



## SFM Indication Provider

### Provider Overview

Common Information Model (CIM) indication provider delivers events generated by native Web Based Enterprise Management (WBEM) monitors.

### Description

SFM Indication Provider is a CIM indication provider. SFM Indication Provider for WBEM provider enables CIM clients to subscribe for, and indication consumers to receive indications that are generated by native WBEM monitors.

When any event is generated by the native monitors, the SFM Indication Provider constructs an indication class from the data received in the event and delivers it as an indication through the Common Information Model Object Manager (CIMOM).

The SFM Indication Provider generates indications for events generated by the following native WBEM monitors.

For Itanium Processor Family servers

- CMC (CMC\_IndicationProviderIA)
- Memory (MemoryIndicationProviderIA)
- Chassis Code (CPE\_IndicationProviderIA)

### Requirements

This provider generates indications of type HP\_DeviceIndication.  
The Provider requires HPUX WBEM Services version A.02.00.09 or later.

### Release history

June 2006 release is the first release of this provider.

### Supported managed resources

Provides Indications by processing the events from CMC\_IndicationProviderIA, MemoryIndicationProviderIA and CPE\_IndicationProviderIA

### 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.

Ensure HPWBEM services V A.02.00.09

Use swinstall to install the product: "Swinstall -s *Fully\_Qualified\_Depot\_Name* SysFaultMgmt"

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

- Schema MOF files: MOF classes HP\_AlertIndication, HP\_HardWareIndication and HP\_DeviceIndication in /opt/sfm/schemas/mof/HP\_DeviceIndication.mof
- Provider registration MOF file: SFMProviderR.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: SFMIndicationProvider.cat in /opt/sfm/msg/C/.
- Provider configuration file FMLoggerConfig.xml
- The SFM Provider is registered to support the "root/cimv2" namespace as an indication provider.

The thresholds for generating events are configurable for each client. All clients use the event thresholds specified in the throttling config files.

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

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

## Configuring this provider

SFM Indication Provider uses a common configuration file for logging along with other SFM providers. So editing the configuration file will affect the other two providers as well. The configuration file FMLoggerConfig.xml can be found in /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

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

Any HP WBEM services 2.00.09 compliant client will be able to use the MOF classes supported by the provider.

## Schema supported by this provider

This Provider services HP\_DeviceIndication and is compliant with CIMSchema V2.7.2 Table 1 shows the properties of HP\_DeviceIndication 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 SFM Indication Provider.

Methods given by this provider

This Provider currently does not provide any method.

Indications generated by this provider.

HP\_DeviceIndication.

**Table 1: HP\_DeviceIndication and base classes' supported properties. (Properties that are not supported are not mentioned.)**

| <b>Property name</b>           | <b>Property inheritance</b>           | <b>Property value (and data source)</b>  |
|--------------------------------|---------------------------------------|--|
| String IndicationIdentifier    | Inherited from<br>CIM_Indication      | A unique identifier for the Indication similar to a key value in that it can be used for identification of the indication.   |
| String[] CorrelatedIndications | Inherited from<br>CIM_Indication      | A list of IndicationIdentifiers whose notifications are correlated with (related to) this one.   |
| Datetime IndicationTime        | Inherited from<br>CIM_Indication      | The time and date of creation of the Indication.   |
| String Description             | Inherited from<br>CIM_AlertIndication | A short description of the Indication.   |
| String AlertingManagedElement  | Inherited from<br>CIM_AlertIndication | The identifying information of the entity (ie, the instance) for which this Indication is generated. <ul style="list-style-type: none"> <li>1. For cpu monitor the Alerting Managed Element is formed using the physical location of the processor chip.</li> <li>2. For cpe monitor the Alerting Managed Element is null.</li> <li>3. For memory monitor the Alerting Managed Element is formed using the physical location of the DIMM.</li> </ul> |
| UInt16 AlertType               | Inherited from<br>CIM_AlertIndication | Primary classification of the Indication. <ul style="list-style-type: none"> <li>1 - Other</li> <li>2 - Communications Alert</li> <li>3 - Quality of Service Alert</li> <li>4 - Processing Error</li> <li>5 - Device Alert</li> <li>6 - Environmental Alert</li> <li>7 - Model Change</li> <li>8 - Security Alert</li> </ul> Indications from SFM Indication Provider belong to Device Alert.  |
| String OtherAlertType          | Inherited from<br>CIM_AlertIndication | A string describing the Alert type - used when the AlertType property is set to 1(Other). This property is set to false.   |
| UInt16 PerceivedSeverity       | Inherited from<br>CIM_AlertIndication | An enumerated value that describes the severity of the AlertIndication from the notifier's point of view. <ul style="list-style-type: none"> <li>0 - Unknown</li> <li>1 - Other</li> <li>2 - Information</li> <li>3 - Degraded/Warning</li> </ul>  |

|                                 |                                       |  |
|---------------------------------|---------------------------------------|--|
|                                 |                                       | <p>4 - Minor</p> <p>5 - Major</p> <p>6 - Critical</p> <p>7 - Fatal/NonRecoverable</p>  |
| String OtherSeverity            | Inherited from<br>CIM_AlertIndication | Holds the value of the user defined severity value when "PerceivedSeverity" is 1(Other).   |
| UInt16 ProbableCause            | Inherited from<br>CIM_AlertIndication | An enumerated value that describes the probable cause of the situation which resulted in the AlertIndication.  |
| String ProbableCauseDescription | Inherited from<br>CIM_AlertIndication | Provides additional information related to the ProbableCause.  |
| UInt16 Trending                 | Inherited from<br>CIM_AlertIndication | <p>Provides information on trending.</p> <p>0 - Unknown</p> <p>1 - Trending Up</p> <p>2 - Trending down</p> <p>3 - No change</p> <p>This is set to False in SFM Indication Provider.</p>   |
| String[] RecommendedActions     | Inherited from<br>CIM_AlertIndication | Free form descriptions of the recommended actions to take to resolve the cause of the notification.  |
| String EventID                  | Inherited from<br>CIM_AlertIndication | An instrumentation or provider specific value that describes the underlying "real-world" event represented by the Indication.  |
| Datetime EventTime              | Inherited from<br>CIM_AlertIndication | The time and date the underlying event was first detected.   |
| String SystemCreationClassName  | Inherited from<br>CIM_AlertIndication | The scoping System's CreationClassName for the Provider generating this Indication. This is set to "CIM_ComputerSystem"  |
| String SystemName               | Inherited from<br>CIM_AlertIndication | The scoping System's Name for the Provider generating this Indication.   |
| String ProviderName             | Inherited from<br>CIM_AlertIndication | <p>The name of the Provider generating this Indication. This property can have on of the following values:</p> <ol style="list-style-type: none"> <li>1. CMC_IndicationProviderIA</li> <li>2. CPE_IndicationProviderIA</li> <li>3. MemoryIndicationProviderIA</li> </ol> |
| String Summary                  | Inherited from<br>HP_AlertIndication  | Short description of the reason for the indication.  |
| String[] RelatedIndications     | Inherited from<br>HP_AlertIndication  | The list of IndicationIdentifiers whose notifications are caused by this one. This indication is the root-cause of the indications in this list. This is set to False currently.   |
| String[] RootCauseIndications   | Inherited from<br>HP_AlertIndication  | The list of IndicationIdentifiers whose notifications are the root-cause of this indication. This is set to False  |

|                              |                                      |   |
|------------------------------|--------------------------------------|---|
| Uin32 EventCategory          | Inherited from<br>HP_AlertIndication | currently.<br><br>Category for the event. This is a value map which is intended to be used by the consumer to group events. Some of the values for this are as follows:<br>0 - Unknown<br>1 - Other<br>2 - Processor<br>3 - Memory<br>4 - System Hardware<br>And so on.   |
| String OtherEventCategory    | Inherited from<br>HP_AlertIndication | A string defining other values for "EventCategory".   |
| Uin32 EventSubCategory       | Inherited from<br>HP_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. Some of the values for this are as follows:<br>0 - Unknown<br>1 - Other<br>2 - instruction cache<br>3 - data cache<br>4 - level 2 cache<br>And so on. |
| String OtherEventSubCategory | Inherited from<br>HP_AlertIndication | A string defining other values for "EventSubCategory".  |
| Uin32 EventThreshold         | Inherited from<br>HP_AlertIndication | Identifies the number of indications that need to occur as part of the internal provider throttling configured for this event. The value for this is got from throttling config applicable for the event.   |
| Uin32 EventTimeWindow        | Inherited from<br>HP_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. The value for this is got from throttling config applicable for the event.   |
| Uin32 ActualEventThreshold   | Inherited from<br>HP_AlertIndication | Identifies the number of indications that have occurred to meet the internal provider throttling configured for this event. The value for this is got from throttling config applicable for the event.  |
| Uin32 ActualEventTimeWindow  | Inherited from<br>HP_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.   |
| String Query                 | Inherited from<br>HP_AlertIndication | The query expression that defines the condition(s) that was met by this Indication. This is set to false currently.   |
| Boolean ClusterWideEvent     | Inherited from<br>HP_AlertIndication | Indicates whether this event is of interest to all cluster members. This is set to false currently.   |

|                                |                                      |  |
|--------------------------------|--------------------------------------|--|
| String ProviderVersion         | Inherited from<br>HP_AlertIndication | The version of the provider generating this indication. Same as the bundle version of SysFaultMgmt.  |
| String InformationURL          | Inherited from<br>HP_AlertIndication | URL where the user should go for the latest information related to this indication. <ol style="list-style-type: none"> <li>1. For cpu monitor the url is <a href="http://docs.hp.com/hpux/content/hardware/ems/cmc_em.htm">http://docs.hp.com/hpux/content/hardware/ems/cmc_em.htm</a> . This url lists the EMS events, which has a one-to-one mapping to the events generated by the cpu monitor.</li> <li>2. For cpe monitor the url is <a href="http://docs.hp.com/hpux/content/hardware/ems/cpe_em.htm">http://docs.hp.com/hpux/content/hardware/ems/cpe_em.htm</a> . This url lists the EMS events, which has a one-to-one mapping to the events generated by the cpe monitor.</li> <li>3. For memory monitor the url is <a href="http://docs.hp.com/hpux/content/hardware/ems/memory_ia64.htm">http://docs.hp.com/hpux/content/hardware/ems/memory_ia64.htm</a>. This url lists the events, which has a one-to-one mapping to the events generated by the memory monitor.</li> </ol> |
| String[] ActionURLs            | Inherited from<br>HP_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<br>HP_AlertIndication | Description of the URLs listed in the ActionURL.   |
| UInt16 OSType                  | Inherited from<br>HP_AlertIndication | The type of OS on the system generating the indication as a value-map. The value for this property is 8 (HP-UX).   |
| String OSVersion               | Inherited from<br>HP_AlertIndication | Version of the OS on the system generating the indication.   |
| String[] NetworkAddresses      | Inherited from<br>HP_AlertIndication | Array of ALL the network addresses of the system generating the indication.  |
| String SystemFirmwareVersion   | Inherited from<br>HP_AlertIndication | Array of versions of firmware on the system generating the indication.   |
| String SystemSerialNumber      | Inherited from<br>HP_AlertIndication | Serial number of the system generating the indication.   |
| String SystemModel             | Inherited from<br>HP_AlertIndication | Model of the system generating the indication.   |
| String UserComment             | Inherited from<br>HP_AlertIndication | User comment information associated with the indication This is set to false currently.  |
| String[] VariableNames         | Inherited from<br>HP_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.

1. For cpu monitor the following names are filled up in the variableNames array.
  - Number\_Of\_Errors - Number of errors on the processor( Int converted to string. )
  - Time\_Window – The time window in minutes. ( Int converted to string )
  - LID – Lid of the processor in error. ( Uint64\_t converted to string )
  - CompanionLid'n', n ranges from 0 - NumberOfCompanionLids
  - PhysicalLocation'n', n ranges from 0 – NumberOfCompanionLids. ( physical location string )
  - NumberOfCompanionLids – number of companion cores. ( int converted to string )

For Memory Monitor and for Double Bit Errors, additional fields of type string are filled for specifying the properties of the second DIMM. The names of the variables are

- 1) PhysicalLocation1
- 2) PartNumber1
- 3) SerialNumber1
- 4) Manufacturer1

UInt16[] VariableTypes

Inherited from  
HP\_AlertIndication

Array of variable types defined as an enumerated value.

- 1 - string
- 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

1. For cpu monitor all values are of type string.

String[] VariableValues

Inherited from  
HP\_AlertIndication

Array of variable values to be used in conjunction with "VariableTypes" and "VariableNames" to reconstruct the information

UInt16 AlertingElementFormat

Inherited from  
HP\_AlertIndication

The format of the AlertingManagedElement property is interpretable based upon the value of this property.  
0 – Unknown

|  |   |   |
|--|---|---|
|  |   | 1 – Other<br>2 – CIMObjectPath<br>This property is has the value 2 as AlertingManagedElement reported by SFM Indication Provider is a CIMObjectPath.  |
| String OtherAlertingElementFormat        | Inherited from<br>HP_AlertIndication    | A string defining other values for "AlertingElementFormat". This property is set to false currently.  |
| String HWPartNumber                      | Inherited from<br>HP_HardwareIndication | Part number for the hardware generating the indication.   |
| String[] HWFirmwareVersion               | Inherited from<br>HP_HardwareIndication | Array of versions of firmware for the hardware associated with the indication.  |
| String HWManufacturer                    | Inherited from<br>HP_HardwareIndication | Manufacturer of the hardware associated with the indication.  |
| String[] HWLogicalLocation               | Inherited from<br>HP_HardwareIndication | Array of ALL the logical locations of the hardware associated with the indication.  |
| String HWPhysicalLocation                | Inherited from<br>HP_HardwareIndication | Physical location of the hardware associated with the indication.   |
| String[] HWSerialNumber                  | Inherited from<br>HP_HardwareIndication | Array of all the serial numbers of the hardware associated with the indication.   |
| String DeviceModel                       | HP_DeviceIndication                     | Model of the device generating the indication.  |
| String[] DeviceControllerLogicalLocation | HP_DeviceIndication                     | Array of ALL the logical locations of the controller of the device associated with the indication.  |
| String DevicePermanentName               | HP_DeviceIndication                     | The permanent, system unique, name of the device, encoded as a string parameter. The name string is formatted per the DevicePermanentNameFormat property.   |
| Uint16 DevicePermanentNameFormat         | HP_DeviceIndication                     | The format of the DevicePermanentName property is interpretable based upon the value of this property.<br>0 - Unknown<br>1 - Other<br>2 - WorldWideName<br>3 – MACAddress<br>This property is set to value 2. |
| String OtherPermanentNameFormat          | HP_DeviceIndication                     | A string defining other values for "DevicePermanentFormat". This property is set false currently.   |

## 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&gid=3550>
- For writing Java clients go to <http://www.openpegasus.org/pp/doc.tpl?CALLER=index.tpl&gid=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](http://docs.hp.com/hpux/onlinedocs/diag/ems/cmc_em.htm)
    - MemoryIndicationProviderIA: [http://docs.hp.com/hpux/onlinedocs/diag/ems/memory\\_ia64.htm](http://docs.hp.com/hpux/onlinedocs/diag/ems/memory_ia64.htm)
    - CPE\_IndicationProviderIA: [http://docs.hp.com/en/diag/ems/cpe\\_em.htm](http://docs.hp.com/en/diag/ems/cpe_em.htm)
  
- **Client information**

None.
  
- **Support contacts**

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

For additional information on HP products and services, visit us at <http://www.hp.com>.

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