Desktop Management Task Force

Desktop Management Interface (DMI) 2.0

Conformance Requirements

DSP0003

Version 1.1 –December 9, 1997

Approved by the Technical Advisory Committee on December 9, 1997

Approved by the Steering Committee on December 10,1997

Technical inquiries and editorial comments should be directed in writing to:

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Change History

Version	Date	Description
V1.1	Dec 9,1997	Revised for consistency
V1.0	Aug 8, 1997	Initial Revision

Versions 1.1 key changes:

- Added IHV categories for Video, Monitor, and LAN adapter vendors
- Minimum DMTF class string revisions were added. It is "legal" to use older groups of course, but for the purposes of DMTF certification, the minimum group revision or higher is required.
- Pointers to specific "Standard Groups" documents with reference to "Master MIF" instead.
- Instrumentation requirements were revised to provide consistency with Intel's Wired for Management V1.1 initiative.

1 Overview

The overall objective of this document is to "Insure intelligent, cross-platform management of manageable network systems and devices via DMTF technologies". This can be achieved by the existence of a standard management framework that provides a consistent interface for management applications and results in consistent behavior across platforms and device classes. A management framework should allow industry players to add value, differentiate and evolve their products over time. This document is the second release of a conformance baseline for instrumentation of servers, mobile computers, desktops, workstations, software, management applications and IHV products. Future revisions will extend this requirement to broader ranges of managed devices and objects.

This document defines baseline requirements for DMI 2.0 Service Providers (SP), Servers, Clients (Desktops, Portables, Workstations, Net PCs, etc.), software applications and operating systems. These requirements are a minimum to claim DMI 2.0 Conformance. Of course, software and hardware manufacturers are likely to provide additional DMTF standard groups and vendor specific groups above this minimum requirement to add value to their products. A complete list of standard group definitions is located in the *DMTF Standard Groups Repository* (or "Master MIF"). For unique devices not described via DMTF standard groups, refer to the "MIF Design Guidelines" on information on how to create proprietary group definitions.

Items described as "recommended" in this version of the document are likely to become "required" in future versions.

This document assumes that the reader is familiar with DMI technology as described in the DMI 2.0 Specification. When DMTF standard group class names are referenced in this document, the convention of specifying a minimum class version has been adopted to convey the notion of a minimum starting version for conformance. Of course, all versions are "legal" for DMI components, but the specified version or higher is required for conformance.

1.1   Ownership

The DMTF is the owner of and will maintain the *DMI 2.0 Specification* and *Errata,* the *DMI 2.0 Conformance Requirements,* and the *DMTF Standard Groups Repository*, or Master MIF. The aforementioned documents will be modified as new DMTF standards are developed and approved. Current versions of this document, the DMI 2.0 Specification and other reference documents are available on the DMTF website at **http://www.dmtf.org**

2 Service Provider Conformance Requirements

This section is applicable primarily to those wishing to implement Service Providers for a given OS platform. This is to ensure interoperability between managed nodes on a network as well as between management applications and instrumented devices on a local system. Requirements in this section are in addition to (or clarifications of) those in the DMI 2.0 Specification and subsequent errata. Service Provider developers should refer to those documents as well for additional details.

A Service Provider is classified as a DMI 2.0 Conformant Service Provider if, and only if, it conforms to the following requirements:

2.1.   This DMI Service Provider (SP) must support one of the standard RPCs; DCE/RPC, ONC/RPC or TI/RPC as specified by the DMTF as a supported remote interface in the DMI 2.0 Specification, published March 27, 1996 and the DMI 2.0 Errata #1.

2.2.   The DMI SP must coordinate the dynamic installation and removal of component instrumentation modules and management applications. It must enforce that at least "DMTF|ComponentID|001" (the ComponentID group) is installed in each component MIF.

2.3.   The DMI SP must coordinate the registration of entities wishing to initiate management activities.

2.4.   The DMI SP is responsible for all run time accesses to the MIF data. Implementations of the DMI Service Provider may choose to store MIF files in an internal format (a MIF database) for performance and ease of access.

2.5.   The DMI SP must enforce command serialization to component instrumentation and ensure that commands are allowed to run to completion. Multiple requests to a particular component instrumentation module must be queued.

2.6.   The DMI SP must support event/indication subscription and filtering.

2.7.   The DMI SP must forward indications based on subscription and filters to each registered management application, and must time-stamp incoming indications before forwarding them.

2.8.   The DMI SP must send an indication to all registered management applications that have subscribed for indications when components are installed or removed from the MIF database. The SP must also send all indication types to registered MI applications as specified in the DMI 2.0 Specification.

2.9.   The DMI SP must appear to management applications as a component with ID 1 (one). As a component, it must support the standard ComponentID group, defined in DMI 2.0 specification Section 3.1.1. Additionally, the DMI SP must support the Subscription Indication and Filter standard groups. In addition, like any component, it may define additional groups beyond the ComponentID group.

2.10.   The DMI SP must support all of the NLS mechanisms contained in the 2.0 specification, including Unicode and multiple NLS installations (mapping) of schema for each component.

3 Software Application Conformance Requirements

3.1   Management Application Conformance Recommendations

It is not necessary for a IHV or OEM provider to include a Management Application with a certified platform, or that if one is included that it be specifically certified by the vendor as meeting the requirements of this section. However, if an ISV management platform vendor wishes to have DMTF formal certification for their application, this section describes the requirements to obtain conformance.

An application is classified as a DMI 2.0 conformant management application if it conforms to all of the following requirements:

3.1.1   All DMI 2.0 Management Applications must strictly adhere to applicable portions of the DMI 2.0 Management Interface as defined in the DMI 2.0 Specification document and subsequent errata.

3.1.2   Access to the DMI components, groups, and attributes must only be done through this interface.

3.1.3   Remote DMI 2.0 applications must support at least one of the defined DMI 2.0 RPC mechanisms (DCE, ONC, TI-RPC).

3.1.4   Applications supporting DMI indications must fully implement the DMI Event mechanism as described in the DMI 2.0 Specification document and subsequent errata.

3.2 Manageable Software Component Conformance Requirements

It is not necessary for an IHV or OEM provider to ensure that some/all of the software packages delivered with the system are DMTF conformant with a certified hardware platform. However, if an ISV wishes to have DMTF formal certification for their manageable software component, this section describes the requirements to obtain conformance.

This section describes specific conformance requirements for software applications that wish to enable software manageability via DMI 2.0. These products must provide the standard group definitions from the *Software MIF* as defined below and any necessary instrumentation via the DMI 2.0 component interface to expose this instrumentation to DMI 2.0 management applications. Note: system vendors are *not* required to ship DMI 2.0 Managed Software Applications as part of their DMI 2.0 conformance requirements.

An application is classified as a DMI 2.0 conformant manageable software component if it conforms to all of the following requirements:

3.2.1   All DMI 2.0 manageable software components must strictly adhere to applicable portions of the DMI 2.0 API as defined in the DMI 2.0 Specification document and subsequent errata.

3.2.2   Access to the DMI components, groups, and attributes must only be done through this interface.

3.2.3   Manageable software components supporting DMI indications must fully implement the DMI Event mechanism as described in the DMI 2.0 Specification document and subsequent errata.

3.2.4   Must implement the following groups from the "Master MIF" (Formerly referred to as the Software MIF):

3.2.5   The following groups are required:

- DMTF|ComponentID|001
- DMTF|Software Component Information|002
- DMTF|Software Signature|002
- DMTF|Location|001
- DMTF|File List|001

3.2.6   The following group is required for a component that describes maintenance.

- DMTF|Maintenance|001

3.2.7   The following group is required for a component that describes a suite.

- DMTF|Subcomponents|001

3.2.8   The following group is required for any component apart from one that describes maintenance.

- DMTF|Support|001

3.2.9   The following specific requirements must be met:

- Where a group is included in a component, all the attributes of that group are required.
- All values must be supplied on a best-effort basis.
- Use null values or the keyword "unsupported" where other values do not apply.
- The signature group table must contain at least one valid entry.
- The location group table must contain at least one valid entry.
- The MIF file must be distributed with the software product.
- For suites, it is required that the publisher supply one MIF file for each product in the suite and one MIF file for the suite itself.

- The MIF must be installed in the MIF database when the application is installed on the managed node.

4 Managed System Baseline Requirements

Because not all computers fall exactly into one of the categories identified below, there is a simple rule to follow when a group is required for a given platform:

"If a standard group is specified for a particular hardware device (for example, PC CARD slot/adapter) and the platform (hardware and operating system) does not support that type of device, there is an exception granted to the conformance requirement in that particular case".

4.1   Specific Conformance Requirements for all Managed Systems

The purpose of this section is to define the core feature set necessary for all manageable PC systems. The enabling technologies and attributes specified in this section should be common, and therefore reasonable to implement on every manageable system manufactured today. Additional features required for specialized classes of systems (such as Servers, Desktops, Portables and Workstations will be defined in later subsections.

Specific required groups in the subsequent sections imply that the *entire* standard group class definition must be present in the MIF. There will be cases where particular attributes within the group do not make sense for a given implementation or hardware device. Vendors should make every attempt to populate attributes whenever possible within required groups. However, If a given implementation does not fully support the contents of a required DMTF standard group, the component should return either "Unsupported" or "Unknown" for the attribute(s) in this category.

It is non-conformant to modify the contents of a DMTF standard group in any way, except for translation of text strings, which are not Class names, to other languages as described in the DMI 2.0 Specification. A vendor requesting extensions to such a group should propose the changes to the DMTF Technical Advisory Committee. Questions on this behavior can be directed to **support@dmtf.org**.

4.1.1.   A DMI 2.0 Service Provider must be present on all managed systems. If it is not provided with the basic machine pre-installed configuration then an upgrade kit (customer kit, CD-ROM, Internet download, etc.) must be easily accessible to enable a DMI 2.0 Service Provider on the system. This is also useful for upgrading legacy systems with DMI 1.x or no manageability to DMI 2.0 manageability

4.1.2.   The following set of groups, or the groups that supercede them over time, is required on the managed system. Note: These groups can be either revised (last field of the class name version updated) or made obsolete by a newer group.   In no way does this list of groups preclude MIF providers from supporting other DMTF standard groups, or to implement their own private groups.

- DMTF|ComponentID|001   *Note: All DMTF components require this group to be included in the MIF*
- DMTF|General Information|001
- DMTF|Network Adapter 802 Port|001
- DMTF|Network Adapter Driver|001
- DMTF|Operating System|001
- DMTF|Physical Container Global Table|001
- DMTF|Processor|003
- DMTF|System BIOS|001
- DMTF|System Cache|002
- DMTF|System Slots|003

The following contains standard groups related to physical memory management. All of these groups are valid standard groups, but the groups designated as "Replacement" groups are designed to replace the group marked "Original." The DMTF recommends that instrumentation migrate to the replacement groups. To be compliant with these guidelines, a DMI-instrumented system should be instrumented with either the Original group or the

corresponding Replacement groups. It is highly recommended that the Replacement groups be selected for the newly implemented instrumentation.

Replacement Groups, recommended for new instrumentation

- DMTF|Memory Device|001
- DMTF|Memory Array Mapped Addresses|001
- DMTF|Memory Device Mapped Addresses|001
- DMTF|Physical Memory Array|001

Original Groups, recommended for legacy instrumentation only

- DMTF|Physical Memory|002

4.1.3.   While the following groups are optional for conformance, it is recommended that the OS platform itself provides instrumentation for the groups in this section:

- DMTF|System Resource 2|001
- DMTF|System Resource Device Info|001
- DMTF|System Resource DMA Info|001
- DMTF|System Resource I/O Info|001
- DMTF|System Resource IRQ Info|001
- DMTF|System Resource Memory Info|001

4.2 Additional Conformance Requirements for Desktop Systems

This section describes incremental conformance requirements over section 4.20 for desktop systems.

- DMTF|Disks|002
- DMTF|Keyboard|003
- DMTF|Pointing Device|001 or DMTF|Mouse|003 required (Pointing Device is recommended over the obsolete Mouse)
- DMTF|Video|002

4.3   Additional Conformance Requirements for Mobile Systems

This section describes incremental conformance requirements over section 4.20 for mobile systems. Mobile systems can and do present significant challenges to management, particularly for remote or network management when the machine is mobile. It is recognized that some portables-specific attributes are not available without "PnP", or Windows/95 plug and play capabilities under other operating systems that do not support PnP (or a suitable replacement) at the present time. A system is classified as a DMI Manageable Mobile System if, and only if, it conforms to the following additional requirements:

The following groups are required for mobile systems

- DMTF|Disks|002
- DMTF|Keyboard|003
- DMTF|Pointing Device|001
- DMTF|Video|002

4.3.1   The following groups from the "Mobile MIF" are required, provided that the appropriate hardware is available on

the mobile computer:

- DMTF|Dynamic States|001
- DMTF|Portable Battery|001

4.4 Additional Conformance Requirements for Server Systems

This section describes incremental conformance requirements over section 4.20 for server systems. Since servers tend to cover a wide range of hardware feature sets and configurations, the exemption identified in section 4.0 is especially important to keep in mind. A system is classified as a DMI Manageable Server System if, and only if, it conforms to the following additional requirements:

4.4.1   Where the OS platform supports the appropriate interfaces, the following groups from the "Master MIF" are required:

- DMTF|Power Supply|002
- DMTF|Cooling Device|002
- DMTF|Operational State|003
- DMTF|Power Unit Global Table|001

4.5 Conformance Requirements for Independent Hardware Vendors

This section identifies classes of IHV products that wish to obtain stand-alone DMTF conformance certification (example: For retail sales, not bundled with an OEM platform). The subsections define guidelines for Video, LAN, and Mass Storage vendors to provide minimum baseline functionality to obtain stand-alone certification. This certification may also be useful for qualifying vendors by OEM hardware vendors.

4.5.1   IHV Video Adapter Conformance Requirements

Video Adapter vendors should provide DMI 2.0 Instrumentation and appropriate MIF files to instrument the required groups described in this section. Inclusion of a DMI 2.0 Service Provider is optional, and should not be installed by default unless explicitly requested in order to avoid conflicts with a service provider already present on a managed system. The following DMTF standard groups from the Master MIF must be included for conformance:

- DMTF|Video BIOS|001
- DMTF|Video|002

4.5.2   IHV Network (LAN) Adapter Conformance Requirements

LAN Adapter vendors should provide DMI 2.0 Instrumentation and appropriate MIF files to instrument the required groups described in this section. Inclusion of a DMI 2.0 Service Provider is optional, and should not be installed by default unless explicitly requested in order to avoid conflicts with a service provider already present on a managed system. The following DMTF standard groups from the Master MIF must be included for conformance:

- DMTF|Network Adapter 802 Port|001
- DMTF|Network Adapter Driver|001

4.5.3   IHV DDC Monitor Conformance Requirements

For DDC compliant monitors, where the OS platform supports the appropriate interfaces, the following group from the "Master MIF" document is required:

- DMTF|Monitor Resolutions|002

5 Event Generation Support

Some of the required standard groups specified above are associated with event generation groups. Event generation for these groups is optional. However, if generated, events must be conformant with the event model specification defined in *Desktop Management Interface Specification, Version 2.0*, Section 3.2.

Information returned from these attributes must provide meaningful information to management applications, as measured by:

- Attributes must behave as defined by the attribute definition.
- The managed data must reflect the state of the managed value
- They must be valid values for the managed system

6 Standard Group Conformance

In order to allow consistent interpretation of DMTF Standard Groups by management applications, certain rules in the implementations of DMTF Standard Groups must be adhered to. This in no way is intended to limit managed product vendors from developing custom groups that expose unique value added features of their products. In the following discussion, "Standard Group" refers to the DMTF group as adopted by the DMTF Steering Committee. "Candidate Group" refers to the group that is being evaluated for conformance. Implementation of these rules may be through the managed component, the service provider or some combination of both.

DMTF Standard group conformance is measured by:

6.1.   The Candidate Group's class string must match exactly a Standard Group's class string

6.2.   The Candidate Group must contain all attributes defined in the Standard Group, one for one. No attribute may be added or deleted. Note that some standard groups (such as the EventGeneration Group) are defined in the DMI v2.0 Specification as containing optional attributes. For these groups, this rule is relaxed to the degree necessary to accommodate these optional attributes. Any Candidate implementation of such groups may modify the number of attributes present, within the constraints of the group definition in the DMI v2.0 Specification

6.3.   The attribute ID and data type of all attributes in a Candidate Group must conform to the Standard Group. For example, if a Standard Group has an attribute with ID=10 that is a type of 64 bit integer, a Candidate Group must have an attribute with ID=10 with a type of 64 bit integer

6.4.   The access type of an attribute in the Candidate Group must match the access type of the corresponding attribute in the Standard Group. Access promotion is allowable whereas demotion is not. Promotion is defined as changing the attribute access from Read-Only or Write-Only to Read-Write. Demotion is changing the access from Read-Write to anything else. Attributes in a Candidate Group may be specified as Unsupported; such groups are still considered conformant

6.5.   If the Candidate Group contains keys, the key list must contain the same attribute IDs, one for one, in the same order as the Standard Group.

6.6.   If the Candidate Group contains attributes with Enum definition(s), the definition must match the Standard Group definition exactly. No new value / string mappings may be added, none may be removed and, other than language translations, no changes may be made to the existing value / string mappings.

6.7.   If the Standard Group contains a Pragma statement the following rules apply:

6.7.1.   If the Standard Group Pragma contains the Dependent_Groups or Implementation_Guideline keywords, the Candidate Group implementation must have a Pragma statement with the identical keywords

6.7.2.   If the Standard Group pragma statement contains the Dependent_Groups keyword, the same groups must be specified in the Candidate Group Pragma statement, and the specified dependent groups must be implemented in the candidate component

6.7.3.   If the Standard Group Pragma statement contains the Implementation_Guideline keyword, the Candidate Group Pragma statement must also contain that keyword. Further, the keyword values must be the same for the Standard and Candidate Groups for the Group version being implemented.

6.7.4.   Group Dependency Promotion is defined as a Candidate Group adding the Pragma Keyword Dependent_Groups to the implementation of a Standard Group that does not contain this keyword. This form of promotion allows extra value to be added to specific implementations of Standard Groups. If a Standard Group implementation is promoted to include the Dependent_Groups keyword, all Dependent Group conformance rules then apply.

6.7.5.   Promotion of Group Pragmas to include the Implementation_Guideline keyword is not allowed.

6.7.6.   The Reg_Key pragma keyword may be present or not in the Candidate Group implementation, without regard to whether the Standard Group contains such a keyword. If present, the syntax must be correct. No

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value checking is performed.

6.7.7. It is recommended that the SNMP keyword and any DMTF OID mapping be present in the Candidate Group implementation, if the Standard Group contains such a keyword. If present, the syntax must be correct.

Special note about SNMP (Simple Network Management Protocol) support on Managed Systems.

If a vendor wishes to support SNMP natively through SNMP instrumentation, then the DMTF has no formal recommendation on how that should be provided. However, if DMI mapping to SNMP interfaces is supported (i.e. DMI instrumentation conversion to/from SNMP Get/Set and Event to Trap conversion), then all systems shipped on/after the adoption date of this specification should use the mapping standard defined in the *DMTF SNMP to DMI Mapping Standard, Version x.y*. DMI to SNMP mapping is not required, but it can be useful in some environments, particularly those using legacy enterprise management consoles that do not speak DMI 2.0 natively.

6.8. If the Candidate Group is an Event Generation Group, the following rules apply:

6.8.1. The main defining body section of the Class String must be 'EventGeneration|'. Any group with this value in its main defining body section is assumed to be an Event Generation Group.

6.8.2. If the <defining-body> section of the <Specific name> part of the Class String is 'DMTF', the <specific-name-of-assoc-group> section must match a known DMTF approved Event Generation Group. Candidate Group implementers may add a <proprietary-extension> section if desired.

6.8.3. All seven of the required attributes must be defined and must conform to the attribute conformance requirements detailed above. These are:

6.8.3.1. Event Type (ID=1)
6.8.3.2. Event Severity (ID=2)
6.8.3.3. Event Is State Based (ID=3)
6.8.3.4. Event State Key (ID=4)
6.8.3.5. Associated Group (ID=5)
6.8.3.6. Event System (ID=6)
6.8.3.7. Event Subsystem (ID=7)

6.8.4. Zero or more of the Optional Attributes may be defined. If any of these are defined, the definition must conform to the Level 1 attribute conformance requirements detailed above. The optional attributes are:

6.8.4.1. Event Solution (ID=8)
6.8.4.2. Instance Data Present (ID=9)
6.8.4.3. Event Message (ID=10)
6.8.4.4. Vendor Specific Data (ID=11)

6.8.5. The Enum mapping for the Event Severity attribute (ID=2) must conform to the attribute enum conformance rule above. Other enumerated attributes (ID= 1, 6, 7 and 8) have their enumeration mapping defined during component definition. In order to be considered conformant, these attributes must each have one or more enum mappings associated with them. The exact number of enum mappings and their numeric values are not checked for these attributes.

6.8.6. The group named in the Associated Group attribute (ID=5) must be present in the Candidate Component implementation.

6.9. If the Candidate Group is an Event State Group, the following rule applies:

6.9.1. For each row in the Event State Group table, the event generation group named in the Event Generation Group attribute must exist in the Candidate Component implementation.

7 Conformance Guidelines Reference Information

7.1   Reference Conformance Test Plan

The sample test plan from version 1.0 of this document has been replaced with a separate document. The DMI 2.0 Conformance Test Plan will contain a conformance testing details. See section 7.2 for the specific location of the document.

7.2   Reference Documents

- Desktop Management Interface Specification 2.0 – http://www.dmtf.org/

- DMI 2.0, Errata #1 – http://www.dmtf.org/

- DMI 2.0 Conformance Test Plan version 1.1d – http://www.dmtf.org/

- *DMTF Standard Groups Repository* (or "Master MIF") – http://www.dmtf.org/

- MIF Design Guidelines – http://www/dmtf.org/

- DMTF SNMP to DMI Mapping Standard, version 1.0 – http://www.dmtf.org/