RecordLog Instance Provider and MCA Indication Provider

This document describes RecordLog Instance Provider and MCA Indication Provider.

RecordLog Instance Provider

provider overview

This provider provides information about error records logged in the SFM database and MCA logs present in /var/tombstones/ directory.

description

RecordLog Instance Provider :

The RecordLog Instance Provider is a Web Based Enterprise Management (WBEM) Instance Provider. On HP 9000 and HP Integrity ® systems running a supported version of HP-UX, the RecordLog Provider retrieves information related to the error records logged in the database. This provider is compliant with the Common Information Model (CIM*) 2.9 schema, proposed by the Distributed Management Task Force (DMTF).

The RecordLog Instance Provider allows any client program, compliant with the CIM Schema as mentioned earlier, to query for information about the errors logged on the managed system.

The RecordLog Instance Provider implements the logs related CIM classes. In addition to the properties that belong to the standard CIM classes, the RecordLog Instance Provider provides information that is specific to HP servers, by implementing HP-specific CIM classes, derived from the standard DMTF classes.

The following MOF classes are handled by the RecordLog Instance Provider:

- HP_CommonRecordLog and HP_SFMRecordLog
  HP_CommonRecordLog (subclass of CIM_RecordLog) and HP_SFMRecordLog (subclass of HP_CommonRecordLog) represent an aggregation of all the error records logged in the SFM database.

- HP_CommonLogRecord and HP_OSErrorLogRecord
  HP_CommonLogRecord (subclass of CIM_LogRecord) and HP_OSErrorLogRecord (subclass of HP_CommonLogRecord) captures the detailed information about each of the records logged in the database. This includes identification of properties like RecordID, RawData, Major Class, Minor Class, Logger Type, Log Index, etc.

- HP_CommonRecordLog and HP_MCARecordLog
  HP_CommonRecordLog (subclass of CIM_RecordLog) and HP_MCARecordLog((subclass of HP_CommonRecordLog) represent the /var/tombstones/ directory holding the MCA error logs.

- HP_CommonLogRecord and HP_MCAErrorLogRecord
  HP_CommonLogRecord (subclass of CIM_LogRecord) and HP_MCAErrorLogRecord (subclass of HP_CommonLogRecord) represent MCA error logs pertaining to each MCA in the /var/tombstones/ directory.

In addition, the RecordLog Instance Provider also implements association classes to associate the instances of the different CIM classes mentioned above. These include:

- HP_LogManagesRecord (subclass of CIM_LogManagesRecord): This class identifies which individual record (HP_CommonLogRecord) instance is associated to which log(HP_CommonRecordLog) instance.

- HP_MCALogManagesRecord(subclass of CIM_LogManagesRecord) : This class identifies which individual MCA record (HP_CommonLogRecord) instance is associated with which log(HP_CommonRecordLog) instance.

The MOF classes mentioned above (i.e. all MOF classes prefixed with “HP_”) are HP-specific

extensions to the CIM Schema, and are registered in the “root/cimv2” namespace.

The following example illustrates the relationship between the MOF classes mentioned above. On an HP Integrity system, if the server has only a single error record, then CIM instance returned by the RecordLog Instance Provider is as follows:

- 1 instance of HP_SFMRecordLog (the only instance for the SFM database.)
- 1 instance of HP_LogManagesRecord (associating the single error record, HP_OSErrorLogRecord instance with the single HP_SFMRecordLog instance)
- 1 instance of HP_OSErrorLogRecord (An instance for the single error record in the SFM database with a RecordID and a LogIndex . An error record present in the database could contain multiple sub error records; this is mapped by a RecordID and a LogIndex. Where the RecordID represents the main error record containing the RawData, and the LogIndex points to the sub error record, giving further decoded information. The RawData is the same for all the Log Indices belonging to a particular RecordID. The LogIndex can be set to “0” while requesting for a particular record, if the client is interested only in RawData for that RecordID.
- 1 instance of HP_MCARecordLog (the only instance for the /var/tombstones directory.)
- 1 instance of HP_MCALogManagesRecord (associating the single error record, HP_MCAErrorLogRecord instance with the single HP_MCARecordLog instance)
- 1 instance of HP_MCAErrorLogRecord (An instance for a single MCA error record in /var/tombstones directory.)

On HP 9000 systems architectures, the following mof classes are not supported :

- HP_MCARecordLog
- HP_MCAErrorLogRecord
- HP_MCALogManagesRecord

For all the MOF classes mentioned above, the RecordLog Instance Provider supports the following standard CIM Operations

- enumerateInstanceNames()
- getInstance()
- enumerateInstances is supported only for HP_SFMRecordLog, HP_MCARecordLog , HP_LogManagesRecord and HP_MCALogManagesRecord

The following CIM operations are not supported by the RecordLog Instance Provider:

- createInstance()
- deleteInstance()
- modifyInstance()

The RecordLog Instance Provider is not a CIM Method Provider, and does not support extrinsic method invocation on instances on any of the MOF classes mentioned above. The invocation of any of these methods will result in a CIM_ERR_NOT_SUPPORTED exception.

MCA Indication Provider :

requirements

The RecordLog instance provider is included in the SysFaultMgmt bundle. For the list of software requirements of SFM, see the SFM Release Notes at: http://docs.hp.com/en/diag

release history

For information on the release history of the provider see SFM release notes at : http://docs.hp.com/en/diag

supported managed resources

This provider provides information about error records logged in the SFM database and MCA logs present in /var/tombstones/ directory only and not other available logs on the system.

setting up this provider

installing this provider

The installation of the bundle SysFaultMgmt will set up this provider. For the list of software requirements for using this provider, see the SFM Release Notes at: http://docs.hp.com/en/diag

On installation, the shared-library files, executable binaries, configuration files and MOF definition and registration files will be available in the /opt/sfm/ directory, as follows:

- The provider library is libsfmproviders.1. This is available in /opt/sfm/lib/, along with all the other libraries it uses to implement the RecordLog Instance provider. A symbolic link is made in /opt/wbem/providers/lib/libsfmprovider.sl to link to the libsfmprovider.1 library in /opt/sfm/lib/.
- The CIM MOF files, containing the definitions of the HP-specific MOF classes, namely HP_SFMRecordLog , HP_OSErrorLogRecord and HP_LogManagesRecord will be available in /opt/sfm/schemas/mof in the file HP_SFMRecordLog.mof. Definitions of HP_MCARecordLog, HP_MCAErrorLogRecord and HP_MCALogManagesRecord will be available in HP_MCARecordLog.mof. This directory will also include the provider registration file, namely SFMProvidersR.mof and SFMProvidersHPOnlyIaR.mof. Note: All the HP-specific MOF classes will be registered under the “root/cimv2” namespace.
- The /var/opt/sfm/conf/ directory will contain the (XML) configuration files of the SysFaultMgmt Product.
- The /opt/sfm/msgcat/C directory will contain the catalog files for all the supported locales. (This is used for the localization of the message strings in RecordLog Instance Provider).
- The /var/opt/sfm/log/ directory will contain log files generated during the execution of the RecordLog Instance Provider.

For the list of systems that the RecordLog Provider supports, see the SFM Release Notes at: http://docs.hp.com/en/diag .

Configuring this provider

RecordLog Provider uses a common configuration file along with other providers. So editing the configuration file will affect the other providers as well. The configuration file can be found in – /var/opt/sfm/conf/FMLoggerConfig.xml

The file specifies the logging threshold severity, and the location of the log-file. The contents of the file are as follows:

```
<SFMConfig> <LoggerConfig> <Severity> WARNING </Severity> <!--Possible Values are
INFORMATIONAL, WARNING, ERROR, CRITICAL, STOPLOGGING -->
<Target> /var/opt/sfm/log/sfm.log </Target>
<FileSize> 20480 </FileSize> <!--sets the max. file size in KB. Min allowed value 2KB, Max
allowed value , 1048576 KB (1 GB) -->
<NBackupFiles> 3 </NBackupFiles> <!--Number of files to
roll over. Min allowed value 1, Max allowed value 10 -->
</LoggerConfig>
</SFMConfig>
```

In order to change the logging configuration, the following steps are to be followed:

1. Edit the configuration file /var/opt/sfm/conf/FMLoggerConfig.xml to change the threshold logging level and/or target. a) Threshold: Possible values are (in increasing severity)
   - INFORMATIONAL
   - WARNING
   - ERROR
   - CRITICAL
   - STOPLOGGING
   - MILESTONE

NOTE The INFORMATIONAL logging severity will generate a lot of log-messages. It is strongly advised not to use this severity level for a long time, for the generated log-files may use a lot of disk space. The default (and recommended) threshold in the runtime environment is WARNING.

b) Target: Possible values include:
   - (i) STDOUT: All log messages are delivered to console.
   - (ii) The complete path to the file where the log messages are to be written

NOTE: The current implementation of the logging mechanism assumes that the path to the log file (target specified in the configuration file) already exists. i.e., if the target is specified as "/abc/def/ghi.log", the path "/abc/def/" should already exist, and should be writeable by root-user.

2. Run /opt/sfm/bin/sfmconfig program, to specify the changed configuration file. i.e. $ /opt/sfm/bin/sfmconfig –c /var/opt/sfm/conf/FMLoggerConfig.xml Note that the complete path of the configuration file must be provided to the sfmconfig program.

using this provider

schema supported by this provider

The "Description" section explains in brief the different MOF classes supported by the RecordLog Instance Provider. The following tables list all the supported properties corresponding to these MOF classes, along with the properties inherited from the standard CIM MOF classes, as per CIM specifications.

Note: All key properties corresponding to the CIM classes are supported by the RecordLog Instance Provider. The few non-key properties not supported (currently) by the RecordLog Instance Provider are not listed below.

Note: All key properties corresponding to the CIM classes are supported by the RecordLog Instance Provider.
The non-key properties that are not supported by the RecordLog Instance Provider are not listed below.

Table 1: HP_CommonRecordLog and HP_SFMRecordLog

Table 1 describes the properties of the HP_CommonRecordLog and HP_SFMRecordLog CIM classes. It has three columns. The first is the property name (including type and units), the second is the property inheritance (indicating which class or superclass defines the property), and the third is the property's value and data source. Each row describes a property.

Property Name	Property Inheritance	Property Value (and Data Source)
string Caption	Inherited from CIM_ManagedElement	This value is always set to "Record Log"
string Description	Inherited from CIM_ManagedElement	This value is always set to "This is an instance of the LOGDB database"
string ElementName	Inherited from CIM_ManagedElement	This value is set to "Record Log"
uint16 EnabledDefault	Inherited from CIM_EnabledLogicalElement	ValueMap { "2", "3", "5", "6", "7", "8..32767", "32768..65535" }, Values { "Enabled", "Disabled", "Not Applicable", "Enabled but Offline", "No Default", "DMTF Reserved", "Vendor Reserved" }] By default, the element is \"Enabled\" (value=2)."),
uint16 EnabledState	Inherited from CIM_EnabledLogicalElement	ValueMap { "0", "1", "2", "3", "4", "5", "6", "7", "8", "9","10", "11..32767", "32768..65535" }, Values { "Unknown", "Other", "Enabled", "Disabled", "Shutting Down", "Not Applicable", "Enabled but Offline", "In Test", "Deferred", "Quiesce", "Starting", "DMTF Reserved", "Vendor Reserved" } As this value is not applicable, its value is set to "5"
uint16 RequestedState	Inherited from CIM_EnabledLogicalElement	ValueMap { "2", "3", "4", "5", "6", "7", "8", "9", "10", "11","..", "32768..65535" }, Values { "Enabled", "Disabled", "Shut Down", "No Change","Offline", "Test", "Deferred", "Quiesce", "Reboot", "Reset", "DMTF Reserved", "Vendor Reserved" } By default the value is set to 5.
uint64 CurrentNumberOfRecords	Inherited from CIM_Log	This value is set with the number of available records in the database during query.
string InstanceID	Inherited from CIM_RecordLog	This value is set to "HP:LOGDB".
datetime TimeOfLastChange	Inherited from HP_CommonRecordLog	"When a change is made to the Log, the date/time of that modification is captured. This value is set with the time of the last record logged in the database.
Unit64 MaxNumberOfRecords	Inherited from CIM_Log	Not Supported
Unit16 HealthState	Inherited from CIM_Log	Not Supported
Datetime InstallDate	Inherited from CIM_Log	Not Supported
String Name	Inherited from CIM_Log	Not Supported

Unit16 OperationalStatus	Inherited from CIM_Log	Not Supported
String OtherEnabledState	Inherited from CIM_Log	Not Supported
String Status	Inherited from CIM_Log	Not Supported
String StatusDescriptions	Inherited from CIM_Log	Not Supported
Datetime TimeOfLastStateChange	Inherited from CIM_Log	Not Supported

Table 2: HP_CommonLogRecord and HP_OSErrorLogRecord

Table 2 describes the properties of the HP_CommonLogRecord and HP_OSErrorLogRecord classes. It has three columns. The first is the property name (including type and units), the second is the property inheritance (indicating which class or superclass defines the property), and the third is the property's value and data source. Each row describes a property.

Property Name	Property Inheritance	Property Value (and data source)
string Caption	Inherited from CIM_ManagedElement.	This value is always set to “Log Record”.
string Description	Inherited from CIM_ManagedElement	This value is always set to “This is an Instance of a single Record in the LOGDB with the logid<logId> and logindex<logIndex> ”
string ElementName	Inherited from CIM_ManagedElement	This value is set to “Log Record”
string LogCreationClassName	Inherited from CIM_LogRecord	This value is always set to “HP_OSErrorLogRecord”
string LogName	Inherited from CIM_LogRecord	This value is always set to “SFM Error Database”
string CreationClassName	Inherited from CIM_LogRecord	This value is always set to “HP_OSErrorLogRecord”
datetime MessageTimestamp	Inherited from CIM_LogRecord	This value is a timestamp for the entry.
string RecordID	Inherited from HP_CommonLogRecord	This value is an identifier for an instance of LogRecord.
uint16 RecordDataType	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3", "4", "5", "6", "7" }, Values { "Unknown", "Other", "None", "Delimited", "Text", "XML", "CIMXML", "SubPacket"} As this value is not used , it is set to 1
uint8 RawData[]	Inherited from HP_CommonLogRecord	This value is set to binary format of the data in the log record.
uint16 MajorClass	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16", "17", "18", "..", "0x1000", "0x1001" }, Values { "Unknown", "Other", "None", "LPMC", "HPMC", "PA_CORE", "Memory", "Diag_log", "ChassisCode", "Environmental", "SAL", "FPL", "SEL", "MCA", "EVM", "Application", "Security", "Active Directory", "IML" "StorageLogRecord Reserved" "Family1", "Family2"} The first value used to identify the type of error logged. This value, combined with MinorClass, OSType and HardwareArchitecture identifies the type and format of the item logged.
uint16 MinorClass	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "..", "0x1000", "0x1001", "0x1002", "0x1003"}, Values { "Unknown", "Other", "None", "StorageLogRecord Reserved", "Gen1", "Gen2", "Gen3", "Gen4"} The second value used to identify the type of error logged. This value is not currently used for Server records and thus is set to “2”.
uint16 LoggerType	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3"}, Values { "Unknown", "Other", "Server", "Storage"} This value is always set to “2”.
string SystemName	Inherited from HP_CommonLogRecord	Name of the system logging the record.
string SystemSerialNumber	Inherited from HP_CommonLogRecord	Serial number of the system logging the record.
string SystemModel	Inherited from HP_CommonLogRecord	Model of the system logging the record.
uint16 OSType	Inherited from HP_CommonLogRecord	A integer indicating the type of OperatingSystem. This value is always set to “8” indicating "HPUX".
string OSVersion	Inherited from HP_CommonLogRecord	Version of the OS on the system logging the record.

uint32 DeviceType	Inherited from HP_CommonLogRecord	ValueMap {"0", "1", "2", "3","4", "5", "6","7", "8","9", "10","11", "12", "13","14", "15", "16","17", "18","19", "20", "21","22", "23","24","25","26", "27""28", "29","30","31", "32","33", "34","35", "36","37", "38", "39","40", "41", "42","43", "44","45", "46"}, Values {"Unknown", "Other", "Processor", "Memory","System Hardware","Support Hardware","Primary Storage Device","Secondary Storage Device", "Other Storage Device","Network Device", "Other Device","I/O Adapter", "Network Adapter", "Other Adapter","Processor Power", "Memory Power", "System Power","Primary Storage Device Power", "Secondary Storage Power","Other Storage Power", "Other Power", "Processor Cooling","Memory Cooling", "System Cooling","Primary Storage Device Cooling","Secondary Storage Device Cooling","Other Storage Device Cooling", "Other Cooling""System HW Security", "Primary Storage Device Security","Secondary Storage Device Security","Other Storage Device Security", "Other HW Security""System Interconnect", "Support Interconnect","Cluster Interconnect", "Storage Interconnect","Network Interconnect", "Other Interconnect", "OS","System Firmware", "Device Firmware", "Support Firmware","System Firmware Security", "OS Security","Software Application", "Software Application Security"} The type of device on the system that reported the error.
uint16 DeviceID[]	Inherited from HP_CommonLogRecord	The DeviceID
uint16 VendorID	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3", "4"} Values { "Unknown", "Other", "None", "HP", "DEC", "Compaq", "Tandem"} The vendor of the system that discovered the error the error. This value is always set to “3”.
uint16 ServerHardwareArchitecture	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10"} Values { "Unknown", "Other", "None", "PDP11", "VAX", "MIPS", "Alpha", "x86-32", "IPF", "PA-RISC", "x86-64" } For PA RISC servers this property is set to “9”. For HP Integrity servers this property is set to “8” .
uint16 LogIndex	Inherited from HP_OSErrorLogRecord	Log Index along with RecordID uniquely identifies the LogRecord within a Log. This value can be set to “0” while requesting for a particular record, along with the required RecordID.
String RecordFormat	Inherited from CIM_RecordForLog	A string describing the data structure of the information in the property, RecordData. If the RecordFormat string is <empty>, RecordData should be interpreted as a free-form string.

To describe the data structure of RecordData, the RecordFormat string should be constructed as follows:
- The first character is a delimiter character and is used to parse the remainde
r of the string into sub-strings.
- Each sub-string is separated by the delimiter character and should be in the form of a CIM property declaration (i.e., datatype and property name). This set of declarations may be used to interpret the similarly delimited RecordData property.
For example, using a '*' delimiter, RecordFormat = "*string ThisDay*uint32 ThisYear*dateti
me SomeTime"
may be used to interpret: RecordData = "*This is Friday*2002*20020807141000.000000-300" |
| String RecordData | Inherited from CIM_RecordForLog | A string containing LogRecord data.
If the corresponding RecordFormat property is <empty>, or cannot be parsed according to the recommended format, RecordData should be interpreted as a free-form string. |

		If the RecordFormat property contains parseable format information (as recommended in the RecordFormat Description qualifier), the RecordData string SHOULD be parsed in accordance with this format. In this case, RecordData SHOULD begin with the delimiter character and this character SHOULD be used to separate substrings in the manner described. The RecordData string can then be parsed by the data consumer and appropriately typed.
String Locale	Inherited from CIM_RecordForLog	A locale indicates a particular geographical, political, or cultural region. The Locale specifies the language used in creating the RecordForLog data. If the Locale property is empty, it is assumed that the default locale is en_US (English).
The locale string consists of three sub-strings, separated by underscores:
- The first sub-string is the language code, as specified in ISO639.
- The second sub-string is the country code, as specified in ISO3166.
- The third sub-string is a variant, which is vendor specific.
For example, US English appears as: "en_US_WIN", where the "WIN" variant would specify a Windows browser-specific collation (if one exists). Since the variant is not standardized, it is not commonly used and generally is limited to easily recognizable values ("WIN", "UNIX", "EURO", etc.) used in standard environments. The language and country codes are required; the variant may be empty.
String DataFormat	Inherited from CIM_LogRecord	CIM_LogRecord.RecordFormat
Unit16 StorageLogType	Inherited from HP_CommonLogRecord	The identification of the type of error log, event, statistics, etc
String SystemPartNumber	Inherited from HP_CommonLogRecord	Part number for the system that reported the item logged.This is expected to be the 6-3 number (example= Evo box = 268616-001)
String OtherDeviceType	Inherited from HP_CommonLogRecord	A string defining "Other" values for DeviceType.This value MUST be set to a non NULL value when DeviceType is set to a value of 1 ("Other"). For all other values of Devic eType, the value of this string must be set to NULL.
String DeviceVersion[]	Inherited from HP_CommonLogRecord	Array of versions for the hardware&#32
String DeviceManufacturer[]	Inherited from HP_CommonLogRecord	Manufacturer of the hardware associated with the record.
String DeviceSerialNumber[]	Inherited from HP_CommonLogRecord	Array of all the serial numbers of the hardware associated with the logged item.
String DevicePartNumber[]	Inherited from HP_CommonLogRecord	Part number for the devices associated with the logged item.This is expected to be the 6-3 number (example= DIMM 268616-0001)
String DeviceModel[]	Inherited from HP_CommonLogRecord	Model of the device associated with the logged item.
String DeviceProductID	Inherited from HP_CommonLogRecord	Product ID, 12-3 number, of the device associated with the logged item.
Unit16 NumCpusInSet	Inherited from HP_CommonLogRecord	The number of CPUs perceived to be running by the operating system when this event was reported. Not always the number of installed CPUs
Unit16 DeviceIDFormat	Inherited from HP_CommonLogRecord	The format used for DeviceID
Unit16 LoggingCPU	Inherited from HP_CommonLogRecord	Identity of the CPU closet to the detector that initiated recording of this event. This is the physical CPU number.

Table 3: HP_LogManagesRecord properties

Table 3 describes the properties of the association class HP_LogManagesRecord (associating HP_SFMRecordLog and HP_OSErrorLogRecord). It has three columns. The first is the property name (including type and units), the second is the property inheritance (indicating which class or superclass defines the property), and the third is the property's value

Property Name	Property Inheritance	Property Value (and data source)
CIM_Log REF Log	Inherited from CIM_LogManagesRecord	Object path of the HP_SFMRecordLog Instance
CIM_RecordForLog REF Record	Inherited from CIM_LogManagesRecord	Object path of the HP_OSErrorLogRecord Instance

Table 4: HP_CommonRecordLog and HP_MCARecordLog

Table 1 describes the properties of the HP_CommonRecordLog and HP_MCARecordLog CIM classes. It has three columns. The first is the property name (including type and units), the second is the property inheritance (indicating which class or superclass defines the property), and the third is the property's value and data source. Each row describes a property.

Property Name	Property Inheritance	Property Value (and Data Source)
string Caption	Inherited from CIM_ManagedElement	This value is always set to "Record Log"
string Description	Inherited from CIM_ManagedElement	This value is always set to " This is an instance of the directory /var/tombstones/"
string ElementName	Inherited from CIM_ManagedElement	This value is set to "Record Log"
uint16 EnabledDefault	Inherited from CIM_EnabledLogicalElement	ValueMap { "2", "3", "5", "6", "7", "8..32767", "32768..65535" }, Values { "Enabled", "Disabled", "Not Applicable", "Enabled but Offline", "No Default", "DMTF Reserved", "Vendor Reserved" }] By default, the element is \"Enabled\" (value=2)."),
uint16 EnabledState	Inherited from CIM_EnabledLogicalElement	ValueMap { "0", "1", "2", "3", "4", "5", "6", "7", "8", "9","10", "11..32767", "32768..65535" }, Values { "Unknown", "Other", "Enabled", "Disabled", "Shutting Down", "Not Applicable", "Enabled but Offline", "In Test", "Deferred", "Quiesce", "Starting", "DMTF Reserved", "Vendor Reserved" } As this value is not applicable, its value is set to "5"
uint16 RequestedState	Inherited from CIM_EnabledLogicalElement	ValueMap { "2", "3", "4", "5", "6", "7", "8", "9", "10", "11","..", "32768..65535" }, Values { "Enabled", "Disabled", "Shut Down", "No Change","Offline", "Test", "Deferred", "Quiesce", "Reboot", "Reset", "DMTF Reserved", "Vendor Reserved" } By default the value is set to 5.
uint64 CurrentNumberOfRecords	Inherited from CIM_Log	This value is set with the number MCA-s whose logs are available in /var/tombstones.
string InstanceID	Inherited from CIM_RecordLog	This value is set to " HP:/var/tombstones".
datetime TimeOfLastChange	Inherited from HP_CommonRecordLog	"This value is set with the latest modification time of all the mca log files in /var/tombstones/ directory.
Unit64 MaxNumberOfRecords	Inherited from CIM_Log	Not supported
Unit16 HealthState	Inherited from CIM_Log	Not supported
Datetime InstallDate	Inherited from CIM_Log	Not supported
String Name	Inherited from CIM_Log	Not supported
Unit16 OperationalStatus	Inherited from CIM_Log	Not supported
String OtherEnabledState	Inherited from CIM_Log	Not supported
String Status	Inherited from CIM_Log	Not supported
String StatusDescriptions	Inherited from CIM_Log	Not supported
Datetime TimeOfLastStateChange	Inherited from CIM_Log	Not supported

Table 5: HP_CommonLogRecord and HP_MCAErrorLogRecord

Property Name	Property Inheritance	Property Value (and data source)
string Caption	Inherited from CIM_ManagedElement.	This value is always set to "Log Record".
string Description	Inherited from CIM_ManagedElement	This value is always set to "This is an instance of a single MCA error log file under the directory /var/tombstones/"
string ElementName	Inherited from CIM_ManagedElement	This value is set to "Log Record"
string LogCreationClassName	Inherited from CIM_LogRecord	This value is always set to "*HP_MCAErrorLogRecord*"
string LogName	Inherited from CIM_LogRecord	This value is always set to "MCA Error Logs directory"
string CreationClassName	Inherited from CIM_LogRecord	This value is always set to "*HP_MCAErrorLogRecord*"
datetime MessageTimestamp	Inherited from CIM_LogRecord	This value represents time of creation of the first MCA log file for this MCA.
string RecordID	Inherited from HP_CommonLogRecord	This value is an identifier for an instance of MCA log record.
uint16 RecordDataType	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3", "4", "5", "6", "7" }, Values { "Unknown", "Other", "None", "Delimited", "Text", "XML", "CIMXML", "SubPacket"} As this value is not used , it is set to 1
uint8 RawData[]	Inherited from HP_CommonLogRecord	This value is set to binary format of the data in the MCA log record.
uint16 MajorClass	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16", "17", "18", "..", "0x1000", "0x1001" }, Values { "Unknown", "Other", "None", "LPMC", "HPMC", "PA_CORE", "Memory", "Diag_log", "ChassisCode", "Environmental", "SAL", "FPL", "SEL", "MCA", "EVM", "Application", "Security", "Active Directory", "IML" "StorageLogRecord Reserved" "Family1", "Family2"} The first value used to identify the type of error logged. This value, combined with MinorClass, OSType and HardwareArchitecture identifies the type and format of the item logged.
uint16 MinorClass	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "..", "0x1000", "0x1001", "0x1002", "0x1003"}, Values { "Unknown", "Other", "None", "StorageLogRecord Reserved", "Gen1", "Gen2", "Gen3", "Gen4"} The second value used to identify the type of error logged. This value is not currently used for Server records and thus is set to "2".
uint16 LoggerType	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3"}, Values { "Unknown", "Other", "Server", "Storage"} This value is always set to "2".
string SystemName	Inherited from HP_CommonLogRecord	Name of the system logging the record.
string SystemSerialNumber	Inherited from HP_CommonLogRecord	Serial number of the system logging the record.
string SystemModel	Inherited from HP_CommonLogRecord	Model of the system logging the record.
uint16 OSType	Inherited from HP_CommonLogRecord	A integer indicating the type of OperatingSystem. This value is always set to "8" indicating "HPUX".
string OSVersion	Inherited from HP_CommonLogRecord	Version of the OS on the system logging the record.

uint32 DeviceType	Inherited from HP_CommonLogRecord	ValueMap {"0", "1", "2", "3","4", "5", "6","7", "8","9", "10","11", "12", "13","14", "15", "16","17", "18","19", "20", "21","22", "23","24","25","26", "27""28", "29","30","31", "32","33", "34","35", "36","37", "38", "39","40", "41", "42","43", "44","45", "46"}, Values {"Unknown", "Other", "Processor", "Memory","System Hardware","Support Hardware","Primary Storage Device","Secondary Storage Device", "Other Storage Device","Network Device", "Other Device","I/O Adapter", "Network Adapter", "Other Adapter","Processor Power", "Memory Power", "System Power","Primary Storage Device Power", "Secondary Storage Power","Other Storage Power", "Other Power", "Processor Cooling","Memory Cooling", "System Cooling","Primary Storage Device Cooling","Secondary Storage Device Cooling","Other Storage Device Cooling", "Other Cooling""System HW Security", "Primary Storage Device Security","Secondary Storage Device Security","Other Storage Device Security", "Other HW Security""System Interconnect", "Support Interconnect","Cluster Interconnect", "Storage Interconnect","Network Interconnect", "Other Interconnect", "OS","System Firmware", "Device Firmware", "Support Firmware","System Firmware Security", "OS Security","Software Application", "Software Application Security"} The type of device on the system that reported the error.
uint16 VendorID	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3", "4"} Values { "Unknown", "Other", "None", "HP", "DEC", "Compaq", "Tandem"} The vendor of the system that discovered the error the error. This value is always set to “3”.
uint16 ServerHardwareArchitecture	Inherited from HP_CommonLogRecord	ValueMap { "0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10"} Values { "Unknown", "Other", "None", "PDP11", "VAX", "MIPS", "Alpha", "x86-32", "IPF", "PA-RISC", "x86-64" } For HP Integrity servers this property is set to “8” .
uint16 ConfigurationSnapshot[]	Inherited from HP_MCAErrorLogRecord	This is the property that holds the contents of the configuration snapshot
String RecordFormat	CIM_RecordForLog	A string describing the data structure of the information in the property, RecordData. If the RecordFormat string is <empty>, RecordData should be interpreted as a free-form string.

To describe the data structure of RecordData, the RecordFormat string should be constructed as follows:
- The first character is a delimiter character and is used to parse the remainder of the string into sub-strings.
- Each sub-string is separated by the delimiter character and should be in the form of a CIM property declaration (i.e., datatype and property name). This set of declarations may be used to interpret the similarly delimited RecordData property.
For example, using a '*' delimiter, RecordFormat = "*string ThisDay*uint32 ThisYear*datetime SomeTime"
may be used to interpret: RecordData = "*This is Friday*2002*200 20807141000.000000-300". |
| String RecordData | CIM_RecordForLog | A string containing LogRecord data.
If the corresponding RecordFormat property is <empty>, or cannot be parsed according to the recommended format, RecordData should be interpreted as a free-form string. If the RecordFormat property contains parseable format information (as recommended in the RecordFormat Description qualifier), the RecordData string SHOULD be parsed in accordance with this format. In this case, RecordData SHOULD begin with the delimiter character and this character SHOULD be used to separate substrings in the manner described. The RecordData string can then be parsed by the data consumer and appropriately typed. |
| String locale | CIM_RecordForLog | A locale indicates a particular geographical, political, or cultural regi on. The Locale specifies the language used in creating the RecordForLog data. If the Locale property is empty, it is assumed that the default locale is en_US (English).
The locale string consists of three sub-strings, separated by underscores:
- The first sub-string is the language code, as specified in ISO639.
- The second sub-string is the country code, as specified in ISO3166. &# |

		10;- The third sub-string is a variant, which is vendor specific.
For example, US English appears as: quot;en_US_WIN", where the "WIN" variant would specify a Windows browser-specific collation (if one exists). Since the variant is not standardized, it is not commonly used and generally is limited to easily recognizable values ("WIN", "UNIX", "EURO", etc.) used in standard environments. The language and country codes are required; the variant may be empty.
String DataFormat	CIM_LogRecord	CIM_LogRecord.RecordFormat
Unit16 StorageLogType	HP_CommonLogRecord	The identification of the type of error log, event, statistics, etc
String SystemPartNumber	Inherited from HP_CommonLogRecord	Part number for the system that reported the item logged. This is expected to be the 6-3 number (example= Evo box = 268616-001)
String OtherDeviceType	Inherited from HP_CommonLogRecord	A string defining "Other" values for DeviceType.This value MUST be set to a non NULL value when DeviceType is set to a value of 1 ("Other& quot;). For all other values of DeviceType, the value of this string must be set to NULL.
String DeviceVersion[]	Inherited from HP_CommonLogRecord	Array of versions for the hardware
String DeviceManufacturer[]	Inherited from HP_CommonLogRecord	Manufacturer of the hardware associated with the record.
String DeviceSerialNumber[]	Inherited from HP_CommonLogRecord	Array of all the serial numbers of the hardware associated with the logged item.
String DevicePartNumber[]	Inherited from HP_CommonLogRecord	Part number for the devices associated with the logged item.This is expected to be the 6-3 number (example= DIMM 268616-0001)
String DeviceModel[]	Inherited from HP_CommonLogRecord	Model of the device associated with the logged item.
String DeviceProductID[]	Inherited from HP_CommonLogRecord	Product ID, 12-3 number, of the device associated with the logged item.
Unit16 NumCpusInSet	Inherited from HP_CommonLogRecord	The number of CPUs perceived to be running by the operating system when this event was reported. Not always the number of installed CPUs&#32
Unti16 LoggingCPU	Inherited from HP_CommonLogRecord	Identity of the CPU closet to the detector that initiated recording of this event. This is the physical CPU number.
Unti16 DeviceIDFormat	Inherited from HP_CommonLogRecord	The format used for DeviceID
Unit16 DeviceID[]	Inherited from HP_CommonLogRecord	The DeviceID
Unit16 VariableNames[]	Inherited from HP_CommonLogRecord	Array of variable names for information that isassociated with this record, but cannot be described by theother properties of the record.The names are correlated with the variable.s types and valuesin the VariableTypes and VariableValues arrays. Each entry isrelated to the entries in the other arrays that are located atthe same index. In this way, the variable binding'sname/type/value tuple can be constructed.
Unit16 VariableTypes[]	Inherited from HP_CommonLogRecord	Array of variable types defined as an enumerated value.This array is correlated with the VariableNames andVariableValues arrays. Each entry is related to the entries inthe other arrays that are located at the same index. In thisway,the variable binding's name/type/value tuple can beconstructed.
String VariableValues	Inherited from HP_CommonLogRecord	Array of variable values.This array is correlated with the VariableNames and VariableTypes arrays. Each entry is related to the entries inthe other arrays that are located at the same index. In thisway, the variable binding's name/type/value tuple can beconstructed.

Table 6: HP_MCALogManagesRecord properties

Table 3 describes the properties of the association class HP_LogManagesRecord (associating HP_SFMRecordLog and HP_OSErrorLogRecord or HP_MCARecordLog and HP_MCAErrorLogRecord). It has three columns. The first is the property name (including type and units), the second is the property inheritance (indicating which class or superclass defines the property), and the third is the property's value

Property Name	Property Inheritance	Property Value (and data source)
CIM_Log REF Log	Inherited from CIM_LogManagesRecord	Object path of the CIM_Log Instance
CIM_RecordForLog REF Record	Inherited from CIM_LogManagesRecord	Object path of the CIM_RecordForLog Instance

Table 7: Intrinsic methods for all the CIM classes supported by RecordLog Instance Provider

Table 4 describes the intrinsic methods supported by this provider. It has three columns. The first is the method name, the second is a description of the provider's actions based on invoking that method, and the third is a list of any exceptions that could result from invoking the method. Each row describes a method.

Method name	Description	Exceptions Thrown
enumerateInstances	Returns all instances of class with values of supported properties. (See tables above.)	
enumerateInstanceNames	Returns object path of all instances of class.	
getInstance	Returns an instance that matches the keys with values of supported properties. (See tables above.)	
modifyInstance	This operation is not supported by the RecordLog Instance Provider. This is indicated to the client, via exceptions.	CIMNotSupportedException
deleteInstance	This operation is not supported by the RecordLog Instance Provider. This is indicated to the client, via exceptions.	CIMNotSupportedException
createInstance	This operation is not supported by the RecordLog	CIMNotSupportedException

MCA Indication Provider

Provider Overview

Common Information Model (CIM) MCA indication provider generates a WBEM indication after system resets on occurrence of a Machine Check Abort (MCA).

Description

The MCA Indication Provider is a Web Based Enterprise Management (WBEM) Indication Provider. On HP Integrity ® systems running a supported version of HP-UX, the MCA Indication Provider generates a WBEM indication of HP_AlertIndication type after an MCA has occured on the system and system resets. This provider is compliant with the Common Information Model (CIM*) 2.9 schema, proposed by the Distributed Management Task Force (DMTF).

Requirements

The MCA Indication provider is included in the SysFaultMgmt bundle. For the list of software requirements of SFM, see the SFM Release Notes at: http://docs.hp.com/en/diag

Release history

For information on the release history of the provider see SFM release notes at : http://docs.hp.com/en/diag

Supported managed resources

Provides Indication whenever a Machine Check Abort(MCA) occurs and system resets.

Setting up this provider

The installation scripts do all the necessary setup. No special setup is required.

Installing this provider

The installation of the bundle SysFaultMgmt will set up this provider. For the list of software requirements for using this provider, see the SFM Release Notes at: http://docs.hp.com/en/diag

On installation, the shared-library files, executable binaries, configuration files and MOF definition and registration files will be available in the /opt/sfm/ directory, as follows:

The MCA Indication Provider is contained within the bundle chosen above as a product which includes:

- Schema MOF files: MOF classes HP_AlertIndication in /opt/sfm/schemas/mof/ HP_AlertIndication.mof
- Provider registration MOF file: SFMProvidersHPOnlyIaR.mof in /opt/sfm/schemas/mof/.
- Provider module shared library: libsfmproviders.1 in /opt/sfm/lib, and is the target of the symbolic link – also a delivered file; in /opt/wbem/providers/lib.
- Provider catalog: MCAIndicationProvider.cat in /opt/sfm/msgcat/C/.
- Provider configuration file FMLoggerConfig.xml
- The MCA Provider is registered to support the "root/cimv2" namespace as an indication provider.

For more information see the System Fault Management Administration guide at http://docs.hp.com/en/diag

NOTE: MCA Indication Provider is one of the providers under SFMProviderModule.

Configuring this provider

MCA Indication Provider uses a common configuration file for logging along with other SFM providers. So editing the configuration file will affect the other providers as well. The configuration file FMLogggerConfig.xml can be found in /var/opt/sfm/conf/.

The file specifies the logging threshold severity, and the location of the log-file. The contents of the file are as follows:

```
<SFMConfig>
   <LoggerConfig>
      <Severity> WARNING </Severity> <!-- Possible Values are INFORMATIONAL, WARNING, ERROR, CRITICAL, STOPLOGGING -->
      <Target> /opt/sfm/log/sfm.log </Target>
      <FileSize> 20480 </FileSize> <!-- sets the max. file size in KB. Min allowed value 2KB, Max allowed value , 1048576 KB (1 GB) -->
      <NBackupFiles> 3 </NBackupFiles> <!-- Number of files to roll over. Min allowed value 1, Max allowed value 10 -->
   </LoggerConfig>
</SFMConfig>
```

In order to change the logging configuration, the following steps are to be followed:

1. Edit the configuration file /opt/sfm/conf/FMLoggerConfig.xml to change the threshold logging level and/or target.

a) Threshold: Possible values are (in increasing severity)

INFORMATIONAL

WARNING

ERROR

CRITICAL

STOPLOGGING

MILESTONE

Note: The INFORMATIONAL logging severity will generate a lot of information. It is advisable not to use it for a long time as it may use a lot of disk space. The best threshold in the running environment will be ERROR. The default logging level is WARNING.

b) Target: Possible values include:

(i) STDOUT: All log messages are delivered to console.

(ii) The complete path to the file where the log messages are to be written

c) FileSize: This field defines the maximum size of the logging file to the logging subsystem.

d) NBackupFiles: When the logging file reaches the maximum file size defined by "FileSize" tag, the logging subsystem takes the backup of the current log file and then truncates it. This variable

defines how many backup files will be preserved by logging subsystem.

2. Run /opt/sfm/bin/sfmconfig command, to specify the changed configuration file. For example

$ /opt/sfm/bin/sfmconfig –c /opt/sfm/conf/FMLoggerConfig.xml

Note that the complete path of the configuration file must be provided to the sfmconfig command.

NOTE: The current implementation of the logging mechanism assumes that the path to the log file (target specified in the configuration file) already exists. i.e., if the target is specified as "/abc/def/ghi.log", the path "/abc/def/" should already exist, and should be writeable by root-user.

Using this provider

Schema supported by this provider

This Provider services HP_AlertIndication. Table 1 shows the properties of HP_AlertIndication that are supported by the provider.

Clients are expected to subscribe to this provider using a CIMClient and also write an appropriate WBEM consumer to consume the indications generated by MCA Indication Provider.

Methods given by this provider

This Provider currently does not provide any method.

Indications generated by this provider.

HP_AlertIndication.

Table 1: HP_AlertIndication and base classes' supported properties. (Properties that are not supported are not mentioned.)

Property Name	Property Inheritance	Property Value (and Data Source)
String IndicationIdentifier	Inherited from CIM_Indication	A unique identifier for the Indication similar to a key value in that it can be used for identification.
String[] CorrelatedIndications*	Inherited from CIM_Indication	A list of IndicationIdentifiers whose notifications are correlated with (related to) this one.
Datetime IndicationTime	Inherited from CIM_Indication	The time and date of creation of the Indication.
String Description	Inherited from CIM_AlertIndication	A short description of the Indication. This property corresponds to "Description of Error" field in the event notification.
String AlertingManagedElement*	Inherited from CIM_AlertIndication	The identifying information of the entity (ie, the instance) for which this Indication is generated. The property contains the path of an instance, encoded as a string parameter - if the instance is modeled in the CIM Schema. If not a CIM instance, the property contains some identifying string that names the entity for which the Alert is generated.
Uint16 AlertType	Inherited from CIM_AlertIndication	Primary classification of the Indication. 1 - Other 2 - Communications Alert 3 - Quality of Service Alert 4 - Processing Error 5 - Device Alert 6 - Environmental Alert 7 - Model Change 8 - Security Alert
String OtherAlertType*	Inherited from CIM_AlertIndication	A string describing the Alert type - used when the AlertType property is set to 1(Other)
Uint16 PerceivedSeverity	Inherited from CIM_AlertIndication	An enumerated value that describes the severity of the AlertIndication from the notifier's point of view. 0 - Unknown

		1 - Other 2 - Information 3 - Degraded / Warning 4 - Minor 5 - Major 6 - Critical 7 - Fatal / NonRecoverable
String OtherSeverity*	Inherited from CIM_AlertIndication	Holds the value of the user defined severity value when "PerceivedSeverity" is 1(Other).
Uint16 ProbableCause	Inherited from CIM_AlertIndication	An enumerated value that describes the probable cause of the situation which resulted in the AlertIndication.
String ProbableCauseDescription	Inherited from CIM_AlertIndication	Provides additional information related to the ProbableCause. This property corresponds to the first sub-section of the “Probable Cause / Recommended Action” field in the EMS event notification.
Uint16 Trending*	Inherited from CIM_AlertIndication	Provides information on trending. 0 - Unknown 1 - Trending Up 2 - Trending down 3 - No change
String[] RecommendedActions	Inherited from CIM_AlertIndication	Free form descriptions of the recommended actions to take to resolve the cause of the notification. This property corresponds to the sub-sections following the first subsection in the “Probable Cause / Recommended Action” field in the EMS event notification.
String EventID	Inherited from CIM_AlertIndication	An instrumentation or provider specific value that describes the underlying "real-world" event represented by the Indication.
Datetime EventTime	Inherited from CIM_AlertIndication	The time and date the underlying event was first detected. This property corresponds to the field “Event time” in the EMS event notification.
String SystemCreationClassName	Inherited from CIM_AlertIndication	The scoping System's CreationClassName for the Page 5 CIM_AlertIndication Provider generating this Indication.
String SystemName	Inherited from CIM_AlertIndication	The scoping System's Name for the Provider generating this Indication. This property corresponds to the “System” field of the EMS event notification.
String ProviderName	Inherited from CIM_AlertIndication	The name of the Provider generating this Indication.
String Summary	Inherited from CIM_AlertIndication	Short description of the reason for the indication. This property corresponds to the “Summary” field in the EMS event notification.
String[] CorrelatedIndications*	Inherited from CIM_AlertIndication	A list of Indication Identifiers whose notifications are correlated with (related to) this one. There is no implication of whether the related indications are the cause of this indication or whether this indication is the cause of the related indications.
String[] RelatedIndications*	Inherited from CIM_AlertIndication	The list of IndicationIdentifiers whose notifications are caused by this one. This indication is the root-cause of the indications in this list.

String[] RootCauseIndications*	Inherited from CIM_AlertIndication	The list of IndicationIndentifers whose notifications are the root-cause of this indication.
Uint32 EventCategory	Inherited from CIM_AlertIndication	Category for the event. This is a value map which is intended to be used by the consumer to group events.
String OtherEventCategory*	Inherited from CIM_AlertIndication	A string defining other values for “EventCategory”.
Uint32 EventSubCategory	Inherited from CIM_AlertIndication	Sub-category for the event. This sub-category is intended to be used by the consumer in conjunction with “EventCategory” to provide additional granularity to group events.
String OtherEventSubCategory*	Inherited from CIM_AlertIndication	A string defining other values for “EventSubCategory”.
Uint32 EventThreshold*	Inherited from CIM_AlertIndication	Identifies the number of indications that need to occur as part of the internal provider throttling configured for this event.
Uint32 EventTimeWindow*	Inherited from CIM_AlertIndication	Identifies the time window during which "EventThreshold" events need to occur as part of the internal provider throttling configured for this event. Time is in minutes. 0 means any amount of time.
Uint32 ActualEventThreshold	Inherited from CIM_AlertIndication	Identifies the number of indications that have occurred to meet the internal provider throttling configured for this event. This property corresponds to the “Number of Events” field, if present, in the EMS Event notification.
Uint32 ActualEventTimeWindow	Inherited from CIM_AlertIndication	Identifies the time window during which the "ActualEventThreshold" events have occurred to meet the internal provider throttling configured for this event. Time is in minutes. 0 means any amount of time. This property corresponds to the field “Event Notification” in the EMS event notification.
String Query*	Inherited from CIM_AlertIndication	The query expression that defines the condition(s) that was met by this Indication.
Boolean ClusterWideEvent*	Inherited from CIM_AlertIndication	Indicates whether this event is of interest to all cluster members.
String ProviderVersion	Inherited from CIM_AlertIndication	The version of the provider generating this indication.
String InformationURL	Inherited from CIM_AlertIndication	URL where the user should go for the latest information related to this indication. This property corresponds to the “Latest information on this event” field in the EMS event notification.
String[] ActionURLs*	Inherited from CIM_AlertIndication	URLs where the user should go to launch tool that will provide information functionality that will allow the user to perform the recommended action for this indication. The tool most likely to help should be listed first in the array, then next most likely, and so on.
String[] ActionURLDescriptions*	Inherited from CIM_AlertIndication	Description of the URLs listed in the ActionURL.

Uint16 OSType	Inherited from CIM_AlertIndication	The type of OS on the system generating the indication as a value-map.
String OSVersion	Inherited from CIM_AlertIndication	Version of the OS on the system generating the indication. This property corresponds to the “OS Version” field in the EMS event notification.
String[] NetworkAddresses	Inherited from CIM_AlertIndication	Array of ALL the network addresses of the system generating the indication.
String SystemFirmwareVersion	Inherited from CIM_AlertIndication	Array of versions of firmware on the system generating the indication. This property corresponds to the “System Firmware Version” field in the EMS event notification.
String SystemSerialNumber	Inherited from CIM_AlertIndication	Serial number of the system generating the indication. This property corresponds to the “System Serial Number” field in the EMS event notification.
String SystemModel	Inherited from CIM_AlertIndication	Model of the system generating the indication. This property corresponds to the “System Model Number” field in the EMS event notification.
String UserComment*	Inherited from CIM_AlertIndication	User comment information associated with the indication
String[] VariableNames*	Inherited from CIM_AlertIndication	Array of variable names for information that is associated with this indication, but cannot be described by the other properties of the indication. The names are correlated with the variable’s types and values in the "VariableTypes" and "VariableValues" arrays. Each entry is related to the entries in the other arrays that are located at the same index.
Uint16[] VariableTypes*	Inherited from CIM_AlertIndication	Array of variable types defined as an enumerated value. 1 - string Page 7 2 - datetime 3 - uint8 4 - uint16 5 - uint32 6 - uint64 7 - sint8 8 - sint16 9 - sint32 10 - sint64 11 - real32 12 - real64 13 - char16 14 - Boolean
String[] VariableValues*	Inherited from CIM_AlertIndication	Array of variable values to be used in conjunction with "VariableTypes" and "VariableNames" to reconstruct the information
Uint16 AlertingElementFormat	Inherited from CIM_AlertIndication	The format of the AlertingManagedElement property is interpretable based upon the value of this property. 0 – Unknown 1 – Other 2 – CIMObjectPath
String OtherAlertingElementFormat*	Inherited from CIM_AlertIndication	A string defining other values for "AlertingElementFormat".

String SystemProductID	Inherited from HP_AlertIndication	Product ID of the system generating the indication that uniquely identifies the system product. This property is required for those products where the serial number is only unique within the product to uniquely identify the system.If this property is not set, the SerialNumber uniquely identifies the system.
String SystemGUID	Inherited from HP_AlertIndication	GUID of the package for the system generating the indication.

For more information refer to the following:

- WBEM information
  - For a CIM tutorial, go to http://www.wbemsolutions.com/tutorials/CIM/.
  - For information about HP WBEM Services for HP-UX, see http://software.hp.com and http://www.hp.com in Network and Systems Management.
  - For an overview of the indication schema go to http://www.openpegasus.org/uploads/40/3452/WBEMIndications.pdf
  - For writing indication consumers go to http://www.openpegasus.org/pp/doc.tpl?CALLER=index.tpl&gdid=3550
  - For writing Java clients go to http://www.openpegasus.org/pp/doc.tpl?CALLER=index.tpl&gdid=3314
  - For information see System Fault Management Administrator's guide available at http://docs.hp.com/en/diag

- Managed resource documentation
  - See event listings for supported native WBEM monitors under
    - CMC_IndicationProviderIA: http://docs.hp.com/hpux/onlinedocs/diag/ems/cmc_em.htm
    - MemoryIndicationProviderIA: http://docs.hp.com/hpux/onlinedocs/diag/ems/memory_ia64.htm
    - CPE_IndicationProviderIA: http://docs.hp.com/en/diag/ems/cpe_em.htm

- Client information
  None.

- Support contacts
  The MCA Indication Provider is supported as part of HP-UX SFM

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