White Paper DSP0131

Status: Preliminary Standard

Exposing Alert Standard Format (ASF) through the Desktop Management Interface (DMI)

Version 1.0 Preliminary
January 14, 2002

Abstract

Managing Systems cannot always count on the systems they are attempting to manage to have a functional operating system. The Alert Standard Format (ASF) specification defines a means of “out-of-band” communications between a fully operational (OS Present) Managing System and a Managed System that may not have an operating system present (OS Absent). These out-of-band communications may be in the form of Alerts or asynchronous notifications sent from the Managed System to the Managing System. In addition, out-of-band communications may also be in the form of requests from the Managing System to the Managed System and responses from the Managed System to the Managing System. The ASF specification also identifies a mechanism for Managed Systems to be setup or configured for out-of-band communications while they are operating with an OS Present.

This white paper describes the standard Desktop Management Interface (DMI) group used to setup a Managed System for out-of-band communications while it is operating with an OS Present. Three additional DMI groups are defined to act as an intermediate interface for out-of-band communications between a DMI Management Application and Managed System where an intermediate OS Present DMI-compliant Managed System translates out-of-band ASF communications. Two DMI groups are defined to map ASF Alerts to DMI Indications. The third DMI group is used to send ASF Requests to a Managed System and receive ASF Responses.

DMI is not the only interface that may be used to perform ASF setup and out-of-band communications. ASF management applications may elect to communicate directly through the interfaces provided by ASF hardware or through management interfaces provided by the ASF-related extensions to the DMTF's Common Information Model (CIM). However, if ASF functionality is exposed through DMI, this document describes the DMTF conformant DMI Groups and Attributes that must be used to perform ASF setup and out-of-band communications when DMI is used.

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Change History

Version	Date	Author	Changes
1.0 Preliminary	January 14, 2002	D. Lawrence	Added paragraph to abstract and introduction about interfaces that may be used for ASF setup and communications per DMTF Board request. Approved for release as Preliminary standard by DMTF Board.
1.001	November 13, 2001	R Williams	Updated Appendix B
1.0i	October 30, 2001	D. Lawrence	1. Changed document name to DSP0131.DOC per DMTF Technical Committee request.
1.0h	October 24, 2001	D. Lawrence	1. Added System Heartbeat Attribute to ASF Local Setup group. 2. Added Known Issues section to identify planned extension work in progress. 3. Removed prior change history (prior change history is available in previous document revisions posted in the Pre-OS WG area of the DMTF web site). 4. Removed Open Issues section as all open items have been resolved and closed or identified for future extensions.

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1. Introduction

1.1. Purpose

This document describes how interfaces for Alert Standard Format (ASF) setup and out-of-band communications are exposed through standard Distributed Management Task Force (DMTF) Desktop Management Interface (DMI) group definitions.

DMI is not the only interface that may be used to perform ASF setup and out-of-band communications. ASF management applications may elect to communicate directly through the interfaces provided by ASF hardware or through management interfaces provided by the ASF-related extensions to the DMTF's Common Information Model (CIM). However, if ASF functionality is exposed through DMI, this document describes the DMTF conformant DMI Groups and Attributes that must be used to perform ASF setup and out-of-band communications when DMI is used.

1.2. Scope

This document is intended to provide enough information that developers of DMI Component Instrumentation may expose ASF setup and out-of-band communications interfaces as DMI data using standard DMTF group definitions.

In addition, it is intended to provide sufficient information for developers of DMI Management Applications to setup and communicate with ASF-enabled systems using only accesses to standard DMTF group definitions.

1.3. References

This section identifies other specifications that add further definition, primarily as the controlling specifications, for some of the data structures or underlying methods used to expose ASF through DMI. These references establish additional requirements a conforming implementation must meet.

[ACPI Specification] Compaq, Intel, Microsoft, Phoenix, and Toshiba, *Advanced Configuration and Power Interface Specification*, Version 2.0, July 27, 2000, www.teleport.com/~acpi

[ASF Specification] DMTF, *Alert Standard Format (ASF) Specification*, Version 1.03, June 20, 2001, www.dmtf.org

[DMI Specification] DMTF, *Desktop Management Interface Specification*, Version 2.0s, June 24, 1998, www.dmtf.org

[PET Specification] Intel, *IPMI Platform Event Trap Format Specification*, Version 1.0, December 7, 1998, www.intel.com

[SMBIOS Specification] DMTF, System Management BIOS Reference Specification, Version 2.3.1, March 16, 1999, www.dmtf.org

1.4. Terms and Abbreviations

Term	Description
Alert Receiver	An ASF-aware system capable of receiving ASF Alerts.
Alert Sender	An ASF-enabled system capable of sending ASF Alerts.
ASF	Acronym for Alert Standard Format, a DMTF specification for out-of-band communications between a Managed System and a Managing System.
ASF Alert	An asynchronous event notification from an ASF-enabled system, formatted as a PET.
ASF-aware	A system capable of communicating with an ASF-enabled system.
ASF-enabled	A system that meets the requirements established by the DMTF ASF specification for originating ASF Alerts and responding to RMCP requests.
Attribute	A piece of data related to a Component.
Component	A collection of one or more Groups. The Component data construct allows component providers to arrange Attributes into logical sets.
DMI	Acronym for Desktop Management Interface.
DMI-compliant	A system that meets the requirements established by the DMTF DMI specification and related conformance documents
DMI Component Instrumentation	Software on a DMI-compliant system that handles access to data requested by a DMI Management Application.
DMI Management Application	Software on a DMI-compliant system that initiates management requests and receives indications.
DMTF	Acronym for Distributed Management Task Force.
Event Consumer	More generically known as a DMI Management Application, an Event Consumer receives Indications when it subscribes to DMI Events.
Event Reporter	Software on an Alert Receiver responsible for mapping an ASF Alert to a DMI Indication
Group	A collection of one or more Attributes.
IANA	Acronym for Internet Assigned Numbers Authority, an organization that manages the assignment of unique numbers for various industry standards.
Indication	The DMI data structure created by an Event Reporter and delivered to an Event Consumer.
Managed System	A system being managed.

Term	Description
Managing System	The system used to manage a Managed System. For DMI, the system running a DMI Management Application.
OS Absent	When there is not active operating system running on a system, the system is said to be in the OS Absent state.
OS Present	When there is an active operating system running on a system, the system is said to be in the OS Present state.
PET	Acronym for Platform Event Trap, an SNMP Trap with a standardized payload.
PDU	Acronym for Protocol Data Unit, a standard SNMP data structure.
RMCP	Acronym for Remote Management Control Protocol, the communications protocol for accessing an ASF-enabled system.
SNMP	Acronym for Simple Network Management Protocol. ASF only refers to SNMP to define a PET in terms of an SNMP PDU.
System	Typically a managing or managed computer system.

2. Functional Overview

The Alert Standard Format (ASF) specification defines the communications protocol (transport and data formats) used by ASF-enabled system to:

- Send alerts
- Receive requests and send responses formatted in Remote Management Control Protocol (RMCP)

ASF communications have been designed to allow out-of-band communications between an ASF-enabled Managed System and a Managing System. These communications may take place without requiring an operating system to be present or functional on the Managed System (when the system is in the OS Absent state).

In addition, the ASF specification suggests that ASF setup (configuration) of a Managed System requires at least "one good boot." The ASF specification expects any ASF-related configuration to occur while the ASF-enabled system is running with a functional operating system present (when the Managed System is in the OS Present state).

This white paper describes the standard DMTF DMI groups used to perform the following functions:

- OS Present setup (configuration) of an ASF-enabled system
- Mapping ASF Alerts received from an ASF-enabled system to DMI Indications
- Out of band access to a Managed System using RMCP

The intent is to allow standard DMI Management Applications to perform ASF setup, reception of ASF Alerts mapped to DMI Indications and out of band management of an ASF-enabled system using only standard DMI access to attribute values populating standard DMTF-defined DMI groups. This white paper models the relationship between a Managing System and an ASF-enabled Managed System from three separate perspectives that correspond to the functions identified above.

2.1. OS Present Setup

For OS Present setup (configuration), a Managing System directly accesses the **DMTF|ASF Local Setup|xxx** group instantiated by DMI component instrumentation running on the ASF-enabled Managed System. For setup, there are only two systems involved, the Managing System running a DMI Management Application and the Managed System running ASF-aware DMI component instrumentation capable of performing ASF setup on the Managed System.

2.2. Mapping ASF Alerts to DMI Indications

The model for mapping ASF Alerts to DMI Indications has three entities involved in the process. The ASF-enabled Alert Sending system may be running in the OS Absent or OS Present state. The Alert Sender has been previously setup while in the OS Present state to send ASF Alerts to an Alert Receiver. When the Alert Receiver receives an ASF Alert, DMI Component Instrumentation translates the ASF Alert into a DMI Indication.

A DMI Management Application subscribes to DMI Indications from the local system or from a remote DMI-compliant system. If the Alert Receiver is also the host for the Management Application, only two systems are required.

However, the DMI Management Application could be running on a third system that is accessing the Alert Receiver remotely. In this model, three systems are involved with ASF Alerts being mapped to DMI Indications. A DMI Management Application subscribes for ASF-related DMI Indications from a remote Alert Receiver. When the Alert Sender sends the ASF Alert to the Alert Receiver, Component Instrumentation on the Alert Receiver translates the ASF Alert to a DMI Indication. The DMI Service Provider notes the subscription for the DMI Indication from the remote Management Application and forwards the notification.

Mapping ASF Alerts to DMI Indications requires two DMTF-defined DMI groups: **EventGeneration|DMTF^^ASF Alert|xxx** and **DMTF|ASF Alert Data|xxx**. The first is a derivation of the standard DMI Event Generation Group template (see the Section on Event Standard Groups in the Desktop Management Interface Specification) defined for ASF Alerts. The second standard DMTF-defined DMI group is the structure of the instance-specific data carried in the DMI Indication data structure used for DMI Event notification.

2.3. Mapping RMCP to DMI

The model for mapping RMCP to DMI also allows two or three systems to be involved in the process depending on whether the DMI Management Application making RMCP requests is accessing Component Instrumentation the local system or a remote system. As with Alert Mapping, DMI Component Instrumentation instantiates a standard DMTF-defined group: **DMTF|ASF Remote Management|xxx**. This group is used for out-of-band communications to an ASF-enabled system.

3. OS Present Setup (Configuration)

OS Present Setup requires Component Instrumentation on the ASF-enabled system to instantiate the **DMTF|ASF Local Setup|xxx** Group where xxx represents the Group's revision number. This white paper was written for the 001 version of this Group. The following table defines the Group's Attributes:

Attribute	ID	Data Type	Access	Description
ASF Version	1	Gauge	R/O	Component Instrumentation implementation is compatible with this version of the ASF Specification. This Attribute is binary coded decimal with an implied precision of two places. For example, if this instrumentation is compatible with version 2.34 of the ASF specification, this Attribute shall be set to 0x234. If this value is zero, the local system is not ASF-capable.
Special Commands	2	Gauge	R/O	Supported special commands as determined from the ACPI ASF_RMCP structure on local system: 0x10 CD/DVD Boot 0x08 Diagnostic Boot 0x04 Hard-drive, Safe-mode 0x02 Hard-drive 0x01 PXE See ASF Specification for meaning of bit definitions.
System Capabilities	3	Gauge	R/O	Supported system capabilities as determined from the ACPI ASF_RMCP structure on the local system: 0x80 Reset 0x40 Power-Up 0x20 Power-Down 0x10 Power Cycle Reset See ASF Specification for meaning of bit definitions.
Firmware Capabilities	4	Gauge	R/O	Supported firmware capabilities as determined by component instrumentation from the ACPI ASF_RMCP structure on the local system: 0x8000 Configuration Data Reset 0x4000 F.W verbosity: quiet 0x2000 F/W verbosity: verbose 0x1000 Forced progress events 0x0800 User password bypass 0x0040 Sleep Button Lock 0x0020 Keyboard Lock 0x0004 Reset Button Lock 0x0002 Power Button Lock 0x0001 Firmware verbosity See ASF Specification for meaning of bit definitions.
Manufacturer ID	5	Gauge	R/O	Private Enterprise Number assigned to the Alert sending system manufacturer by IANA as determined by component instrumentation from the ACPI ASF_INFO structure on the local system. Used to populate the Manufacturer ID field of the PET.

Attribute	ID	Data Type	Access	Description
System ID	6	Gauge	R/O	The number assigned to the system by the system manufacturer as determined by component instrumentation from the ACPI ASF_INFO structure on the local system. Used to populate the System ID field of the PET.
GUID	7	OctetString	R/O	Globally Unique Identifier for the ASF-enabled system as determined by component instrumentation from the SMBIOS System Information structure on the local system. Used to populate the GUID field of the PET. Length is 16 bytes.
Sender IP Address	8	DisplayString	R/W	IP Address used by Alert Sender during OS Absent operations. Set by Management Application during Setup.
Receiver IP Address	9	DisplayString	R/W	IP Address of ASF Alert Receiver for this Alert Sender. Set by Management Application during Setup.
CommandsMask	10	Gauge	R/W	Bit mask to enable or disable specific supported special commands. If bit is set, command is enabled, if supported. If bit is reset, command is disabled (or unsupported). Resetting a bit corresponding to a supported special command disables the command, if supported by the system. If disabling command is not supported, no error is reported when attempting to reset corresponding bit, but subsequent reads of this value shall report command as enabled.
System Mask	11	Gauge	R/W	Bit mask to enable or disable specific supported system capabilities. If bit is set, capability is enabled, if supported. If bit is reset, capability is disabled (or unsupported). Resetting a bit corresponding to a supported capability disables the capability, if supported by the system. If disabling capability is not supported, no error is reported when attempting to reset corresponding bit, but subsequent reads of this value shall report capability as enabled.
Firmware Mask	12	Gauge	R/W	Bit mask to enable or disable specific supported firmware capabilities. If bit is set, capability is enabled, if supported. If bit is reset, capability is disabled (or unsupported). Resetting a bit corresponding to a supported capability disables the capability, if supported by the system. If disabling capability is not supported, no error is reported when attempting to reset corresponding bit, but subsequent reads of this value shall report capability as enabled.
Enable Alerts	13	Boolean	R/O or R/W	If TRUE, local system is enabled to send ASF Alerts to Alert Receiver.
Enable RMCP	14	Boolean	R/O or R/W	If TRUE, local system is enabled to accept Remote Management Control Protocol requests.

Attribute	ID	Data Type	Access	Description
Heartbeat Interval	15	Gauge	R/W	ASF hardware may support the capability to send System Heartbeat messages indicating the system is still present. A Get operation for this Attribute returns the interval between heartbeat messages expressed as seconds. If the value of this Attribute is all ones, the ASF hardware does not support a Heartbeat Timer and all Set operations shall be ignored. If the value of this Attribute is zero, the Heartbeat Timer is disabled. A Set operation with a value of zero is ignored if the ASF hardware does not support a Heartbeat Timer or does not allow the Timer to be disabled. Any non-zero value that is not all ones is the interval between Heartbeat messages. Different ASF implementations may support different granularities for this interval. For example, one system might support intervals in one minute increments while another supports intervals in half-minute (30 second) increments. The range of intervals supported may vary. One implementation might support a range of one minute to 10 minutes for the interval between Heartbeats while another supports a range of 30 seconds to 4 minutes. In addition, there is no requirement that the granularity of supported intervals is linear. To manage this range of implementations, any non-zero value used in a Set operation results in the selection of the interval supported by the hardware that is closest to the value requested. This may result in rounding the interval requests by the Set operation up or down. A Management Application uses a Get operation to determine the interval actually selected.

To begin initial new system Setup (configuration), a Management Applications reads this scalar group. This DMI Group is present and the ASF Version Attribute is non-zero when a system is ASF-enabled.

A Management Application determines the system's ASF capabilities by reading the value of the Special Commands, System Capabilities and Firmware Capabilities Attributes. The Management Application may limit the system capabilities offered for remote management by resetting selected bits within the Attribute values read and writing the resulting value to the corresponding Mask Attributes.

Setting a bit in a Mask Attribute for an unsupported capability is not an error and shall not be reported as an error. Component Instrumentation shall simply ignore the bit during the Set operation. Subsequent Get requests shall return a bit mask that describes the currently enabled features.

Attempting to disable a feature that may not be disabled is also not an error and shall not be reported as an error. Again, Component Instrumentation shall simply ignore the bit during the Set operation. Subsequent Get requests shall return a bit mask that describes the currently enabled features.

If ASF Alerts are desired, the Management Application shall set the Local IP Address and Received IP Address Attributes to the desired IP address values. The Management Application must also ensure that the ASF hardware has been enabled for sending ASF Alerts by setting the Enable Alerts attribute to TRUE.

The Enable RMCP Attribute serves as a master enable for the currently enabled RMCP features. If this Attribute is set to FALSE, the RMCP capabilities are disabled. As with other disabling feature, attempting to disable RMCP in a system that does not support this disabling is not an error and shall not be reported as an error. Component Instrumentation once again shall simply ignore the request to set this Attribute to FALSE. Subsequent Get requests in this case shall continue to return TRUE.

This behavior of ignoring requests that cannot be honored because the system does not support disabling supported features has been selected to minimize the error recovery code required in Management Applications. Since the ASF-enabled systems doesn't support the request, the system continues to provide the feature and the Management Applications doesn't have to perform error processing when there is no other possible outcome. Management Applications that wish to determine whether an ASF-enabled system really supports disabling a feature should attempt to disable it and then read back the results. If no change was made to the state prior to the request, disabling the feature is not supported.

4. Mapping ASF Alerts to DMI Indications

Mapping ASF Alerts to DMI Indications requires two Groups to be instantiated on an Alert Receiver. The first is a derivation of the DMTF Event Generation Group known as the **EventGeneration|DMTF^^ASF Alert|xxx** where xxx represents the Group's revision number. This white paper was written for the 001 version of this Group.

The second is the **DMTF|ASF Alert Data|xxx** Group that is used to describe the format of the instance data associated with the DMI Indication data mapped from an ASF Alert. Again, xxx represents the Group's revision number. This white paper was written for the 001 version of this Group.

An Event Reporter is responsible for receiving ASF Alerts on the Alert Receiver system and converting them to a DMI Indication, the data structure sent to the Event Consumer (more generically known as a DMI Management Application). For ASF Alerts, the DMI Indication is a DmiMultiRowData structure created by the Event Reporter with two DmiRowData structures.

The first DmiRowData structure contains instance data for a **EventGeneration|DMTF^^ASF Alert|xxx** Group. The second DmiRowData structure contains instance data directly mapped from the ASF Alert to the **DMTF|ASF Alert Data|xxx** Group.

The following table defines the **EventGeneration|DMTF^^ASF Alert|xxx** Group's Attributes:

Attribute	ID	Data Type	Access	Description
Event Type	1	<Enum>	R/O	This Attribute is set to zero (0) for ASF Alerts.
Event Severity	2	<Enum>	R/O	Populated directly from the Event Severity field of the ASF PET without any translation.
Event is State Based	3	Boolean	R/O	Always set to FALSE to indicate the event is not state-based. State-based events require only one Alert per event and an OK event every time a reported event is cleared. ASF does not meet these requirements.
Event State Key	4	Integer	R/O	Not used with non State Based events, so this Attribute shall be ignored by Management Applications. Event Reporter shall set this Attribute to zero.
Associated Group	5	DisplayString	R/O	This Attribute is set to the string "DMTF|ASF Alert Data|xxx" where xxx is the revision number of the group used to express the data format of the instance data included with this event data.
Event System	6	<Enum>	R/O	This Attribute is set to zero (0) for ASF Alerts.
Event Subsystem	7	<Enum>	R/O	This Attribute is set to zero (0) for ASF Alerts.
Event Solution	8	<Enum>	R/O	Not used for standard ASF Alert mapping, may be omitted.
Instance Data Present	9	Boolean	R/O	This is always set to TRUE to indicate that the second DmiRowData structure of the Indication contains instance data as described by the schema for the DMTF|ASF Alert Data|xxx Group.
Vendor Specific Message	10	DmiString_t	R/O	Not used for standard ASF Alert mapping, may be omitted.
Vendor Specific Data	11	DmiString_t	R/O	Not used for standard ASF Alert mapping, may be omitted.

See the DMI Specification for further details related to the above Attributes.

The following table defines the **DMTF|ASF Alert Data|xxx** Group's Attributes:

Attribute	ID	Data Type	Access	Description
Enterprise OID	1	DmiString	R/O	enterprise field from PET.
Sender IP Address	2	DmiString	R/O	agent-addr field from PET. From value set in Sender IP Address Attribute in **DMTF|ASF Setup|xxx** Group by Management Application during OS Present Setup (configuration).
Generic Trap	3	Gauge	R/O	generic-trap field from PET. The only legal value for this Attribute is six (6) indicating the SNMP trap represented by the PET is Enterprise Specific.
Specific Trap	4	Gauge	R/O	specific-trap field from PET. Indicates Event Sensor Type, Event Type and Event Offset.
Elapsed Time	5	Counter	R/O	time-stamp field from PET. Time elapsed between this ASF Alert and the initialization of Alert Sender. Expressed in hundredths of a second.
GUID	6	OctetString	R/O	GUID field from PET. This originates in the GUID Attribute of the **DMTF|ASF Setup|xxx** Group.
Sequence	7	Counter	R/O	Sequence#/Cookie field from PET. An Event Reporter ignores back-to-back ASF Alerts with the same Sequence#/Cookie value. Only one DMI Indication is prepared for all ASF Alerts received with the same Sequence#/Cookie value.
Alert Timestamp	8	Date	R/O	Conversion of PET fields Local Timestamp and UTC Offset into DMI Date format. Set to zero if Local Timestamp is zero. PET UTC Offset ignored if UTC Offset is out of range: -720 to +720.
Trap Source Type	9	Integer	R/O	Trap Source Type field from PET.
Event Source Type	10	Integer	R/O	Event Source Type field from PET.
Event Severity	11	<Enum>	R/O	Event Severity field from PET. Note: This information is also conveyed in the Event Severity Attribute of the **EventGeneration|DMTF^^ASF Alert|xxx** Group.
Sensor Device	12	Gauge	R/O	Sensor Device field from PET. Only the least significant byte is significant.
Sensor Number	13	Gauge	R/O	Sensor Number field from PET. Only the least significant byte is significant.
Entity	14	Gauge	R/O	Entity field from PET. Only the least significant byte is significant.
Entity Instance	15	Gauge	R/O	Entity Instance field from PET. Only the least significant byte is significant.
Event Data	16	OctetString	R/O	Event Data fields from PET. Always eight (8) significant bytes.
Language	17	Gauge	R/O	Language Code field from PET. Only the least significant byte is significant. See PET Specification.

Attribute	ID	Data Type	Access	Description
Manufacturer ID	18	Gauge	R/O	Manufacturer ID field from PET. Originally established by Manufacturer ID Attribute in **DMTF|ASF Setup|xxx** Group of Alert Sender.
System ID	19	Gauge	R/O	System ID field from PET. Originally established by System ID Attribute in **DMTF|ASF Setup|xxx** Group of Alert Sender.
OEM-Specific	20	OctetString	R/O	From OEM Custom Fields field in PET.

See the PET Specification for further details related to the contents of the above Attributes.

5. Mapping RMCP to DMI

The **DMTF|ASF Remote Management|xxx** Group is used to provide access to the Remote Management Control Protocol to communicate with ASF-enabled systems from an ASF-aware system. Each row in the table is a different ASF-enabled system that may be accessed through the ASF-aware system.

The following table defines the **DMTF|ASF Remote Management|xxx** Group's Attributes:

Attribute	ID	Data Type	Access	Description
Managed System IP Address	1	DisplayString	R/O	IP Address used by Managed System during OS Absent operations. **Key Attribute.**
Get Presence	2	OctetString	R/W	Performing a Set operation on this Attribute causes a Ping Request RMCP message to be sent to the remote system using the Managed System IP Address. In the event of an error, one of the following two error codes is returned: DMIERR_NO_ASF_ACK DMIERR_NO_ASF_RESPONSE A Get operation on this Attribute returns the last Pong Response RMCP message received from the remote system. If the last Ping Request RMCP message failed, the Get returns: DMIERR_VALUE_UNKNOWN The format of a Pong Response Data block is defined in the ASF Specification.
Get Capabilities	3	OctetString	R/W	Performing a Set operation on this Attribute causes a Capabilities Request RMCP message to be sent to the remote system using the Managed System IP Address. In the event of an error, one of the following two error codes is returned: DMIERR_NO_ASF_ACK DMIERR_NO_ASF_RESPONSE A Get operation on this Attribute returns the last Capabilities Response RMCP message received from the remote system. If the last Capabilities Request RMCP message failed, the Get returns: DMIERR_VALUE_UNKNOWN The format of a Capabilities Response Data block is defined in the ASF Specification.

Attribute	ID	Data Type	Access	Description
Get System State	4	OctetString	R/W	Performing a Set operation on this Attribute causes a System State Request RMCP message to be sent to the remote system using the Managed System IP Address. In the event of an error, one of the following two error codes is returned: DMIERR_NO_ASF_ACK DMIERR_NO_ASF_RESPONSE A Get operation on this Attribute returns the last System State Response RMCP message received from the remote system. If the last System State Request RMCP message failed, the Get returns: DMIERR_VALUE_UNKNOWN The format of a System State Response Data block is defined in the ASF Specification.
Do Power-Down	5	Integer	W/O	Performing a Set operation of any value on this attribute sends an Unconditional Power-Down RMCP message to the remote system using the Managed System IP Address. In the event of an error, the following error code is returned: DMIERR_NO_ASF_ACK
RMCP Data	6	OctetString	R/W	Performing a Set operation on this attribute sends the RMCP Request Data block supplied by the Management Application to the remote system using the Managed System IP Address. This Attribute is intended for RMCP Requests that require arguments to be specified. Examples are Reset, Power-up and Power-Cycle Reset. In the event of an error, one of the following two error codes is returned: DMIERR_NO_ASF_ACK DMIERR_NO_ASF_RESPONSE The Set operation requires a complete payload for the RMCP Request. The payload shall include all of the fields of the Data block from the IANA Enterprise Number field up to and including the variable length Data field. The Set operation does not validate the fields in the payload. A Management Application uses a Get operation to return the RMCP Response Data block from the last RMCP Request. If the last Set operation failed or did not have a corresponding Response, the following error code is returned in response to a Get Operation: DMERR_VALUE_UNKNOWN The format of a RMCP Request and Response Data blocks is defined in the ASF Specification.

Complete Setup (configuration) of an ASF-enabled system requires manipulation of two groups. First, a Management Application uses the **DMTF|ASF Local Setup|xxx** Group to configure ASF features on the local system during OS present operations on the Alert Sender. Second, the management Application adds a row to the **DMTF|ASF Remote Management|xxx** Group on an

ASF-aware system such as the Alert Receiver to enable RMCP access to the ASF-enabled system.

The **DMTF|ASF Remote Management|xxx** Group has been designed to simulate methods or procedures in other management protocols by performing RMCP transactions when a Management Application performs a Set operation on selected Attributes. Set operations are used to request an RMCP transaction be performed and Get operations return the result of the transaction, if the transaction returns data and the Set was successful. If a transaction fails, the Set operation returns an error indicating whether the operation failed to send the Request (DMIERR_NO_ASF_ACK) or the ASF-enabled system accepted the Request and then failed to return a Response (DMIERR_NO_ASF_RESPONSE).

A Set operation on the Get Presence, Get Capabilities, and Get Status Attributes sends a pre-formatted RMCP Request to the ASF-enabled system and retrieves the entire Data block of the RMCP Response. This Data block is placed into the RMCP Data Attribute by component instrumentation before returning the return code to the Management Application for the Set operation. The Management Application performs a Get operation on the RMCP Data Attribute after a successful Set to retrieve the returned data for the Attribute and then parses it according to the ASF Specification.

A Set operation on the Do Power-Down Attribute does not require a Response. If the Set operation is successful, the remote system has acknowledged the request and no Response or Data block is returned to the ASF-aware system. For that reason, the Do Power-Down Attribute is restricted to Write-Only operations.

For RMCP Requests that require arguments, a Management Application uses a Set operation to write the entire ASF RMCP Data block to the RMCP Data Attribute. The Management Application uses a Get operation on the RMCP Data Attribute to retrieve the RMCP Response.

For all of the Attributes that simulate methods returning data, multiple Get operations without an intervening Set operation continue to return the same RMCP data or error code that was the result of the last Set operation.

While an Alert Receiver is not required to be the host for the **DMTF|ASF Remote Management|xxx** Group used to access the Alert Sender, it may be more convenient to do so. The Sender IP Address Attribute of the **DMTF|ASF Alert Data|xxx** Group may be used as a key to the appropriate row in the **DMTF|ASF Remote Management|xxx** Group for remotely managing the ASF-enabled system. The value of a row's Managed System IP Address Attribute is the key for the ASF Remote Management Group. Collocating the two groups places all required ASF-awareness on a single system and all ASF remote management and Alert reception may be performed using only DMI access methods.

Appendix A: ASF Specific Error Codes

Component Instrumentation may return any of the standard DMI error codes if the situation warrants. There are also two new error codes specific to ASF RMCP operations.

Symbol	Value	Description
DMI_NO_ASF_ACK	0x80000001	Remote system did not acknowledge receipt of RMCP Request. Remote system may not be available. Retry at a later time.
DMI_NO_ASF_RESPONSE	0x80000002	Remote system did not reply with expected RMCP Response. Remote system may have decided that Request was invalid based on system capabilities. Confirm that Remote System supports requested features and Request was properly formatted.

Appendix B: MIF for ASF-related DMI Groups

This section describes the ASF-related DMI Groups in Managed Information File (MIF) format. These initial group definitions are intended for inclusion in the DMI Master MIF published by the DMTF. Once included in the Master MIF, the Master MIF is the controlling document and the information in this appendix shall be for illustration purposes only. Developers must use the Master MIF for any implementation efforts.

```
////////////////////////////////////////////////////////////////////////
// "DMTF|ASF Local Setup|001"
//
// Supercedes:
// Superceded By:
// Dependent Groups:
//
////////////////////////////////////////////////////////////////////////
  Start Group
    Name  = "OS Present Setup Group"
    Class = "DMTF|ASF Local Setup|001"
    ID  = 3
    Description = "For OS Present setup (configuration), a Managing System "
                  "directly accesses this group instantiated by DMI component "
                  "instrumentation running on the ASF-enabled Managed System. "
                  "For setup, there are only two systems involved, the "
                  "Managing System running a DMI Management Application and "
                  "the Managed System running ASF-aware DMI component "
                  "instrumentation capable of performing ASF setup on the "
                  "Managed System."
    Pragma = "SNMP: 1.3.6.1.4.1.412.2.12.1 ;"


    Start Attribute
      Name = "ASF Version"
      ID = 1
      Description = "Component Instrumentation implementation is compatible "
                    "with this version of the ASF Specification. This "
                    "Attribute is binary coded decimal with an implied "
                    "precision of two places. For example, if this "
                    "instrumentation is compatible with version 2.34 of the "
                    "ASF specification, this Attribute shall be set to 0x234. "
                    "If this value is zero, the local system is not ASF-capable."

      Type = Gauge
      Access =  Read-Only
      Value = unknown
    End Attribute

    Start Attribute
      Name = "Special Commands"
      ID = 2
      Description = "Supported special commands as determined from the ACPI "
                    "ASF_RMCP structure on local system:  "
                    " 0x10 CD/DVD Boot "
                    " 0x08 Diagnostic Boot "
                    " 0x04 Hard-drive, Safe-mode "
                    " 0x02 Hard-drive "
                    " 0x01 PXE "
                    "See ASF Specification for meaning of bit definitions."
      Type = Gauge
      Access = Read-Only
      Value = unknown
```

```
End Attribute

Start Attribute
  Name = "System Capabilities"
  ID = 3
  Description = "Supported system capabilities as determined from the ACPI "
                "ASF_RMCP structure on the local system: "
                " 0x80 Reset "
                " 0x40 Power-Up "
                " 0x20 Power-Down "
                " 0x10 Power Cycle Reset "
                "See ASF Specification for meaning of bit definitions."
  Type = Gauge
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Firmware Capabilities"
  ID = 4
  Description = "Supported firmware capabilities as determined by "
                "component instrumentation from the ACPI ASF_RMCP "
                "structure on the local system: "
                " 0x8000 Configuration Data Reset "
                " 0x4000 F.W verbosity: quiet "
                " 0x2000 F/W verbosity: verbose "
                " 0x1000 Forced progress events "
                " 0x0800 User password bypass "
                " 0x0040 Sleep Button Lock "
                " 0x0020 Keyboard Lock "
                " 0x0004 Reset Button Lock "
                " 0x0002 Power Button Lock "
                " 0x0001 Firmware verbosity "
                "See ASF Specification for meaning of bit definitions."
  Type = Gauge
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Manufacturer ID"
  ID = 5
  Description = "Private Enterprise Number assigned to the Alert sending "
                "system manufacturer by IANA as determined by component "
                "instrumentation from the ACPI ASF_INFO structure on the "
                "local system.  Used to populate the Manufacturer ID field "
                "of the PET."
  Type = Gauge
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "System ID"
  ID = 6
  Description = "The number assigned to the system by the system "
                "manufacturer as determined by component instrumentation "
                "from the ACPI ASF_INFO structure on the local system. "
                "Used to populate the System ID field of the PET."
  Type = Gauge
  Access = Read-Only
  Value = unknown
End Attribute
```

```
Start Attribute
  Name = "GUID"
  ID = 7
  Description = "Globally Unique Identifier for the ASF-enabled system as "
                "determined by component instrumentation from the SMBIOS "
                "System Information structure on the local system.  Used "
                "to populate the GUID field of the PET."
  Type = OctetString (16)
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Sender IP Address"
  ID = 8
  Description = "IP Address used by Alert Sender during OS Absent "
                "operations. Set by Management Application during Setup."
  Type = DisplayString (15)
  Access = Read-Write
  Value = unknown
End Attribute

Start Attribute
  Name = "Receiver IP Address"
  ID = 9
  Description = "IP Address of ASF Alert Receiver for this Alert Sender. "
                "Set by Management Application during Setup."
  Type = DisplayString (15)
  Access = Read-Write
  Value = unknown
End Attribute

Start Attribute
  Name = "CommandsMask"
  ID = 10
  Description = "Bit mask to enable or disable specific supported special "
                "commands.  If bit is set, command is enabled, if "
                "supported. If bit is reset, command is disabled (or "
                "unsupported). Resetting a bit corresponding to a "
                "supported special command disables the command, if "
                "supported by the system. If disabling command is not "
                "supported, no error is reported when attempting to reset "
                "corresponding bit, but subsequent reads of this value "
                "shall report command as enabled."
  Type = Gauge
  Access = Read-Write
  Value = unknown
End Attribute

Start Attribute
  Name = "System Mask"
  ID = 11
  Description = "Bit mask to enable or disable specific supported system "
                "capabilities.  If bit is set, capability is enabled, if "
                "supported. If bit is reset, capability is disabled (or "
                "unsupported). Resetting a bit corresponding to a "
                "supported capability disables the capability, if "
                "supported by the system. If disabling capability is not "
                "supported, no error is reported when attempting to reset "
                "corresponding bit, but subsequent reads of this value "
                "shall report capability as enabled."
  Type = Gauge
```

```
  Access = Read-Write
  Value = unknown
End Attribute

Start Attribute
  Name = "Firmware Mask"
  ID = 12
  Description = "Bit mask to enable or disable specific supported "
                "firmware capabilities.  If bit is set, capability is "
                "enabled, if supported.  If bit is reset, capability is "
                "disabled (or unsupported).  Resetting a bit corresponding "
                "to a supported capability disables the capability, if "
                "supported by the system.  If disabling capability is not "
                "supported, no error is reported when attempting to reset "
                "corresponding bit, but subsequent reads of this value "
                "shall report capability as enabled."
  Type = Gauge
  Access = Read-Write
  Value = unknown
End Attribute

Start Attribute
  Name = "Enable Alerts"
  ID = 13
  Description = "If TRUE, local system is enabled to send ASF Alerts to "
                "Alert Receiver."
  Type = "Boolean"
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Enable RMCP"
  ID = 14
  Description = "If TRUE, local system is enabled to accept Remote "
                "Management Control Protocol requests."
  Type = "Boolean"
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Heartbeat Interval"
  ID = 15
  Description = "ASF hardware may support the capability to send "
                "System Heartbeat messages indicating the system is "
                "still present.  A Get operation for this Attribute "
                "returns the interval between heartbeat messages expressed "
                "as seconds.  If the value of this Attribute is all ones, "
                "the ASF hardware does not support a Heartbeat Timer and "
                "all Set operations shall be ignored.\n "
                "If the value of this Attribute is zero, the Heartbeat "
                "Timer is disabled.  A Set operation with a value of zero "
                "is ignored if the ASF hardware does not support a Heartbeat"
                "Timer or does not allow the Timer to be disabled.\n "
                "Any non-zero value that is not all ones is the interval "
                "between Heartbeat messages.  Different ASF implementations "
                "may support different granularities for this interval.  "
                "For example, one system might support intervals in one "
                "minute increments while another supports intervals in "
                "half-minute (30 second) increments.\n "
                "The range of intervals supported may vary.  One "
                "implementation might support a range of one minute to 10 "
```

```
                    "minutes for the interval between Heartbeats while another "
                    "supports a range of 30 seconds to 4 minutes.  In addition, "
                    "there is no requirement that the granularity of supported "
                    "intervals is linear.\n "
                    "To manage this range of implementations, any non-zero value "
                    "used in a Set operation results in the selection of the "
                    "interval supported by the hardware that is closest to the "
                    "value requested.  This may result in rounding the interval "
                    "requests by the Set operation up or down.  A Management "
                    "Application uses a Get operation to determine the interval "
                    "actually selected. "
      Type = Gauge
      Access = Read-Write
      Value = unknown
    End Attribute
  End Group

////////////////////////////////////////////////////////////////////////
// "DMTF|ASF Remote Management|001"
//
// Supercedes:
// Superceded By:
// Dependent Groups:
//
////////////////////////////////////////////////////////////////////////
  Start Group
    Name  = "ASF Remote Management Group"
    Class = "DMTF|ASF Remote Management|001"
    ID  = 4
    Key = 1
    Pragma = "SNMP: 1.3.6.1.4.1.412.2.12.2 ;"


    Start Attribute
      Name = "Managed System IP Address"
      ID = 1
      Description = "IP Address used by the Managed System during OS Absent
operations."
      Type = DisplayString (15)
      Access = Read-Only
      Value = "0.0.0.0"
    End Attribute

    Start Attribute
      Name = "Get Presence"
      ID = 2
      Description = "Performing a Set operation on this Attribute causes a "
                    "Ping Request RMCP message to be sent to the remote system "
                    "using the Managed System IP Address. In the event of an error, "
                    "one of the following two error codes is returned: "
                    "DMIERR_NO_ASF_ACK          DMIERR_NO_ASF_RESPONSE "
                    "A Get operation on this Attribute returns the last Pong "
                    "Response RMCP message received from the remote system. "
                    "If the last Ping Request RMCP message failed, the Get "
                    "returns: DMIERR_VALUE_UNKNOWN. The format of a Pong "
                    "Response Data block is defined in the ASF Specification."
      Type = OctetString (16)
      Access = Read-Write
      Value = unknown
    End Attribute

    Start Attribute
      Name = "Get Capabilities"
```

```
  ID = 3
  Description = "Performing a Set operation on this Attribute causes a "
                "Capabilities Request RMCP message to be sent to the "
                "remote system using the Managed System IP Address. In the event "
                "of an error, one of the following two error codes is "
                "returned: DMIERR_NO_ASF_ACK     DMIERR_NO_ASF_RESPONSE "
                "A Get operation on this Attribute returns the last "
                "Capabilities Response RMCP message received from the "
                "remote system. If the last Capabilities Request RMCP "
                "message failed, the Get returns: DMIERR_VALUE_UNKNOWN "
                "The format of a Capabilities Response Data block is "
                "defined in the ASF Specification."
  Type = OctetString (16)
  Access = Read-Write
  Value = unknown
End Attribute

Start Attribute
  Name = "Get System State"
  ID = 4
  Description = "Performing a Set operation on this Attribute causes a "
                "System State Request RMCP message to be sent to the "
                "remote system using the Managed System IP Address. In the event "
                "of an error, one of the following two error codes is "
                "returned: DMIERR_NO_ASF_ACK     DMIERR_NO_ASF_RESPONSE "
                "A Get operation on this Attribute returns the last "
                "System State Response RMCP message received from the "
                "remote system. If the last System State Request RMCP "
                "message failed, the Get returns: DMIERR_VALUE_UNKNOWN "
                "The format of a System State Response Data block is "
                "defined in the ASF Specification."
  Type = OctetString (4)
  Access = Read-Write
  Value = unknown
End Attribute

Start Attribute
  Name = "Do Power-Down"
  ID = 5
  Description = "Performing a Set operation on this attribute of any value ”
                “sends an Unconditional Power-Down RMCP message to the remote "
                "system using the Managed System IP Address. In the event of an "
                "error, the following error code is "
                "returned: DMIERR_NO_ASF_ACK."
  Type = Integer
  Access = Write-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "RMCP Data"
  ID = 6
  Description = "Performing a Set operation on this attribute sends the "
                "RMCP Request Data block supplied by the Management "
                "Application to the remote system using the Managed System IP "
                "Address. This Attribute is intended for RMCP Requests "
                "that require arguments to be specified. Examples are "
                "Reset, Power-up and Power-Cycle Reset. In the event of "
                "an error, one of the following two error codes is "
                "returned: DMIERR_NO_ASF_ACK DMIERR_NO_ASF_RESPONSE. The "
                "Set operation requires a complete payload for the RMCP "
                "Request. The payload shall include all of the fields of "
                "the Data block from the IANA Enterprise Number field up "
```

```
                    "to and including the variable length Data field.  The Set "
                    "operation does not validate the fields in the payload. A "
                    "Management Application uses a Get operation to return the "
                    "RMCP Response Data block from the last RMCP Request.If "
                    "the last Set operation failed or did not have a "
                    "corresponding Response, the following error code is "
                    "returned in response to a Get Operation: "
                    "DMERR_VALUE_UNKNOWN. The format of a RMCP Request and "
                    "Response Data blocks is defined in the ASF Specification."
      Type = OctetString (128)
      Access = Read-Write
      Value = unknown
    End Attribute
  End Group

////////////////////////////////////////////////////////////////////////
// "DMTF|ASF Alert Data|001"
//
// Supercedes:
// Superceded By:
// Dependent Groups:
//
////////////////////////////////////////////////////////////////////////
  Start Group
    Name = "ASF Events"
    Class = "DMTF|ASF Alert Data|001"
    ID = 5
    Description = "DMTF Standard data group for ASF Events"
    Pragma = "SNMP: 1.3.6.1.4.1.412.2.12.3 ;"


    Start Attribute
      Name = "Enterprise OID"
      ID = 1
      Description = "enterprise field from PET"
      Type = DisplayString (64)
      Access = Read-Only
      Value = unknown
    End Attribute

    Start Attribute
      Name = "Sender IP Address"
      ID = 2
      Description = "agent-addr field from PET.  From value set in Sender IP "
                    "Address Attribute in DMTF|ASF Setup|001 Group by "
                    "Management Application during OS Present Setup "
                    "(configuration)."
      Type = DisplayString (15)
      Access = Read-Only
      Value = unknown
    End Attribute

    Start Attribute
      Name = "Generic Trap"
      ID = 3
      Description = "generic-trap field from PET.  The only legal value for "
                    "this Attribute is six (6) indicating the SNMP trap "
                    "represented by the PET is Enterprise Specific."
      Type = Gauge
      Access = Read-Only
      Value = 6
    End Attribute
```

```
Start Attribute
  Name = "Specific Trap"
  ID = 4
  Description = "specific-trap field from PET.  Indicates Event Sensor "
                "Type, Event Type and Event Offset."
  Type = Gauge
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Elapsed Time"
  ID = 5
  Description = "time-stamp field from PET.  Time elapsed between this ASF "
                "Alert and the initialization of Alert Sender.  Expressed "
                "in hundredths of a second."
  Type = Counter
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "GUID"
  ID = 6
  Description = "GUID field from PET. This originates in the GUID Attribute "
                "of the DMTF|ASF Setup|xxx Group."
  Type = OctetString (16)
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Sequence"
  ID = 7
  Description = "Sequence#/Cookie field from PET. An Event Reporter ignores "
                "back-to-back ASF Alerts with the same Sequence#/Cookie "
                "value. Only one DMI Indication is prepared for all ASF "
                "Alerts received with the same Sequence#/Cookie value."
  Type = Counter
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Alert Timestamp"
  ID = 8
  Description = "Conversion of PET fields Local Timestamp and UTC Offset "
                "into DMI Date format. Set to zero if Local Timestamp is "
                "zero. PET UTC Offset ignored if UTC Offset is out of "
                "range: -720 to +720."
  Type = Date
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Trap Source Type"
  ID = 9
  Description = "Trap Source Type field from PET."
  Type =  Integer
  Access = Read-Only
  Value = unknown
End Attribute
```

```
Start Attribute
  Name = "Event Source Type"
  ID = 10
  Description = "Event Source Type field from PET."
  Type = Integer
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Event Severity"
  ID = 11
  Description = "Event Severity field from PET. Note: This information is "
                "also conveyed in the Event Severity Attribute of the "
                "EventGeneration|DMTF ASF Alert|xxx Group."
  Type =  Start Enum
            1 = "Monitor"
            2 = "Information"
            4 = "OK"
            8 = "Non-Critical"
           16 = "Critical"
           32 = "Non-Recoverable"
          End Enum
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Sensor Device"
  ID = 12
  Description = "Sensor Device field from PET. Only the least significant "
                "byte is significant."
  Type = Gauge
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Sensor Number"
  ID = 13
  Description = "Sensor Number field from PET. Only the least significant "
                "byte is significant."
  Type = Gauge
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Entity"
  ID = 14
  Description = "Entity field from PET. Only the least significant byte "
                "is significant."
  Type = Gauge
  Access = Read-Only
  Value = unknown
End Attribute

Start Attribute
  Name = "Entity Instance"
  ID = 15
  Description = "Entity Instance field from PET. Only the least significant "
                "byte is significant."
```

```
      Type = Gauge
      Access = Read-Only
      Value = unknown
    End Attribute

    Start Attribute
      Name = "Event Data"
      ID = 16
      Description = "Event Data fields from PET. Always eight (8) significant bytes."
      Type = OctetString (8)
      Access = Read-Only
      Value = unknown
    End Attribute

    Start Attribute
      Name = "Language"
      ID = 17
      Description = "Language Code field from PET. Only the least significant "
                    "byte is significant. See PET Specification."
      Type = Gauge
      Access = Read-Only
      Value = unknown
    End Attribute

    Start Attribute
      Name = "Manufacturer ID"
      ID = 18
      Description = "Manufacturer ID field from PET. Originally established by "
                    "Manufacturer ID Attribute in DMTF|ASF Setup|xxx Group of "
                    "Alert Sender."
      Type = Gauge
      Access = Read-Only
      Value = unknown
    End Attribute

    Start Attribute
      Name = "System ID"
      ID = 19
      Description = "System ID field from PET. Originally established by System "
                    "ID Attribute in DMTF|ASF Setup|xxx Group of Alert Sender."
      Type = Gauge
      Access = Read-Only
      Value = unknown
    End Attribute

    Start Attribute
      Name = "OEM-Specific"
      ID = 20
      Description = "From OEM Custom Fields field in PET."
      Type = OctetString (64)
      Access = Read-Only
      Value = unknown
    End Attribute
  End Group

////////////////////////////////////////////////////////////////////////
// "EventGeneration|DMTF ASF Alert|001"
//
// Supercedes:
// Superceded By:
// Dependent Groups:
//
////////////////////////////////////////////////////////////////////////
```

```
Start Group
  Name = "ASF Events"
  Class = "EventGeneration|DMTF^^ASF Alert||001"
  ID = 6
  Description = "DMTF Standard EventGeneration Group for ASF Events"
  Key = 5
  Pragma = "SNMP: 1.3.6.1.4.1.412.2.12.4 ;"

  Start Attribute
    Name = "Event Type"
    ID = 1
    Description = "Event Type Identification"
    Type =  Start Enum
              0 = "Not Used in ASF Events"
            End Enum
    Access = Read-Only
    Value = 0
  End Attribute

  Start Attribute
    Name = "Event Severity"
    ID = 2
    Description = "DMTF-defined Severity, Populated directly from the Event "
                  "Severity field of the ASF PET without any translation."
    Type =  Start Enum
              1 = "Monitor"
              2 = "Information"
              4 = "OK"
              8 = "Non-Critical"
             16 = "Critical"
             32 = "Non-Recoverable"
            End Enum
    Access = Read-Only
    Value = unknown
  End Attribute

  Start Attribute
    Name = "Event is State Based"
    ID = 3
    Description = "Always set to FALSE to indicate the event is not "
                  "state-based.  State-based events require only one Alert "
                  "per event and an OK event every time a reported event is "
                  "cleared.  ASF does not meet these requirements."
    Type = "Boolean"
    Access = Read-Only
    Value = "False"
  End Attribute

  Start Attribute
    Name = "Event State Key"
    ID = 4
    Description = "Not used with non State Based events, so this Attribute "
                  "shall be ignored by Management Applications.  Event "
                  "Reporter shall set this Attribute to zero."
    Type = Integer
    Access = Read-Only
    Value = 0
  End Attribute

  Start Attribute
    Name = "Associated Group"
    ID = 5
```

```
    Description = "This Attribute is set to the string "
                  "DMTF|ASF Alert Data|001, the class string of the group "
                  "used to express the data format of the instance data "
                  "included with this event data."
    Type = DisplayString (256)
    Access = Read-Only
    Value = "DMTF|ASF Alert Data|001"
  End Attribute

  Start Attribute
    Name = "Event System"
    ID = 6
    Description = "Event System. Not used for ASF Events"
    Type =  Start Enum
              0 = "Not Used in ASF Events"
            End Enum
    Access = Read-Only
    Value = 0
  End Attribute

  Start Attribute
    Name = "Event Subsystem"
    ID = 7
    Description = "Event Sub-system. Not used for ASF Events"
    Type =  Start Enum
              0 = "Not Used in ASF Events"
            End Enum
    Access = Read-Only
    Value = 0
  End Attribute

  Start Attribute
    Name = "Instance Data Present"
    ID = 9
    Description = "This is always set to TRUE to indicate that the second "
                  "DmiRowData structure of the Indication contains instance "
                  "data as described by the schema for the "
                  "DMTF|ASF Alert Data|001 Group."
    Type = "Boolean"
    Access = Read-Only
    Value = "True"
  End Attribute
End Group
```

Appendix C: Known Issues

This section identifies known issues not addressed by this revision of the white paper. These issues are to be addressed in a future revision of this document and in the DMI Groups defined by the associated MIF. The resolution of these issues is not expected to impact any of the Attributes or usage models specified in this version of the white paper.

DHCP/ARP Issues

The IP Address used by an ASF-enabled system for sending ASF Alerts or receiving RMCP requests may need to participate in DHCP and ARP communications. This participation may be required to avoid problems with IP address assignments expiring and being reassigned by an external entity to another system or the inability to reach an ASF-system operating in an OS-absent state through intervening hardware such as routers or switches.

There is work in progress within the Pre-OS WG to address these issues with an extension to the DMI interface used to configure ASF in the OS present state and potentially with an extension to the ASF Specification to describe expected behaviors for ASF hardware related to DHCP and ARP in more detail.

Watchdog Timer

The ASF Specification defines a Watchdog Timer that enables an ASF-enabled system to send an ASF Alert if a timed period expires. How this is managed in an OS-present environment is unknown at this time.

There is work in progress within the Pre-OS WG to address this issue with an extension to the DMI interface used to configure ASF in the OS present state and potentially with an extension to the ASF Specification to describe in more detail the usage model for the Watchdog Timer required to be supported by ASF-capable NICs.