acts as a VTAM performance monitor. The session monitor provides software problem determination and configuration management.
- *Help function*—Provides help for NetView management services users. The help function includes a browse facility, a help desk facility, and a library of commonly encountered network operation situations.
- *Status monitor*—Summarizes and presents network status information.
- *Performance monitor*—Monitors the performance of *communications controllers* (also called *front-end processors*, or *FEPs*), the *Network Control Program* (NCP), and attached resources.
- *Distribution manager*—Plans, schedules, and tracks the distribution of data, software, and 3174 microcode in an SNA environment.

LAN Network Manager

IBM's *LAN Network Manager* (LNM) product is an OS/2 Extended Edition-based network management application that enables control of Token Ring *local-area networks* (LANs) from a central support site. NetView can see LNM activity (for example, alarms). LNM communicates with *LAN Station Manager* (LSM) software, which implements management agents in individual LAN end stations. Communication between LNM and LSM is effected using OSI *Common Management Information Services/Common Management Information Protocol* (CMIS/CMIP) running over the connectionless *Logical Link Control* (LLC) protocol.

SNMP

IBM has added support for the *Simple Network Management Protocol* (SNMP). For information about this protocol, see Chapter 32, "Simple Network Management Protocol."

