HP-UX Memory Instance Provider

Provider overview

Memory Instance Provider provides information about System's Physical Memory.

Description

The Memory Instance Provider provides information about system physical memory configuration. This provider instruments CIM and HP defined MOF classes, which are CIM 2.7.2 compliant. All the HP specific MOF classes are registered in root/cimv2 name space.

This provider instruments the following MOF classes

- HP_PhysicalMemory

  This class describes DIMM/SIMM that are present in the system/partition. In case of vPar, this provider describes all the DIMM/SIMM in the hard partition "nPar".

- HP_MemoryLocation

  This class describes all volatile memory module slots that are present in the system/partition. In case of vPar, this class describes all memory slots that are present in hard partition "nPar".

- HP_MemoryInLocation (Association)

  This association class associates a DIMM/SIMM described by an instance of "HP_PhysicalMemory" that is present in a memory slot described by an instance of "HP_MemoryLocation".

Following intrinsic methods, of CIM instance provider, are supported by memory instance provider

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

Following intrinsic methods, of CIM instance provider, are not supported by memory instance provider

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

Any extrinsic method of any of the supported MOF class is not supported.

Associations are instrumented using the instance provider framework.

Requirements

HP WBEM Services 2.0.

Release history

This provider will be made available via web release in march 2004.

Supported managed resources

This provider provides information about Physical Memory Module (DIMM/SIMM) and Memory Module Slots.

Please note that the provider provides only the information about the above resources. They don't provide any managing or diagnostic or configuring capabilities for the above resources.

Setting up this provider

Installing this provider

The installation of the appropriate bundle (SysFaultMgmt32PA or SysFaultMgmt64PA) will set up this provider.

- Choose SysFaultMgmt32PA for 32bit PA-RISC platforms.
- Choose SysFaultMgmt64PA for 64bit PA-RISC platforms.
- Choose SysFaultMgmt32PA for 32/64 bit platforms booted in 32 bit mode.
- Choose SysFaultMgmt64PA for 32/64 bit platforms booted in 64 bit mode.

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 libmemvider.1. This is available in /opt/sfm/lib/, along with all the other libraries it uses to implement the Memory Instance provider. A symbolic link is made in /opt/wbem/providers/lib/libmemprovider.sl to link to the libmemprovider.1 library in /opt/sfm/lib/.
- The CIM MOF files, containing the definitions of the HP-specific MOF classes, (namely HP_MemoryPhysical27.mof) will be available in /opt/sfm/schemas/mof. This directory will also include the provider registration file, namely HP_MemInstanceProvidersReg.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 Memory Instance Provider. This includes the "fmControl" utility that is used for sending notifications to the Memory Instance Provider (e.g. on updation to the configuration file).
- The /opt/sfm/conf/ directory will contain the (XML) configuration files of the Memory Instance Provider, and all the modules that this provider uses.
- 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 Memory Instance Provider).
- The /opt/sfm/log/ directory will contain log files generated during the execution of the CPU Instance Provider.

The Memory Instance Provider will support following OS and Platform combination

- PA-RISC servers (HP-UX 11i v1) - 32-Bit Platforms
  - A180, A180C
  - D200, D210, D280 (HVERS 0x589 not 0x5A9), D350, D360
  - K100, K210, K220, K360 (HVERS 0x591 not 0x5A6), K370, K380, K400, K410, K420
- PA-RISC servers (HP-UX 11i v1) – 32/64 Bit Platforms
  - D390
  - K450, K460, K570, K580
- PA-RISC servers (HP-UX 11i v1) - 64-Bit Platforms
  - A400, A500
  - K250, K260, K360 (HVERS 0x5B6 not 0x5A6), K370, K380
  - L1000, L2000, L3000
  - N4000
  - rp7410
  - rp8400
  - SD16000, SD32000, SD64000

Configuring this provider

Memory Provider uses a common configuration file along with CPU Instance Provider and EMSWrapper Indication Provider. So editing the configuration file will affect the other two 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 information. It is advisable not to use it for a long time as it may use a lot of disk space. The recommended threshold in the running environment will be WARNING. 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

NOTE The current implementation of the logging mechanism assumes that the path to the log file (target specified in the configuration file) already exists. For example, 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. For example

$ /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

Any HP WBEM services 2.0 compliant client will be able to use the MOF classes supported by the Memory Instance Provider.

The description section provides the brief description of the supported MOF classes. The following tables provide the information about the supported properties of these MOF classes or their base classes.

Note: All supported properties may not be available on all the supported platforms mentioned in the installation section.

Table 1: HP_PhysicalMemory supported properties. (Properties that are not supported are not mentioned.)

Property name	Property inheritance	Property value (and data source)
String Description	CIM_ManagedElement	The description provides the following information about a DIMM • Memory Chip Type (Not Mandatory) • Memory Chip form factor description (Not Mandatory) • Location description • Size, in bytes, description.
String ElementName	CIM_ManagedElement	Same as Name
uint16 OperationalStatus[]	CIM_ManagedSystemElement	The Value-Map associated with this property (as per the CIM 2.7.2 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 following status information and its conversion to CIM operational status is mentioned below 1. Configured : "Ok" status 2. HW De-Configured: "Stopped" status. 3. SW De-configured: "Stopped" status. 4. De-Configured (if on a server the firmware doesn't precisely tells weather the DIMM is de-configured by HW or SW. : "Stopped" status. 5. Degrade (On Mohawk type of system, a DIMM/SIMM can participate in more than one memory bank. It is possible that one of the memory banks is de-configured, while the other are still configured. In such scenario, the f/w only tells about the configured size of DIMM/SIMM rather than actual size of DIMM/SIMM. In such scenario, memory provider will return the configured size of DIMM/SIMM, instead of actual size, and show the status of the DIMM/SIMM as degraded.) : "Degraded" status 6. SPD Error: "Error" status 7. Extended SPD error: "Error" status 8. DIMM type mismatch: "Error Status". 9. Unsupported DIMM: "Error Status" 10. SBE (indicating excessive Single Bit Error has occurred on this memory module) : "Error" Status: It is possible that a DIMM/SIMM may have more than one status code for e.g. if the DIMM/SIMM is de-configured due to DIMM type mismatch than we will have "Error" and "Stopped" status.
String StatusDescriptions[]	CIM_ManagedSystemElement	Derived from operation status.
string Name	CIM_ManagedSystemElement	Obtained from the FRU name. The example name will be DIMM_1024. If the FRU information is not present than memory instance provider tries to form the name in the format using the memory chip form factor and its size in MB. Thus a derived name will be <Chip Form factor>_<module size in MB>
String PartNumber	CIM_PhysicalElement	DIMM/SIMM Part number.
String SerialNumber	CIM_PhysicalElement	DIMM/SIMM Serial Number.
String CreationClassName [Key]	CIM_PhysicalElement	Hard coded to "HP_PhysicalMemory"
String Tag [Key]	CIM_PhysicalElement	This field will be derived from memory slot location and form factor. The form will be as follows <Form Factor>::<location attrib 1> ::<location attrib 2>::

		... ::<location attrib n> For e.g., the tag for a DIMM present in cellular system at cabinet 0, cell slot 01 and dimm slot 0b will be DIMM::00::01::0b
Uint64 Capacity	CIM_PhysicalMemory	Capacity of DIMM/SIMM in number of Bytes.
Uint16 MemoryType	CIM_PhysicalMemory	Defines the memory chip type as per the CIM specification defined enumeration.
Uint16 FormFactor	CIM_PhysicalMemory	Defines the form factor of memory chip as per the CIM specification defined enumeration.
Uint16 MemoryChipStatus[]	HP_PhysicalMemory	The Value-Map associated with this property (as is defined in HP_PhysicalMemory mof class) is as follows: ValueMap {"0", "1", "2", "3", "4", "5", "6", "7", "8", "9","10"} Values {"Other", "Unknown", "Configured", "Deconfigured By Hardware", "Deconfigured By Software", "DIMM Type Mismatch", "Unsupported DIMM", "SPD Error", "Extended SPD CheckSum Error", "Degraded","SBE"}] Returns the status of the memory module in this array. Following status types are provides (the enum values are mentioned along with the status type) 1. Configured : 2 2. De-Configured : 3 3. HW De-Configured : 3 4. SW De-Configured :4 5. Degraded (Detailed description is given in OperationalStatus row of this table) : 9 6. DIMM Type Mismatch : 5 7. Unsupported DIMM : 6 8. SPD Error : 7 9. XSPD Error : 8 10. SBE : 10
String MemoryChipStatusDescription[]	HP_PhysicalMemory	Describes the memory module status.

Table 2: HP_MemoryLocation supported properties. (Properties that are not supported are not mentioned.)

Property name	Property inheritance	Property value (and data source)
String Description	CIM_ManagedElement	Describes the slot according to type of slot. It also describes the location attributes of the memory slot.
String ElementName	CIM_ManagedElement	Hardcoded to “Volatile Memory Module Slot”.
String Name [Key]	CIM_Location	<System Name>::<memory controller HPA/ controller index>.::<slot index> “slot Index” is unique slot identifier relative to memory

		controller. “controller index” is unique number assigned to memory controller that manages this slot. (This is used when the controller HPA is not available.)
String PhysicalPosition [Key]	CIM_Location	This field will be derived from “form factor” of one of the memory module controlled by associated memory controller (It is assumed that all the modules controlled by a memory controller are of same form factor.) and slot location attribute. The format will be <form factor> slot::<location attrib 1>::...<location attrib n> for e.g. DIMM Slot::00::01:0a.
String LocationIdentifiers	HP_MemoryLocation.	The string arrays LocationIdentifiers and LocationNames" , which keeps the location name and location value pair at corresponding indices. Each successive index in LocationIdentifiers and LocationNames array will narrow down the location of the memory slot in the system. For e.g. if at index n we have LocationNames [n] = "cell" "LocationIdentifiers [n]="5" then at index n+1 we will have the LocationNames[n+1] = "extender", LocationIdentifiers[n+1]="1" and at index n+2 we will have LocationNames[n+2] = "slot", LocationIdentifiers [n+2]="4". It means this instance of MOF class represent the 4'th slot on 1'st extender in 5'th cell. Not all the LocationIdentifiers will be valid on all the platforms. If a location attribute is not valid on a given platform than corresponding LocationIdentifiers array entry will have “0xFF”.
String LocationNames	HP_MemoryLocation	Description is given in LocationIdentifiers. The LocationNames array will always have fixed location names in predefined order. The Location names and their order is as follows: “Cabinet”, “Card Cage”, “Back Plane”, “Cell Slot”, “Slot”, “Extender”.

Table 3: HP_MemoryInLocation supported properties. (Properties that are not supported are not mentioned.)

This class associates the DIMM/SIMM with corresponding slots. A memory module (DIMM/SIMM) will always be associated with a memory slot. But a memory slot may not be associated with a memory module as it may be empty.

The getInstance() method is not supported for this association class.

Property name	Property inheritance	Property value (and data source)
HP_PhysicalMemory REF Element	Overridden by HP_MemoryInLocation	The reference to the memory module. See HP_PhysicalMemory keys for further information.
HP_MemoryLocation REF PhysicalLocation	Overridden by HP_MemoryInLocation	The reference to the memory slot. See HP_MemoryLocation keys for further information.

indications generated by this provider	This Provider does not currently generate any indications.

links to more information

- WBEM information
  For a CIM tutorial, go to http://www.dmtf.org/education/cimtutorial.php.

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

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