



Environmental Instance Provider

provider
overview
description

The Environmental Provider is a Web Based Enterprise Management (WBEM) Instance Provider that fetches Cooling & Power Subsystems & individual devices (Fans, Bulk Power Supply & AC Input lines) related information from HP PA-RISC Servers and HP Integrity Servers, running HPUX. It also fetches status of thermal & voltage subsystem.

The Environmental Provider allows any client program, compliant with the CIM 2.7 Schema, to query for information about the managed system's Cooling devices & Power Supply devices.

It implements the Cooling & Power Supply related CIM classes, proposed in the DMTF CIM 2.7 revision. In addition to the properties that belong to the standard CIM classes, the Environmental Provider serves 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 this Provider:

- o HP_Fan
- o HP_FanModule
- o HP_FanLocation
- o HP_CoolingRedundancyGroup
- o HP_PowerSupply
- o HP_PowerSupplyModule
- o HP_PowerSupplyLocation
- o HP_PowerRedundancyGroup
- o HP_CoolingCollection
- o HP_PowerCollection
- o HP_SystemTemperatureCollection
- o HP_SystemVoltageCollection

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

- o HP_RealizesFan
- o HP_FanModuleInLocation
- o HP_MemberOfCoolingRedundancy
- o HP_HostedCoolingCollection
- o HP_MemberOfCoolingCollection
- o HP_RealizesPowerSupply
- o HP_PowerSupplyModuleInLocation
- o HP_MemberOfPowerRedundancy

- o HP_HostedPowerCollection
- o HP_MemberOfPowerCollection
- o HP_HostedTemperatureCollection
- o HP_HostedVoltageCollection

(Note that HP_SystemTempCollection and HP_SystemVoltageCollection do not have any members of collection associated though subclasses of CIM_MemberOfCollection association class)

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.

For all the MOF classes mentioned above, the Environmental Provider supports the following standard CIM Operations:

- o enumerateInstanceNames()
- o enumerateInstances()
- o getInstance()

The following CIM operations are not supported by the Environmental Provider:

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

The Environmental 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.

requirements

For the list of software requirements for using the EnvironmentalProvider, see the SFM Release Notes at:
<http://docs.hp.com/en/diag>.

release history

supported managed resources

This provider provides "logical" information about system Cooling devices & Power Supply devices, "physical" attributes of the same modules, and details of the physical-locations of these hardware modules.

This provider also supports the consolidated status for cooling & Power Subsystem as well as System Thermal & Voltage Subsystems.

Please note that the Environmental Instance Provider provides only the information about the above resources. It does not provide any management, diagnostic or configuration capabilities for the above resources.

setting up this provider

installing this provider

The installation of the bundle SysFaultMgmt will set up this provider.

Ensure HPWBEM services A.02.00.09 and OnlineDiag containing EMS V A.04.20 are already installed.

Use swinstall to install the product: "swinstall -s Fully_Qualified_Depot_Name SysFaultMgmt"

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 Environmental Instance provider. A symbolic link is made in /opt/wbem/providers/lib/libsfmproviders.sl to link to the

libsfmproviders.1 library in /opt/sfm/lib/.

- The CIM MOF files, containing the definitions of the HP-specific MOF classes, (namely HP_Cooling_Power.mof) will be available in /opt/sfm/schemas/mof. This directory will also include the provider registration file, namely SFMProviderR.mof. Note: All the HP-specific MOF classes will be registered under the "root/cimv2" namespace.
- The /opt/sfm/bin/ directory will contain the binary executable files that are used by the Environmental Instance Provider. This includes the "fmControl" utility that is used for sending notifications to the Environmental Instance Provider (e.g. on updating the configuration file).
- The /opt/sfm/conf/ directory will contain the (XML) configuration files of the SysFaultMgmt Product.
- The /opt/sfm/msgcat/ directory will contain the catalog files for all the supported locales. (This is used for the localization of the message strings in Environmental Instance Provider).
- The /opt/sfm/log/ directory will contain log files generated during the execution of the Environmental Instance Provider.

For a list of supported platforms, see the SFM Release Notes at:
<http://docs.hp.com/en/diag>

The Environmental instance provider does not report instances of power and cooling subsystem

on Itanium based BL60p systems, and Itanium based rx2660 systems.

Environmental Provider uses a common configuration file along with other SysfaultMgmt Providers. So editing the configuration file will affect the other providers as well. The configuration file can be found in - /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>
    <Target> /opt/sfm/log/sfm.log </Target>
  </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 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

Configuring this provider

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/fmControl program, to specify the changed configuration file. i.e.

```
$ /opt/sfm/bin/fmControl /opt/sfm/conf/FMLoggerConfig.xml
```

Note that the complete path of the configuration file must be provided to the fmControl program.

using this provider

schema supported by this provider

The "Description" section explains in brief the different MOF classes supported by the Environmental 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 2.7 schema specifications.

Note:

1. All key properties corresponding to the CIM classes are supported by the Environmental Instance Provider.
2. All non-key properties that are not supported by the Environmental Instance Provider are also listed below with comment "Not Supported".

Table 1: HP_Fan Properties (Logical Information):

Table 1 describes the properties of the HP_Fan CIM class. 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 | Caption value can be one of the following, depending on the fan type: Unknown, Other, Cabinet Blower, Compute Cabinet I/O Fans, I/O Expansion Cabinet Utility Chassis Fan, I/O Expansion Cabinet I/O Fan |
| string Description | Inherited from CIM_ManagedElement | "This is a cooling device with following details: Cabinet Number: x, Fan Number: x, Type of cooling device:Cabinet Blower" |
| string ElementName | Inherited from CIM_ManagedElement | This value can be one of the following, depending on the fan type: Unknown, Other, Cabinet Blower, Compute Cabinet I/O Fans, I/O Expansion Cabinet Utility Chassis Fan, I/O Expansion Cabinet I/O Fan |
| String Name | Inherited from CIM_ManagedSystemElement | This value can be one of the following, depending on the fan type: Unknown, Other, Cabinet Blower, Compute Cabinet I/O Fans, I/O Expansion Cabinet Utility Chassis Fan, I/O Expansion Cabinet I/O Fan |
| datetime InstallDate; | Inherited from CIM_ManagedSystemElement | Not Supported |

| | | |
|---|---|---|
| uint16 OperationalStatus [] | Inherited from CIM_ManagedSystemElement | The Value-Map associated with this property (as per the CIM 2.7 Schema Specification) is as follows: <pre>ValueMap {"0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16", "17"},</pre> <pre>Values {"Unknown", "Other", "OK", "Degraded", "Stressed", "Predictive Failure", "Error", "Non-Recoverable Error", "Starting", "Stopping", "Stopped", "In Service", "No Contact", "Lost Communication", "Aborted", "Dormant", "Supporting Entity in Error", "Completed"}</pre> <p>The first index in the OpStatus Array indicates the overall status of the instance of the fan.</p> <p>If a fan is working, OpStatus[0] will be set to "OK", if a fan is failed, OpStatus[0] will be "Error", for any other values, it will be set to "Unknown".</p> |
| string StatusDescriptions[] | Inherited from CIM_ManagedSystemElement | In the above mentioned cases, strings will be "Fan Not Working", "Fan OK", "Fan Status Unknown" respectively. |
| Uint16 EnabledStatus | Inherited from CIM_EnabledLogicalElement | Not Supported |
| String OtherEnabledStatus | Inherited from CIM_EnabledLogicalElement | Not Supported |
| Uint16 RequestedStatus | Inherited from CIM_EnabledLogicalElement | Not Supported |
| Uint16 EnabledDefault | Inherited from CIM_EnabledLogicalElement | Not Supported |
| string SystemCreationClassName [Key] | Inherited from CIM_LogicalDevice | Fixed string "CIM_ComputerSystem" |
| string SystemName [Key] | Inherited from CIM_LogicalDevice | The host name of the server. |
| string CreationClassName [Key] | Inherited from CIM_LogicalDevice | This is set to the name of the instantiated sub-class, i.e. "HP_Fan". |
| string DeviceID [Key] | Inherited from CIM_LogicalDevice | Device ID will be the unique physical location of the fan in string format. E.g. 0-ff-ff-ff-ff-0-ff-63 |
| Uint16 Availability | Inherited from CIM_LogicalDevice | Not Supported |
| string OtherIdentifyingInfo[] | Inherited from CIM_LogicalDevice | Not Supported |
| Uint64 PowerOnHours | Inherited from CIM_LogicalDevice | Not Supported |

| | | |
|-------------------------------------|-------------------------------------|--|
| Uint64 TotalPowerOnHours | Inherited from CIM_LogicalDevice | Not Supported |
| string IdentifyingDescriptions[] | Inherited from CIM_LogicalDevice | Not Supported |
| Uint16 AdditionalAvailability[] | Inherited from CIM_LogicalDevice | Not Supported |
| Boolean activeCooling | Inherited from CIM_CoolingDevice | This flag indicates that the Cooling Device provides active (as opposed to passive) cooling. This value is set to "true". |
| Boolean VariableSpeed | Inherited from CIM_CoolingDevice | Not Supported. |
| Uint64 DesiredSpeed | Inherited from CIM_CoolingDevice | Not Supported. |
| Uint8 type | HP_Fan | It represents the type of this fan instance. The valuemap is as follows: ValueMap {"0", "1", "2", "3", "4", "5", "6"}, Values {"Unknown", "Other", "Cabinet Blower", "Compute Cabinet I/O Fans", "I/O Expansion Cabinet Utility Chassis Fan", "I/O Expansion Cabinet I/O Fan", "Processor Fan", "Cell Fan"}] |

Table 2: HP_FanModule properties

Table 2 describes the properties of the HP_FanModule class. 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. | Caption value can be one of the following, depending on the fan type: Unknown, Other, Cabinet Blower, Compute Cabinet I/O Fans, I/O Expansion Cabinet Utility Chassis Fan, I/O Expansion Cabinet I/O Fan |
| string Description | Inherited from CIM_ManagedElement. | "This is a cooling device with following details: Cabinet Number: x, Fan Number: x, Type of cooling device:Cabinet Blower" |
| string ElementName | Inherited from CIM_ManagedElement | This value can be one of the following, depending on the fan type: Unknown, Other, Cabinet Blower, Compute Cabinet I/O Fans, I/O Expansion Cabinet Utility Chassis Fan, I/O Expansion Cabinet I/O Fan |
| String Name | Inherited from CIM_ManagedSystemElement | This value can be one of the following, depending on the fan type: Unknown, Other, Cabinet Blower, Compute Cabinet I/O Fans, I/O Expansion Cabinet Utility Chassis Fan, I/O Expansion Cabinet I/O Fan |

| | | |
|---------------------------------------|---|--|
| datetime InstallDate; | Inherited from CIM_ManagedSystemElement | Not Supported |
| Uint16 OperationalStatus | Inherited from CIM_ManagedSystemElement. | The Value-Map associated with this property (as per the CIM 2.7 Schema Specification) is as follows: ValueMap {"0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16", "17"}, Values {"Unknown", "Other", "OK", "Degraded", "Stressed", "Predictive Failure", "Error", "Non-Recoverable Error", "Starting", "Stopping", "Stopped", "In Service", "No Contact", "Lost Communication", "Aborted", "Dormant", "Supporting Entity in Error", "Completed"} The first index in the OpStatus Array indicates the overall status of the instance of the fan. If a fan is working, OpStatus[0] will be set to "OK", if a fan is failed, OpStatus[0] will be "Error", for any other values, it will be set to "Unknown". |
| string StatusDescriptions[] | Inherited from CIM_ManagedSystemElement | In the above mentioned cases, strings will be "Cooling Device is OK", "Cooling Device is not working", "Cooling device is in Unknown state" respectively. |
| String Tag [Key] | Inherited from CIM_PhysicalElement | This string will be set to a unique value, indicating the physical location of the fan in string format. E.g. 0-ff-ff-ff-ff-0-ff-63 |
| String CreationClassName [Key] | Inherited from CIM_PhysicalElement | The name of the subclass being instantiated, i.e. "HP_FanModule". |
| String ElementName | Inherited from CIM_PhysicalElement | value can be one of the following, depending on the fan type: Unknown, Other, Cabinet Blower, Compute Cabinet I/O Fans, I/O Expansion Cabinet Utility Chassis Fan, I/O Expansion Cabinet I/O Fan |
| String Manufacturer | Inherited from CIM_PhysicalElement | This will be set to "Hewlett-Packard" |
| String Model | Inherited from CIM_PhysicalElement | Not Supported |
| String SKU | Inherited from CIM_PhysicalElement | Not Supported |
| String SerialNumber | Inherited from CIM_PhysicalElement | Not Supported |
| String Version | Inherited from CIM_PhysicalElement | Not Supported |
| String PartNumber | Inherited from CIM_PhysicalElement | Not Supported |

| | | |
|-----------------------------|---------------------------------------|---------------|
| String OtherIdentifyingInfo | Inherited from CIM_PhysicalElement | Not Supported |
| boolean PoweredOn | Inherited from CIM_PhysicalElement | Not Supported |
| datetime ManufactureDate | Inherited from CIM_PhysicalElement | Not Supported |
| string VendorEquipmentType | Inherited from CIM_PhysicalElement | Not Supported |
| string UserTracking | Inherited from CIM_PhysicalElement | Not Supported |
| boolean CanBeFRUed | Inherited from CIM_PhysicalElement | Not Supported |

Table 3: HP_PoweSupply Properties (Logical Information):

Table 3 describes the properties of the HP_PowerSupply CIM class. 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

| <i>property name</i> | <i>property inheritance</i> | <i>property value (and data source)</i> |
|----------------------|--|---|
| String Caption | Inherited from CIM_ManagedElement | Caption value can be one of the following, depending on the device type: Compute Cabinet Bulk Power Supply, Compute Cabinet Backplane Power Supply, Compute Cabinet I/O Chassis Enclosure Power Supply, Compute Cabinet AC Input Line, I/O Expansion Cabinet Bulk Power Supply, I/O Expansion Cabinet Backplane Power Supply, I/O Expansion Cabinet I/O Chassis Enclosure Power Supply, I/O Expansion Cabinet AC Input Line, Cooling Device Slot, Power Device Slot |
| string Description | Inherited from CIM_ManagedElement | "This is a power supply device with following details: Cabinet Number: 0, Power Module Number: 0, Type of power supply device: Compute Cabinet Bulk Power Supply" |
| string ElementName | Inherited from CIM_ManagedElement | This value can be one of the following, depending on the device type: Compute Cabinet Bulk Power Supply, Compute Cabinet Backplane Power Supply, Compute Cabinet I/O Chassis Enclosure Power Supply, Compute Cabinet AC Input Line, I/O Expansion Cabinet Bulk Power Supply, I/O Expansion Cabinet Backplane Power Supply, I/O Expansion Cabinet I/O Chassis Enclosure Power Supply, I/O Expansion Cabinet AC Input Line, Cooling Device Slot, Power Device Slot |
| String Name | Inherited from CIM_ManagedSystemElement | This value can be one of the following, depending on the device type: Compute Cabinet Bulk Power Supply, Compute |

| | | |
|---|---|---|
| | | Cabinet Backplane Power Supply, Compute Cabinet I/O Chassis Enclosure Power Supply, Compute Cabinet AC Input Line, I/O Expansion Cabinet Bulk Power Supply, I/O Expansion Cabinet Backplane Power Supply, I/O Expansion Cabinet I/O Chassis Enclosure Power Supply, I/O Expansion Cabinet AC Input Line, Cooling Device Slot, Power Device Slot |
| datetime InstallDate; | Inherited from CIM_ManagedSystemElement | Not Supported |
| uint16 OperationalStatus [] | Inherited from CIM_ManagedSystemElement | The Value-Map associated with this property (as per the CIM 2.7 Schema Specification) is as follows: ValueMap {"0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16", "17"}, Values {"Unknown", "Other", "OK", "Degraded", "Stressed", "Predictive Failure", "Error", "Non-Recoverable Error", "Starting", "Stopping", "Stopped", "In Service", "No Contact", "Lost Communication", "Aborted", "Dormant", "Supporting Entity in Error", "Completed"} |
| | | The first index in the OpStatus Array indicates the overall status of the instance of the power supply device. If a power module is working, OpStatus[0] will be set to "OK", if it is failed, OpStatus[0] will be "Error", for any other values, it will be set to "Unknown". |
| string StatusDescriptions[] | Inherited from CIM_ManagedSystemElement | In the above mentioned cases, strings will be "Power Supply is not working", "Power Supply is OK", "Power Supply is in unknown state" respectively. |
| Uint16 EnabledStatus | Inherited from CIM_EnabledLogicalElement | Not Supported |
| String OtherEnabledStatus | Inherited from CIM_EnabledLogicalElement | Not Supported |
| Uint16 RequestedStatus | Inherited from CIM_EnabledLogicalElement | Not Supported |
| Uint16 EnabledDefault | Inherited from CIM_EnabledLogicalElement | Not Supported |
| string SystemCreationClassName [Key] | Inherited from CIM_LogicalDevice | Fixed string "CIM_ComputerSystem" |
| string SystemName [Key] | Inherited from CIM_LogicalDevice | The host name of the server. |
| string CreationClassName [Key] | Inherited from CIM_LogicalDevice | This is set to the name of the instantiated sub-class, i.e. "HP_PowerSupply". |

| | | |
|----------------------------------|-------------------------------------|---|
| string DeviceID [Key] | Inherited from CIM_LogicalDevice | Device ID will be the unique physical location of the power supply in string format. E.g. 0-ff-ff-ff-ff-0-ff-44 |
| String[] OtherIdentifyingInfo | Inherited from CIM_LogicalDevice | First element in this array will specify the grid to which this power supply is attached, if the power supply type is A/C Line. Note: If the type is not A/C Line, these do not need to be populated. |
| UInt16 Availability | Inherited from CIM_LogicalDevice | Not Supported |
| string OtherIdentifyingInfo[] | Inherited from CIM_LogicalDevice | Not Supported |
| UInt64 PowerOnHours | Inherited from CIM_LogicalDevice | Not Supported |
| UInt64 TotalPowerOnHours | Inherited from CIM_LogicalDevice | Not Supported |
| string IdentifyingDescriptions[] | Inherited from CIM_LogicalDevice | Not Supported |
| UInt16 AdditionalAvailability[] | Inherited from CIM_LogicalDevice | Not Supported |
| Boolean isSwitchingSupply | Inherited from CIM_PowerSupply | Not Supported |
| UInt32 Range1InputVoltageLow | Inherited from CIM_PowerSupply | Not Supported |
| UInt32 Range1InputVoltageHigh | Inherited from CIM_PowerSupply | Not Supported |
| UInt32 Range1InputFrequencyLow | Inherited from CIM_PowerSupply | Not Supported |
| UInt32 Range1InputFrequencyHigh | Inherited from CIM_PowerSupply | Not Supported |
| UInt32 Range2InputVoltageLow | Inherited from CIM_PowerSupply | Not Supported |
| UInt32 Range2InputVoltageHigh | Inherited from CIM_PowerSupply | Not Supported |
| UInt32 Range2InputFrequencyLow | Inherited from CIM_PowerSupply | Not Supported |
| UInt32 Range2InputFrequencyHigh | Inherited from CIM_PowerSupply | Not Supported |
| UInt16 ActiveInputVoltage | Inherited from CIM_PowerSupply | Not Supported |
| UInt16 TypeOfRangeSwitching | Inherited from CIM_PowerSupply | Not Supported |

| | | |
|-------------------------|-----------------------------------|--|
| Uint32 TotalOutputPower | Inherited from CIM_PowerSupply | Not Supported |
| Uint8 type | HP_PowerSupply | Type of this instance of PowerSupply. ValueMap {"0", "1", "2", "3", "4", "5", "6", "7", "8", "9"}, Values {"Unknown", "Other", "Compute Cabinet Bulk Power Supply", "Compute Cabinet System Backplane Power Supply", "Compute Cabinet I/O chassis enclosure Power Supply", "Compute Cabinet AC Input Line", "I/O Expansion Cabinet Bulk Power Supply", "I/O Expansion Cabinet System Backplane Power Supply", "I/O Expansion Cabinet I/O chassis enclosure Power Supply", "I/O Expansion Cabinet AC Input Line"}]} |

Table 4: HP_PowerModule properties

Table 4 describes the properties of the HP_PowerSupplyModule class. 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. | Caption value can be one of the following, depending on the device type: Compute Cabinet Bulk Power Supply, Compute Cabinet Backplane Power Supply, Compute Cabinet I/O Chassis Enclosure Power Supply, Compute Cabinet AC Input Line, I/O Expansion Cabinet Bulk Power Supply, I/O Expansion Cabinet Backplane Power Supply, I/O Expansion Cabinet I/O Chassis Enclosure Power Supply, I/O Expansion Cabinet AC Input Line, Cooling Device Slot, Power Device Slot |
| String Description | Inherited from CIM_ManagedElement. | "This is a power supply device with following details: Cabinet Number: 0, Power Module Number: 0, Type of power supply device: Compute Cabinet Bulk Power Supply" |
| String ElementName | Inherited from CIM_ManagedElement | Caption value can be one of the following, depending on the device type: Compute Cabinet Bulk Power Supply, Compute Cabinet Backplane Power Supply, Compute Cabinet I/O Chassis Enclosure Power Supply, Compute Cabinet AC Input Line, I/O Expansion Cabinet Bulk Power Supply, I/O Expansion Cabinet Backplane Power Supply, I/O Expansion Cabinet I/O Chassis Enclosure Power Supply, I/O Expansion Cabinet AC Input Line, Cooling Device Slot, Power Device Slot |
| String Name | Inherited from CIM_ManagedSystemElement | Caption value can be one of the following, depending on the device type: Compute Cabinet Bulk Power Supply, Compute Cabinet Backplane Power Supply, Compute Cabinet I/O Chassis Enclosure |

| | | |
|---------------------------------------|---|---|
| | | Power Supply, Compute Cabinet AC Input Line, I/O Expansion Cabinet Bulk Power Supply, I/O Expansion Cabinet Backplane Power Supply, I/O Expansion Cabinet I/O Chassis Enclosure Power Supply, I/O Expansion Cabinet AC Input Line, Cooling Device Slot, Power Device Slot |
| datetime InstallDate; | Inherited from CIM_ManagedSystemElement | Not Supported |
| uint16 OperationalStatus | Inherited from CIM_ManagedSystemElement. | The Value-Map associated with this property (as per the CIM 2.7 Schema Specification) is as follows: <pre>ValueMap {"0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16", "17"},</pre> <pre>Values {"Unknown", "Other", "OK", "Degraded", "Stressed", "Predictive Failure", "Error", "Non-Recoverable Error", "Starting", "Stopping", "Stopped", "In Service", "No Contact", "Lost Communication", "Aborted", "Dormant", "Supporting Entity in Error", "Completed"}</pre> <p>The first index in the OpStatus Array indicates the overall status of the instance of the power supply device.</p> <p>If a power module is working, OpStatus[0] will be set to "OK", if it is failed, OpStatus[0] will be "Error", for any other values, it will be set to "Unknown".</p> |
| String StatusDescriptions[] | Inherited from CIM_ManagedSystemElement | In the above mentioned cases, strings will be "Power Supply Not Working", "Power Supply OK", "Power Supply Status Unknown" respectively. |
| String Tag [Key] | Inherited from CIM_PhysicalElement | This string will be set to a unique value, indicating the Physical Location of the physical Power Supply Module. E.g. 0-ff-ff-ff-ff-0-ff-44 |
| String CreationClassName [Key] | Inherited from CIM_PhysicalElement | The name of the subclass being instantiated, i.e. "HP_PowerModule". |
| String ElementName | Inherited from CIM_PhysicalElement | Caption value can be one of the following, depending on the device type: Compute Cabinet Bulk Power Supply, Compute Cabinet Backplane Power Supply, Compute Cabinet I/O Chassis Enclosure Power Supply, Compute Cabinet AC Input Line, I/O Expansion Cabinet Bulk Power Supply, I/O Expansion Cabinet Backplane Power Supply, I/O Expansion Cabinet I/O Chassis Enclosure Power Supply, I/O Expansion Cabinet AC Input Line, Cooling Device Slot, Power Device Slot |
| String Manufacturer | Inherited from CIM_PhysicalElement | This will be set to "Hewlett-Packard" |
| String Model | Inherited from CIM_PhysicalElement | The model of the power supply device. |

| | | |
|-------------------------------|---------------------------------------|---|
| String SKU | Inherited from CIM_PhysicalElement | Not Supported |
| String SerialNumber | Inherited from CIM_PhysicalElement | This is populated with SerialNumber of the device. |
| String Version | Inherited from CIM_PhysicalElement | Not Supported |
| String PartNumber | Inherited from CIM_PhysicalElement | This is populated with PartNumber of the device. |
| String[] OtherIdentifyingInfo | Inherited from CIM_PhysicalElement | First element in this array will specify the grid to which this power supply is attached, if the power supply type is A/C Line. Note: If the type is not A/C Line, these do not need to be populated. |
| boolean PoweredOn | Inherited from CIM_PhysicalElement | Not Supported |
| Datetime ManufactureDate | Inherited from CIM_PhysicalElement | This contains the date of manufacturing. |
| string VendorEquipmentType | Inherited from CIM_PhysicalElement | Not Supported |
| string UserTracking | Inherited from CIM_PhysicalElement | Not Supported |
| boolean CanBeFRUed | Inherited from CIM_PhysicalElement | Not Supported |

table 5: HP_FanLocation & HP_PowerLocation properties

Table 5 describes the properties of the HP_FanLocation & HP_PowerLocation. 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 returned as "Cooling Device Slot". Or "Power Device Slot" |
| string Description | Inherited from CIM_ManagedElement. | This value will be something like: "This is a cooling device with following details: Cabinet Number: 0, Fan Number: 0, Type of cooling device:Cabinet Blower:". |
| string ElementName | Inherited from CIM_ManagedElement | This value is returned as "Cooling Device Slot". Or "Power Device Slot" |
| String Name [Key] | Inherited from CIM_Location | The location is returned as a string, of the form "CabinetNumber = <Cabinet#> : SlotNumber = <Slot#> : " |
| String PhysicalPosition [Key] | Inherited from CIM_Location | A string indicating (uniquely) the position of the Fan Or PowerModule. E.g. 0-ff-ff-ff-ff-0-ff-63 |

| | | |
|------------------------------------|--|---|
| String[] PhysicalLocationLevels | Inherited from HP_PhysicalLocationInComplex | ValueMap { "0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13"}, Values { "Cabinet", "Cardcage", "Backplane", "Cell Slot", "Processor Module", "CPU Slot", "Reserved", "Source", "Detail", "DIMM Slot", "Impl. Dep", "Slot", "Extender", "Instance"}, It will be set as 0 11 for cabinet and Slot. |
| Uint8[] PhysicalLocationValues | Inherited from HP_PhysicalLocationInComplex | This will have the array of values for Cabinet & Slot number. E.g. 0 1 |
| String CreationClassName | Inherited from HP_PhysicalLocationInComplex | "HP_FanLocation" Or "HP_PowerSupplyLocation" |

table 6: HP_CoolingRedundancyGroup & HP_PowerRedundancyGroup properties

Table 6 describes the properties of the HP_CoolingRedundancyGroup & HP_PowerRedundancyGroup. 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) |
|---------------|----------------------|----------------------------------|
|---------------|----------------------|----------------------------------|

| | | |
|--------------------------------------|---------------------------------------|---|
| Caption | Inherited from CIM_ManagedElement | "HP_CoolingRedundancyGroup" or "HP_PowerRedundancyGroup" |
| Description | Inherited from CIM_ManagedElement | This is a cooling (or power) redundancy group with following details: Cabinet Number: 0, Type of cooling subsystem:: Cabinet Blower (or power device type) |
| ElementName | Inherited from CIM_ManagedElement | This is a cooling redundancy group of type:Cabinet Blower |
| String Name (Key) | Inherited from CIM_RedundancyGroup | Hewlett-Packard:diags.sfm:<CreationClassName>:<LocalID> |
| String CreationClassName(Key) | Inherited from CIM_RedundancyGroup | "HP_CoolingRedundancyGroup" or "HP_PowerRedundancyGroup" |
| Uint16 RedundancyStatus | Inherited from CIM_RedundancyGroup | ValueMap { "0", "1", "2", "3", "4" }, Values { "Unknown", "Other", "Fully Redundant", "Degraded Redundancy", "Redundancy Lost" }] Depending on the number of cooling or power devices failed, subsystem may be still functioning with full redundancy, or degraded redundancy. This redundancy state of the subsystem is reflected in this property. |

table 7: HP_CoolingCollection , HP_PowerCollection, HP_SystemTemperatureCollection & HP_SystemVoltageCollection properties

Table 7 describes the properties of the HP_CoolingCollection, HP_PowerCollection, HP_SystemTemperatureCollection & HP_SystemVoltageCollection. 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.

| <i>property name</i> | <i>property inheritance</i> | <i>property value (and data source)</i> |
|----------------------|-----------------------------|---|
|----------------------|-----------------------------|---|

| | | |
|------------------------------------|--|---|
| String InstanceID (Key) | Inherited from CIM_SystemSpecificCollection | Hewlett-Packard:diags.sfm:<CreationClassName>:<LocalID> CreationClassName reflects the collection class name. LocalID is always 0, as we are creating only 1 instance of collection class. |
| String Caption | Inherited from HP_GroupSystemSpecificCollection | "HP_CoolingCollection" or "HP_PowerCollection" or HP_SystemTemperatureCollection or HP_SystemVoltageCollection |
| Uint16[] GroupOperationalStatus | Inherited from HP_GroupSystemSpecificCollection | ValueMap {"0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16", "17"}, Values {"Unknown", "Other", "OK", "Degraded", "Stressed", "Predictive Failure", "Error", "Non-Recoverable Error", "Starting", "Stopping", "Stopped", "In Service", "No Contact", "Lost Communication", "Aborted", "Dormant", "Supporting Entity in Error", "Completed"}, This property reflects the overall status of the subsystem. Any device failure is reflected in the overall status. CoolingCollection class represents only system cooling devices, so it considers only fan types of Cabinet Blower, Compute Cabinet I/O Fans, I/O Expansion Cabinet Utility Chassis Fan, I/O Expansion Cabinet I/O Fan and not any other instances of HP_Fan with other types, like ProcessorFan. Same holds true for PowerCollection. GroupOperationalStatus considers only the PowerSupply types mentioned in this document. Since cooling & power subsystems have redundancy, GroupOperationalStatus considers RedundancyStatus as well as individual device status in consideration. If any device is in 'not-OK' state, and system is not fully redundant, overall status will be reflected as 'not-OK'. E.g. Say, a cabinet needs 4 fans to be fully redundant and it has 5 to start with. Even if one fan fails, system is fully redundant. Thus, GroupOperationalStatus will be set to OK. If one more fan fails, system is no longer fully redundant. RedundancyStatus is set to redundancy degraded, and GroupOperationalStatus is set to Degraded. If RedundancyStatus is RedundancyLost and some fans are not working, GroupOperationalStatus is set to 'Stressed'. However, if all (installed) fans are working fine and system is not Fully Redundant, the GroupOperationalStatus is |

String[]
GroupStatusDescriptions

Inherited from
HP_GroupSystemSpecificCollecti
on

still set to 'OK', as we assume that all fans were not intended to be installed.

Same algorithm is used for GroupOperationalStatus for PowerCollection as well.

It can be one of the following

"All member devices are OK."

"At least one member device is degraded."

"At least one member device is Stressed."

"At least one member device has Unknown Status."

table 8: HP_RealizesFan properties

Table 8 describes the properties of the HP_RealizesFan association class (associating HP_FanModule and HP_Fan). 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) |
|------------------------------------|----------------------------|---|
| HP_FanModule ref Antecedent | Property of HP_RealizesFan | Object path of the HP_FanModule Instance. |
| HP_Fan ref Dependent | Property of HP_RealizesFan | Object path of the HP_Fan Instance. |

table 9: HP_RealizesPowerSupply properties

Table 9 describes the properties of the HP_RealizesPowerSupply association class (associating HP_PowerSupplyModule and HP_PowerSupply). 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) |
|--|------------------------------------|---|
| HP_PowerSupplyModule ref Antecedent | Property of HP_RealizesPowerSupply | Object path of the HP_PowerSupplyModule Instance. |
| HP_PowerSupply ref Dependent | Property of HP_RealizesPowerSupply | Object path of the HP_PowerSupply Instance. |

table 10: HP_FanModuleInLocation properties

Table 10 describes the properties of the HP_FanModuleInLocation association class (associating HP_FanModule and HP_FanLocation). 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) |
|---------------|----------------------|----------------------------------|
|---------------|----------------------|----------------------------------|

| | | |
|--|--|---|
| HP_FanModule ref Element | Property of HP_PhysicalElementLocationInComplex | Object path of the HP_FanModule Instance. |
| HP_FanLocation ref PhysicalLocation | Property of HP_PhysicalElementLocationInComplex | Object path of the HP_FanLocation Instance. |

table 11: HP_PowerSupplyModuleInLocation properties

Table 10 describes the properties of the HP_PowerSupplyModuleInLocation association class (associating HP_PowerSupplyModule and HP_PowerSupplyLocation). 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) |
|--|--|---|
| HP_PowerSupplyModule ref Element | Property of HP_PhysicalElementLocationInComplex | Object path of the HP_PowerSupplyModule Instance. |
| HP_PowerSupplyLocation ref PhysicalLocation | Property of HP_PhysicalElementLocationInComplex | Object path of the HP_PowerSupplyLocation Instance. |

table 12: HP_MemberOfCoolingRedundancy properties

Table 12 describes the properties of the HP_MemberOfCoolingRedundancy association class (associating HP_CoolingRedundancyGroup and HP_Fan). 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) |
|---|--|--|
| HP_CoolingRedundancyGroup ref GroupComponent | Property of CIM_RedundancyComponent | Object path of the HP_CoolingRedundancyGroup Instance. |
| HP_Fan ref PartComponent | Property of CIM_RedundancyComponent | Object path of the HP_Fan Instance. |

table 13: HP_MemberOfPowerRedundancy properties

Table 13 describes the properties of the HP_MemberOfPowerRedundancy association class (associating HP_PowerRedundancyGroup and HP_PowerSupply). 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) |
|---|--|--|
| HP_PowerRedundancyGroup ref GroupComponent | Property of CIM_RedundancyComponent | Object path of the HP_PowerRedundancyGroup Instance. |
| HP_PowerSupply ref PartComponent | Property of CIM_RedundancyComponent | Object path of the HP_PowerSupply Instance. |

table 14: *HP_HostedCoolingCollection* , *HP_HostedPowerCollection*, *HP_HostedVoltageCollection*, *HP_HostedTemperatureCollection* properties

Table 14 describes the properties of the *HP_HostedCoolingCollection*, *HP_HostedPowerCollection* , *HP_HostedVoltageCollection*, *HP_HostedTemperatureCollection* association class (associating *CIM_ComputerSystem* and *HP_GroupSystemSpecificCollection*). 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) |
|---|---|---|
| CIM_ComputerSystem ref Antecedent | Property of <i>HP_GroupHostedCollection</i> | Object path of the <i>CIM_ComputerSystem</i> |
| HP_GroupSystemSpecificCollection ref Dependent | Property of <i>HP_GroupHostedCollection</i> | Object path of the <i>HP_CoolingCollection</i> , <i>HP_PowerCollection</i> , <i>HP_HostedVoltageCollection</i> OR <i>HP_HostedTemperatureCollection</i> Instance. |

table 15: *HP_MemberOfCoolingCollection* & *HP_MemberOfPowerCollection* properties

Table 15 describes the properties of the *HP_MemberOfCoolingCollection* & *HP_MemberOfPowerCollection* association class (associating *HP_CoolingCollection* & *HP_Fan* and *HP_PowerCollection* & *HP_PowerSupply* respectively). 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) |
|--|---|---|
| HP_CoolingCollection or HP_PowerCollection ref Collection | Property of <i>CIM_MemberOfCollection</i> | Object path of the <i>HP_CoolingCollection</i> or <i>HP_PowerCollection</i> Instance. |
| HP_Fan or HP_PowerSupply ref Member | Property of <i>CIM_MemberOfCollection</i> | Object path of the <i>HP_Fan</i> or <i>HP_PowerSupply</i> Instance. |

table 16: intrinsic methods for all the CIM classes supported by Environmental Instance Provider

Table 16 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.) | <i>CIMOperationFailedException</i> |
| enumerateInstanceNames | Returns object path of all instances of class. | <i>CIMOperationFailedException</i> |
| getInstance | Returns an instance that matches the keys with values of supported properties. (See tables above.) | <i>CIMOperationFailedException</i> & <i>CIMObjectNotFoundException</i> |

links to more information

- WBEM information

For a CIM tutorial, go to <http://www.wbemsolutions.com/tutorials/CIM/>

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

For the location of the nearest sales office, call:

United States: +1 800 637 7740

Canada: +1 905 206 4725

Japan: +81 3 3331 6111

Latin America: +1 305 267 4220

Australia/New Zealand: +61 3 9272 2895

Asia Pacific: +8522 599 7777

Europe/Africa/Middle East: +41 22 780 81 11

For more information, contact any of our worldwide sales offices or HP Channel Partners (in the U.S., call 1 800 637 7740).

Technical information contained in this document is subject to change without notice.

© Copyright Hewlett-Packard Company 2007

4/2007

