

System Management Common Facilities

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4.1 Overview

System Management Common Facilities should provide a set of utility interfaces for system administration functions. These interfaces abstract basic functions such as control, monitoring, security management, configuration, and policy that are needed to perform Systems Management operations, such as adding new users, setting permissions, installing software, and so forth.

The classes of user identified for System Management Common Facilities include:

- Computer System Administrators (User)
- Management Application Developers (Developer)
- System Service Providers (Service Provider)
- Computer System Resource Planners (Enterprise)

System Management Common Facilities have their own unique view of a systems architecture.

Resources are the entities within a system that require management. Resources can include physical entities (such as printers or routers) and logical entities (such as users, groups, applications, and other common facilities).

For a resource to be managed it must provide a management interface or have it provided by a proxy, and take part in management interactions such that it becomes a managed resource.

The OMG has developed an architectural scheme whereby resources within the enterprise are viewed as manageable components. A manageable component may directly invoke a

Systems Management Facility, although usually this class of facility will be used to manage components. Tools will be developed to aid in this management effort.

Systems Management Facilities are as follows:

- Policy Management
- Quality of Service Management
- Instrumentation
- Data Collection
- Security
- Data Collection
- Security
- Collection Management
- Instance Management
- Customization
- Event Management

4.2 Description and Requirements

Policy Management

Policy Management provides a common interface that supports the definition of policy and its application to manageable components. Policy is used to provide control over the creation, deletion, and modification of manageable components.

This facility allows administrators to be able to define their own policy. It also enable administrators to define both the default values for object attributes and the rules to validate the modification of those values.

Policy Management provides the functionality that supports the ability to group resources into policy regions over which a set of policies is defined.

Quality of Service Management

Quality of Service provides a common interface that supports the selection of service levels for availability, performance, reliability and recovery.

Instrumentation

Instrumentation facilities provide a common interface for the gathering, management and dissemination of resource-specific data in support of systems management.

Facilities that might be defined include:

Workload. For example: invocation per second on an object from both application and object point of view; object create counts; object delete counts; clients per object; locates per second.

Allocation of Objects to Physical Resources. For example: object location; object replication; object failure due to host crash, network crash, disk crash;

Responsiveness. For example, invocation response time; invocation throughput; object availability; object system errors; locate delay.

Data Collection

Data Collection facilities provide a common interface to information gathering functionality in support of systems management. Data Collection facilities identified thus far are: Logging and History Management.

Logging provides a common interface that supports the recording and storage of information relevant to systems management. For instance, keeping records of system events.

History Management provides a common interface that supports the storage of and access to archived data.

Any manageable component may have a history, which is a record of historical events related to the component. An example of this kind of facility is an interface that provides for the query of a manageable component's history.

Security

Security Facilities provide a common interface for the management of the security of system resources. This is distinct from the implementation of security mechanisms.

Collection Management

The Collection Management Facility defines operations required to have two way reference relationships between objects. It enables the resulting collections to be queried or have operations applied to the members of the collection. The collection functionality is required to allow administrators to interact naturally with applications.

Instance Management

Instance Management facilities provide much of the required infrastructure for objects to be logically associated and managed with other objects which support a common interface and are subject to common policies. It defines the fundamental operations which support the management of multiple instances of an object type.

Scheduling Management

Scheduling Management requires the performance of certain tasks on a regular basis in a controlled manner. A facility is required to be defined in a flexible and precise manner which reliably performs these tasks under the control of particular stimuli.

Customization

The Customization Facility provides a mechanism for object instances to be extended dynamically while retaining type safety. This allows application objects to be extended and customized once there are instances in place without invalidating existing object references. Examples of this might include replacing a printer with a more functional model.

Event Management

Event Management facilities provide for the generation, registration, filtering, aggregation and forwarding of event notifications to management applications. They must provide facilities for applications to reliably receive notifications using complex filtering rules. Enabling automation of an action associated with events is the key aspect to move to a proactive mode of operation.

Other Services

Other potential System Management Common Facilities include a Process Launch service and a Consistency service. These facilities are under investigation by X/Open and are not yet fully defined.

4.2.1 Related Standards and References

X/Open Resolution 20-6, *Interfaces for a Distributed Systems Management Framework*, (IDSMF).

X/Open Systems Management: Reference Model (XRM).

Tivoli Systems, Tivoli Management Environment (TME), proposal to X/Open SysMan.

Network Management

SNMP. The Internet version of Network management. Over 20,000 MIB variables have been defined.

CMIP. The Telephone Company version of Network Management. OMNIPOINT from Network Management Forum describe the basic Managed Objects Classes.

SNMP to/from CMIP to CORBA Translation:

Joint X/Open NM Forum Inter-domain Management (JIDM) Task Force has produced several documents for converting SNMP (MIBs) and CMIP (GDMO) definitions into OMG IDL.

OIW NMSIG-94/086m Translation of CMIP/ASN.1 Spec to CORBA-IDL, January 24, 1994.

OIW NMSIG-94/085m Translation of SNMPv2 MIB Spec to CORBA-IDL, March 2, 1994.

OIW NMSIG-94/084m Comparison of OSI, OMG, Internet M.O.Models, July 14, 1994.

Middleware Management

OSF DCE OSF (<http://www.osf.org:8001/>) had a working group on instrumenting DCE. The two main documents are:

R. Friedrich, *Requirements for Performance Instrumentation of DCE RPC and CDS Services*, DCE-RFC-32.0. (<http://www.osf.org:8001/dce/dce-rfc/rfc-archive/rfc32.0.txt>).

R. Friedrich, *Standardized Performance Instrumentation and Interfaces for the DCE*, DCE-RFC-33.0 (Not published).

System Management

X/Open Systems Management Working Group. This group has a work program that is focused on providing specifications for Distributed Systems Management. It has published a Reference Model (referenced above), and is currently developing a specification for Systems Management Services necessary to provide a Systems Management Framework based on CORBA. It is also advancing the work of the PMWG (see below) which may soon become an X/Open Preliminary Specification.

Performance Management Working Group (PMWG) of X/Open and Computer Measurement Group (CMG). PMWG is defining a Universal Measurement Architecture (UMA) and has three documents available via anonymous ftp ([tarpon.instrumental.com](ftp://tarpon.instrumental.com)). PMWG is a mature specification and some implementations may appear soon.

Posix Datapool, <pub/pmwg/<pub/pmwg/dcispec4.0.ps>>.

Measurement Layer Interface (MLI), <pub/pmwg/mlispec7.2.ps>.

Data Capture Interface (DCI) <pub/pmwg/dcispec4.0.ps>.

System Management for the PC. Desktop Management Task Force (DMTF) has several documents on how system management works for the PC and with the Desktop Management Interface (DMI). The DMTF mailing list deals with issues related to the Desktop Management Task Force and the Desktop Management Interface. The mailing list is available at this address:

dmtf-info@sun.com

DMTF materials, including a white paper, plan-ahead guide, various press releases, DMI reference code, and draft version 4.5 of the DMI specification, are available via anonymous FTP from:

aurora.intel.com: /pub/dmtf/Spec

gatekeeper.dec.com: /pub/forums/dmtf/Spec

NIST Distributed System Management. In June 1994, NIST has started a new group to work on system management. This effort is focusing on ISO OME. The contact for the work group is:

jhungate@nist.gov.

4.2.2 Relationship to Components of OMA

It is envisioned that hardware vendors will deliver ORBs bundled with their native systems and with a standard set of System Management interfaces (facilities). These facilities would provide the capability to control, configure, and monitor system resources.

Other Common Facilities and Object Services should specify the management interfaces needed in order to manage them. For example, Security and Time Facilities and Services require management. These interfaces should include monitoring, control, and configuration functionality.

4.2.3 Technical Issues

None.