1 HP Insight Management WBEM System Memory Provider

Description

The HP Insight Management Web-Based Enterprise Management (WBEM) System Memory provider implements the HP Memory Profile and HP Memory Physical Asset Profile to represent system memory on HP servers.

This provider implements the following profiles and installs the necessary files:

Profile Name	Organization	Version
HP Memory Profile	HP WBEM TC	1.0
HP Memory Physical Asset Profile	HP WBEM TC	1.0
HP Location Profile	HP WBEM TC	1.0

Requirements

For each hardware architecture listed, this provider requires the following distributions

HP Integrity managed servers	SLES 10 and later
	RLEL 5.0 and later
HP ProLiant managed servers	SLES 11 and later
	RHEL 5.3 and later

Release History Initial release with HP Insight Management WBEM Providers for Linux v2.0.

1-1 Setting Up the Provider

Installing the Provider

There are no special installation instructions for this provider. It is installed by default as part of the HP Insight Management WBEM providers.

Configuring the Provider

This provider does not accept specific configuration adjustments beyond standard HP Insight Management WBEM support.

1-2 Using the Provider

Namespaces Supported by the Provider This provider returns instances in the root/hpq namespace.

Schema Supported by the Provider

This provider supports the following classes:

- SMX_Memory
- SMX_SystemMemory
- SMX_MemoryModule
- SMX_MemoryBoard
- SMX_RealizesMemoryModule
- SMX_MemoryModuleSlot
- SMX_MemoryBoardSlot
- SMX_MemoryModuleInSlot
- SMX_MemoryBoardInSlot
- SMX_MemoryModuleSlotOnBoard
- SMX_MemoryModuleSlotLocation
- SMX_MemoryBoardSlotLocation
- SMX_MemoryModuleSlotElementLocation
- SMX_MemoryBoardSlotElementLocation
- SMX_SystemMemoryModule
- SMX_SystemMemoryBoard
- SMX_MemoryRedundancySet
- SMX_MemoryCollection
- SMX_HostedMemoryCollection
- SMX_MemberOfMemoryCollection
- SMX_MemberOfMemoryRedundancySet
- SMX_HostedMemoryRedundancySet
- SMX_SystemMemoryModuleSlot
- SMX_SystemMemoryBoardSlot

The tables in the following sections describe the properties of the supported classes. The classes are categorized by the class or superclass that defines the property, the first column is the Property Name (including type and units) and the second column describes how the provider determines the properties implementation. When the Property Implementation value is a number, the number given is the default behavior and the Managed Object Format interpretation is within parenthesis. If other values are returned, a problem is indicated.

Unless otherwise noted, all of the property implementation values given are for HP ProLiant and HP Integrity (cellular and non-cellular) systems. The location related properties and implementation values are determined based on the server type so they may differ.

1-2-1 SMX_Memory Class

The SMX_Memory class represents logical memory on HP servers. There is one instance of this class.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	System Memory
Description	Logical system memory
ElementName	System Memory
CIM_ManagedSystemElement	
OperationalStatus	Enumerator indicating the logical system memory operational status. The status represents the 'worst-of' algorithm for all OperationalStatus[0] values reported by physical memory modules in SMX_MemoryModule instances. OperationalStatus[0] (shown in order of increasing severity; a higher severity overrides a lower severity): 2 (OK), when all physical memory modules report 2 (OK) 0 (Unknown), when any physical memory module reports 0 (Unknown) 3 (Degraded), when any physical memory module reports 3 (Degraded) **NOTE:** This status does not represent the overall status of the memory system; refer to the SMX_MemoryCollection class for overall memory system status.
StatusDescriptions	StatusDescriptions[0]contains descriptive text per OperationalStatus[0]: OK Unknown Degraded
HealthState	5 (OK), when OperationalStatus[0] = 2 (OK) 0 (Unknown), when OperationalStatus[0] = 0 (Unknown) 10 (Degraded/Warning), when OperationalStatus[0]=3 (Degraded)
Name	System Memory

Property Name	Property Implementation
CIM_LogicalElement	
CIM_EnabledLogicalElement	
EnabledDefault	2 (Enabled)
EnabledState	5 (Not Applicable)
RequestedState	12 (Not Applicable)
CIM_LogicalDevice	
CreationClassName	SMX_Memory
DeviceID	HPQ:SMX_Memory:000
SystemCreationClassName	Same value as SMX_ComputerSystem.CreationClassName property
SystemName	Same value as SMX_ComputerSystem.Name property
CIM_StorageExtent	
Access	3 (Read/Write Supported)
BlockSize	1 (byte)
ConsumableBlocks	Capacity in bytes
NumberOfBlocks	Capacity in bytes
Primordial	TRUE
Purpose	System Memory
SequentialAccess	FALSE
CIM_Memory	
StartingAddress	Beginning address of the memory in kilobytes
EndingAddress	Ending address of the memory in kilobytes
Volatile	TRUE
HP_Memory	
SMX_Memory	

1-2-2 SMX_SystemMemory Class

The SMX_SystemMemory class represents an association between SMX_Memory and the computer system that contains the memory. There is one instance of this class.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_SystemDevice	
HP_SystemMemory	
GroupComponent	References SMX_ComputerSystem
PartComponent	References SMX_Memory
SMX_SystemMemory	

1-2-3 SMX_MemoryModule Class

The SMX_MemoryModule class represents a physical memory module on HP servers. There is an instance of this class for each memory module present in the system; empty memory module sockets are not instantiated.

The following table lists the properties implemented.

Note: In the following property implementation descriptions, memory modules located on the system board are denoted as being located on board/cartridge number 0.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	Physical Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_ManagedSystemElement	
OperationalStatus	Enumerator indicating the memory module operational status. OperationalStatus[0] contains overall memory module status OperationalStatus[1] contains detailed memory module status (as needed) For details, see "Properties for Memory Module Status".

Property Name	Property Implementation
StatusDescriptions	StatusDescriptions[0]contains descriptive text per OperationalStatus[0]: StatusDescriptions[1]contains descriptive text per OperationalStatus[1]: For details, see "Properties for Memory Module Status".
HealthState	Enumerator indicating the memory module health state: 0 (Unknown), when OperationalStatus[0] = 0 (Unknown) 5 (OK), when OperationalStatus[0] = 2 (OK) 10 (Degraded/Warning), when OperationalStatus[0] = 3 (Degraded)
Name	Physical Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_PhysicalElement	
CreationClassName	SMX_MemoryModule
Tag	Opaque key of the form "HPQ:SMX_MemoryModule: <*unique keys*>
Description	Physical Memory Module <*physical location*>. Refer to "Physical Location" for more information.
ElementName	Physical Memory Module <*physical location*>. Refer to "Physical Location" for more information.
Manufacturer	Name of the organization that produced the memory module. For example: HP This property is conditional; it is populated if the data is available.
PartNumber	Part number of the memory module. This property is conditional; it is populated if the data is available.
SerialNumber	Manufacturer allocated serial number of the memory module. This property is conditional; it is populated if the data is available.
CIM_PhysicalComponent	
RemovalConditions	3 (Removable when off)
CIM_Chip	
CIM_PhysicalMemory	

Property Name	Property Implementation
DataWidth	Data width of memory module in bits
Capacity	Total capacity of memory module in bytes
InterleavePosition	Position of memory module in an interleave. This property is conditional; it will be populated if the data is available
IsSpeedInMhz	The IsSpeedInMHz property is used to indicate if the Speed property or the MaxMemorySpeed contains the value of the memory speed. A value of TRUE shall indicate that the speed is represented by the MaxMemorySpeed property.A value of FALSE shall indicate that the speed is represented by the Speed property
TotalWidth	Total width of memory module in bits
Speed	Speed of memory module in nanoseconds. Speed is set to 0 if the propert is IsSpeedInMhz=TRUE.
MaxMemorySpeed	The maximum speed in MHz of PhysicalMemory
MemoryType	Enumerator indicating the type of memory module. Refer to MOF file for details.
PositionInRow	Position of memory module in a row
FormFactor	Enumerator indicating the form factor of the memory module. Refer to MOF file for details. For example: 8 (DIMM)
BankLabel	String identifying the physically labeled bank where the memory is located. For examples: 'DIMM 0A' or 'PROC 1 DIMM 0A' or 'Board 1,0A' This property is conditional; it is populated if the data is available.
SMX_MemoryModule	
Spd	An array that contains raw Serial Presence Detect information for the memory module. Each array element contains a byte of the Spd. This property is conditional; it is populated if the data is available.

1-2-3-1 Properties for Memory Module Status

Condition	OperationalStatus[0] StatusDescriptions[0]	OperationalStatus[1] StatusDescriptions[1]
Memory module status is unknown	0 (Unknown)	<not populated>
	Unknown	<not populated>
Memory module is operating properly	2 (OK)	<not populated>
	OK	<not populated>
Memory module is present but is not currently used by the operating system	2 (OK)	15 (Dormant)
	OK	Memory module status: Memory present but not in use
Memory module has correctable errors exceeding the condition for pre-failure warranty	3 (Degraded)	5 (Predictive Failure)
	Degraded	Memory module status: Correctable error threshold for pre-failure warranty has been exceeded

1-2-4 SMX_MemoryBoard Class

The SMX_MemoryBoard class represents a physical memory board on HP servers. There is an instance of this class for each memory module present in the system; empty memory module sockets are not instantiated.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	Physical Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_ManagedSystemElement	
OperationalStatus	Enumerator indicating the memory board operational status. OperationalStatus[0] contains overall memory board status OperationalStatus[1] contains detailed memory board status (as needed) For details, see "Properties for Memory Board Status".

Property Name	Property Implementation
StatusDescriptions	StatusDescriptions[0]contains descriptive text per OperationalStatus[0]: StatusDescriptions[1]contains descriptive text per OperationalStatus[1]: For details, see "Properties for Memory Board Status".
HealthState	Enumerator indicating the memory board health state: 0 (Unknown), when OperationalStatus[0]= 0 (Unknown) 5 (OK), when OperationalStatus[0] = 2 (OK) 10 (Degraded/Warning), when OperationalStatus[0] = 3 (Degraded)
Name	Physical Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_PhysicalElement	
CreationClassName	SMX_MemoryBoard
Tag	Opaque key of the form: HPQ:SMX_MemoryBoard: <*unique_keys*>
Description	Physical Memory Module <*physical location*>. Refer to "Physical Location" for more information.
ElementName	Physical Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_PhysicalPackage	
RemovalConditions	Removal conditions of the memory board: When the memory board is the system board: 2 (Not Applicable) When the memory board is not the system board: 3 (Removable when off) 4 (Removable when on or off)
PackageType	9 (Module/Card)
CIM_Card	

Property Name	Property Implementation
HostingBoard	True – memory board is on the baseboard. False – memory board not on the baseboard
SMX_MemoryBoard	
Locked	Indicates the locked state of the memory board: 1 (Not-Applicable), non-AMP systems only 2 (Unlocked) 3 (Locked)
NumberOfSockets	Number of memory module sockets on this board
AvailableMemory	Size of memory for this board seen by the operating system in MB
TotalMemory	Total size of memory for this board in MB

1-2-4-1 Properties for Memory Board Status

Condition	OperationalStatus[0] StatusDescriptions[0]	OperationalStatus[1] StatusDescriptions[1]
Memory board status is unknown	0 (Unknown)	<not populated>
	Unknown	<not populated>
Memory board is operating properly	2 (OK)	<not populated>
	OK	<not populated>
Memory board contains a memory module that has correctable errors exceeding the condition for pre-failure warranty.	3 (Degraded)	5 (Predictive Failure)
	Degraded	Memory board status: Correctable error threshold for pre-failure warranty has been exceeded
Memory board has a configuration error, e.g. there is a problem with the board release latch (unlock error) or there is an improper configuration of memory modules on the board.	3 (Degraded)	3 (Degraded)
	Degraded	Memory board status: Configuration error

1-2-5 SMX_RealizesMemoryModule Class

The SMX_RealizesMemoryModule class represents an association between SMX_MemoryModule and SMX_Memory.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_Realizes	
HP_RealizesMemoryModule	
SMX_RealizesMemoryModule	
Antecedent	References SMX_MemoryModule
Dependent	References SMX_Memory

1-2-6 SMX_MemoryModuleSlot Class

The SMX_MemoryModuleSlot class represents memory module slots on HP servers. There is an instance of this class for each memory module socket in the system (whether the slot is occupied or not).

Note: In the following property implementation descriptions, memory module slots located on the system board are denoted as being located on board/cartridge number 0.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_ManagedSystemElement	
OperationalStatus	OperationalStatus[0] = 2 (OK)
StatusDescriptions	StatusDescriptions[0] = Memory module slot status:OK
HealthState	5 (OK)
Name	Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_PhysicalElement	
CreationClassName	SMX_MemoryModuleSlot

Property Name	Property Implementation
Tag	Opaque key of the form: HPQ:SMX_MemoryModuleSlot: <*unique_keys*>
Description	Memory Module <*physical location*>. Refer to "Physical Location" for more information.
ElementName	Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_PhysicalConnector	
ConnectorLayout	1 (Other)
ConnectorGender	3 (Female)
ConnectorDescription	Memory Module <*physical location*>. Refer to "Physical Location" for more information.
CIM_Slot	
Number	The memory socket number where the memory slot is located. **Note:** Not unique on HP Cellular servers.
SMX_MemoryModuleSlot	

1-2-7 SMX_MemoryBoardSlot Class

The SMX_MemoryBoardSlot class represents memory board slots on HP servers. There is an instance of this class for each memory board slot in the system (whether the slot is occupied or not).

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	Memory Board Slot <*physical location*>. Refer to "Physical Location" for more information.
CIM_ManagedSystemElement	
OperationalStatus	OperationalStatus[0] = 2 (OK)
StatusDescriptions	StatusDescriptions[0] = Memory board slot status: OK
HealthState	5 (OK)

Property Name	Property Implementation
Name	Memory Board Slot <*physical location*>. Refer to "Physical Location" for more information.
CIM_PhysicalElement	
CreationClassName	SMX_MemoryBoardSlot
Tag	Opaque key of the form: HPQ:SMX_MemoryModuleSlot: <*unique_keys*>
Description	Memory Board Slot <*physical location*>. Refer to "Physical Location" for more information.
ElementName	Memory Board Slot <*physical location*>. Refer to "Physical Location" for more information.
CIM_PhysicalConnector	
ConnectorLayout	1 (Other)
ConnectorDescription	Memory Board Slot <*physical location*>. Refer to "Physical Location" for more information.
CIM_Slot	
Number	The board/cartridge number where the memory board is located. **Note:** Not unique on HP Cellular servers.
SMX_MemoryBoardSlot	

1-2-8 SMX_MemoryModuleInSlot Class

The SMX_MemoryModuleInSlot class represents the association between an SMX_MemoryModule and the SMX_MemoryModuleSlot where it resides.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ElementInConnector	
HP_MemoryModuleInSlot	
SMX_MemoryModuleInSlot	
Antecedent	References SMX_MemoryModuleSlot
Dependent	References SMX_MemoryModule

1-2-9 SMX_MemoryBoardInSlot Class

The SMX_MemoryBoardInSlot class represents the association between an SMX_MemoryBoard and the SMX_MemoryBoardSlot where it resides.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_PackageInConnector	
HP_MemoryBoardInSlot	
SMX_MemoryBoardInSlot	
Antecedent	References SMX_MemoryBoardSlot
Dependent	References SMX_MemoryBoard

1-2-10 SMX_MemoryModuleSlotOnBoard Class

The SMX_MemoryModuleSlotOnBoard class represents an association between a SMX_MemoryModuleSlot and the SMX_MemoryBoard that contains it.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_Container	
HP_MemoryModuleSlotOnBoard	
SMX_MemoryModuleSlotOnBoard	
GroupComponent	References SMX_MemoryBoard
PartComponent	References SMX_MemoryModuleSlot

1-2-11 SMX_MemoryModuleSlotLocation Class

The SMX_MemoryModuleSlotLocation class extends the CIM_Location class and represents memory module slot locations on HP servers. There is an instance of this class for each memory module slot in the system (whether the slot is occupied or not).

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	Memory Module Socket Location <*physical location*>.

Property Name	Property Implementation
	Refer to "Physical Location" for more information.
Description	Memory Module Socket Location <*physical location*>. Refer to "Physical Location" for more information.
ElementName	Memory Module Socket Location <*physical location*>. Refer to "Physical Location" for more information.
CIM_Location	
Name	Opaque key of the format: HPQ:SMX_MemoryModuyleSlotLocation:<*Key 1*>: <*Key 2*>: ...etc.
PhysicalPosition	Opaque key. Example for memory socket number 2 on cpu, board, or cartridge number 1: FF-FF-FF-FF-01-02-FF-79
HP_Location	
ElementLocationTag	Opaque key. Example for memory socket number 2 on cpu, board, or cartridge number 1: FF-FF-FF-FF-01-02-FF-79
ElementLocationTagDesc	8 (Memory Module)
LocationInformation	Indexed array: LocationInformation[0] per LocationInformation[0]. Location information will contain a numeric string representing the unique location identifier of each object type described by the corresponding LocationInfoDesc index.
LocationInfoDesc	Array indices will report as many of the following enumerated values as are applicable: 4 (Socket) 5 (Memory Board) 7 (Cabinet) 10 (Cell) 14 (BladeBay) 15 (ProcessorBoard)
SMX_MemoryModuleSlotLocation	

1-2-12 SMX_MemoryBoardSlotLocation Class

The SMX_MemoryBoardSlotLocation class extends the CIM_Location class and represents memory board slot locations on HP servers. There is an instance of this class for each memory board slot in the system (whether the slot is occupied or not).

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	Memory Board Slot Location <*physical location*>. Refer to "Physical Location" for more information.
Description	Memory Board Slot Location <*physical location*>. Refer to "Physical Location" for more information.
ElementName	Memory Board Slot Location <*physical location*>. Refer to "Physical Location" for more information.
CIM_Location	
Name	Opaque key of the form: HPQ:SMX_MemoryBoardSlotLocation:<*unique_keys*>.
PhysicalPosition	Opaque key. For example, for memory board, cartridge, or processor number 1: FF-FF-FF-FF-01-FF-FF-7A
HP_Location	
ElementLocationTag	Opaque key. For example, for memory board, cartridge, or processor number 1: FF-FF-FF-FF-01-FF-FF-7A
ElementLocationTagDesc	9 (Memory Board) / 13 (Processor Board)
LocationInformation	LocationInformation[0] text: <*x*> Where: <*x*> is the board/cartridge/processor number Location information will contain a numeric string representing the unique location identifier of each object type described by the corresponding LocationInfoDesc index.

Property Name	Property Implementation
LocationInfoDesc	Array indices will report as many of the following enumerated values as are applicable: 5 (Memory Board) 7 (Cabinet) 10 (Cell) 14 (BladeBay) 15 (ProcessorBoard)
SMX_MemoryBoardSlotLocation	

1-2-13 SMX_MemoryModuleSlotElementLocation Class

The SMX_MemoryModuleSlotElementLocation class extends the CIM_ElementLocation class and is used to associate a memory module slot (SMX_MemoryModuleSlot) with its corresponding location (SMX_MemoryModuleSlotLocation). There is an instance of this class for each memory module slot in the system (whether the slot is occupied or not).

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ElementLocation	
HP_ElementLocation	
SMX_MemoryModuleSlotElementLocation	
Element	References SMX_MemoryModuleSlot
PhysicalLocation	References SMX_MemoryModuleSlotLocation

1-2-14 SMX_MemoryBoardSlotElementLocation Class

The SMX_MemoryBoardSlotElementLocation class extends the CIM_ElementLocation class and is used to associate a memory board slot (SMX_MemoryBoardSlot) with its corresponding location (SMX_MemoryBoardSlotLocation). There is an instance of this class for each memory board slot in the system (whether the slot is occupied or not).

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ElementLocation	
HP_ElementLocation	
SMX_MemoryBoardSlotElementLocation	

Property Name	Property Implementation
Element	References SMX_MemoryBoardSlot
PhysicalLocation	References SMX_MemoryBoardSlotLocation

1-2-15 SMX_SystemMemoryModule Class

The SMX_SystemMemoryModule class represents an association between SMX_MemoryModule and SMX_ComputerSystemChassis. There is an instance of this class for each memory module slot on the chassis system board (whether the slot is occupied or not). Only system board resident memory module slots are instantiated.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_Container	
HP_SystemMemoryModule	
SMX_SystemMemoryModule	
GroupComponent	References SMX_ComputerSystemChassis
PartComponent	References SMX_MemoryModule

1-2-16 SMX_SystemMemoryBoard Class

The SMX_SystemMemoryBoard class represents an association between SMX_MemoryBoard and SMX_ComputerSystemChassis. There is an instance of this class for each memory board slot in the chassis (whether the slot is occupied or not).

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_Container	
HP_SystemMemoryBoard	
SMX_SystemMemoryBoard	
GroupComponent	References SMX_ComputerSystemChassis
PartComponent	References SMX_MemoryBoard

1-2-17 SMX_MemoryRedundancySet Class

The SMX_MemoryRedundancySet class represents memory board redundancy on HP servers supporting Advanced Memory Protection (AMP). There is one instance of this class on systems supporting AMP. This class is not instantiated on non-AMP systems.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	Memory Redundancy Set
Description	Memory Redundancy Set for Advanced Memory Protection
ElementName	Memory Redundancy Set
CIM_SystemSpecificCollection	
InstanceID	HPQ:SMX_MemoryRedundancySet:001
CIM_RedundancySet	
TypeOfSet	Represents the type of redundancy currently in operation for the Advanced Memory Protection system. This property corresponds functionally to the property CurrentConfiguration. TypeOfSet[0] contains the current type of redundancy: 1 (Other), when the system is operating in Advanced ECC or Lockstep mode 2 (N+1), when the system is operating in RAID (XOR) mode 3 (Load Balanced), when the system is operating in Mirrored mode 4 (Sparing), when the system is operating in Online Spare mode
OtherTypeOfSet	OtherTypeOfSet[0] contains the type of redundancy when the property TypeOfSet[0] = 1 (Other). In this case, the property will contain the value Advanced ECC or Lockstep, otherwise the property is not populated.
LoadBalanceAlgorithm	2 (No Load Balancing)

Property Name	Property Implementation
RedundancyStatus	Represents the current memory redundancy status as follows: 2 (Fully Redundant) System is operating properly in the Advanced Memory Protection mode given in the TargetConfiguration property. 3 (Degraded Redundancy) Degraded Redundancy can occur in either of the following conditions: • System is not operating in the TargetConfiguration mode (the CurrentConfiguration mode does not match the TargetConfiguration mode). • System is operating in the TargetConfiguration mode but memory module(s) have correctable errors exceeding the condition for pre-failure warranty.
HP_MemoryRedundancySet	
OperatingSpeed	The current operating speed of the Advanced Memory Protection subsystem in MHz
AvailableMemory	The size of the memory as seen by the operating system in MB
TotalMemory	Total size of memory as seen by the operating system and memory used for Advanced Memory Protection configurations in MB
CurrentConfiguration	The current operating mode of the Advanced Memory Protection system. The value in this property corresponds to the value populated in the property TypeOfSet[0]. CurrentConfiguration is one of the following: Advanced ECC, when the system is operating in Advanced ECC mode RAID, when the system is operating in RAID (XOR) mode Mirrored, when the system is operating in Mirrored mode Online Spare, when the system is operating in Online Spare mode Lockstep when the system is operating in Lockstep mode

Property Name	Property Implementation
TargetConfiguration	The desired or targeted mode of the Advanced Memory Protection system. TargetConfiguration is one of the following: Advanced ECC, when the system is configured for Advanced ECC mode RAID, when the system is configured for RAID (XOR) mode Mirrored, when the system is configured for Mirrored mode Online Spare, when the system is configured for Online Spare mode Lockstep when the system is configured for Lockstep mode
ConfigurationsAvailable	An array containing Advanced Memory Protection configurations supported on this system (the CurrentConfiguration and TargetConfiguration properties will contain one of these values). Each indexed position in the array contains one supported configuration. Possible values are: Advanced ECC Online Spare Mirrored RAID Lockstep

1-2-18 SMX_MemoryCollection Class

The SMX_MemoryCollection class represents physical memory collections on HP servers. The collection comprehends physical memory modules and boards as components of the collection. There is one instance of this class.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_ManagedElement	
Caption	Memory Collection
Description	Physical memory collection
ElementName	Memory Collection
CIM_SystemSpecificCollection	
InstanceID	HPQ:SMX_MemoryCollection:001
HP_GroupSystemSpecificCollection	

Property Name	Property Implementation
`GroupOperationalStatus`	Enumerator indicating the group operational status of the memory collection. The status is determined as follows: • If an instance of `SMX_MemoryRedundancySet` exists, `GroupOperationalStatus[0]` is determined from the property `SMX_MemoryRedundancySet.RedundancyStatus`. • If no instance of `SMX_MemoryRedundancySet` exists, `GroupOperationalStatus[0]` is determined by the 'worst-of' algorithm for physical memory boards and memory modules. For details, see "Properties for Memory Collection Status".

`GroupStatusDescriptions`	`GroupStatusDescriptions`[0] contains descriptive text per `GroupOperationalStatus[0]`:
	`Memory collection status: OK`
	`Memory collection status: Degraded`
	`Memory collection status: Unknown`

`HP_MemoryCollection`	

1-2-18-1 Properties for Memory Collection Status

`RedundancyStatus`	**'worst'**	**'worst'**	**`GroupOperationalStatus[0]`**
from	**`OperationalStatus[0]`**,	**`OperationalStatus[0]`**,	
`SMX_MemoryRedundancySet`	**`SMX_MemoryBoard`**	**`SMX_MemoryModule`**	
2 (Fully Redundant)	-	-	2 (OK)
3 (Degraded Redundancy)	-	-	3 (Degraded)
-	2 (OK)	2 (OK)	2 (OK)
-	2 (OK)	3 (Degraded)	3 (Degraded)
-	2 (OK)	`0` (Unknown)	`0` (Unknown)
-	3 (Degraded)	2 (OK)	3 (Degraded)
-	3 (Degraded)	3 (Degraded)	3 (Degraded)
-	3 (Degraded)	`0` (Unknown)	3 (Degraded)

-	0 (Unknown)	2 (OK)	0 (Unknown)
-	0 (Unknown)	3 (Degraded)	3 (Degraded)
-	0 (Unknown)	0 (Unknown)	0 (Unknown)

1-2-19 SMX_HostedMemoryCollection Class

The SMX_HostedMemoryCollection class represents an association between SMX_MemoryCollection and the computer system that contains this collection.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_Dependency	
CIM_HostedDependency	
CIM_HostedCollection	
HP_GroupHostedCollection	
HP_HostedMemoryCollection	
SMX_HostedMemoryCollection	
Antecedent	References SMX_ComputerSystem
Dependent	References SMX_MemoryCollection

1-2-20 SMX_MemberOfMemoryCollection Class

The SMX_MemberOfMemoryCollection class represents an association between SMX_MemoryCollection and SMX_MemoryModule or SMX_MemoryBoard.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_MemberOfCollection	
HP_MemberOfMemoryCollection	
SMX_MemberOfMemoryCollection	
Collection	References SMX_MemoryCollection
Member	References CIM_PhysicalElement (either SMX_MemoryModule or SMX_MemoryBoard)

1-2-21 SMX_MemberOfMemoryRedundancySet Class

The SMX_MemberOfMemoryRedundancySet class represents an association between SMX_MemoryBoard and SMX_MemoryRedundancySet.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_MemberOfCollection	
HP_MemberOfMemoryRedundancySet	
SMX_MemberOfMemoryRedundancySet	
Collection	References SMX_MemoryRedundancySet
Member	References SMX_MemoryBoard

1-2-22 SMX_HostedMemoryRedundancySet Class

The SMX_HostedMemoryRedundancySet class represents an association between SMX_MemoryRedundancySet and the computer system that contains this redundancy set.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_OwningCollectionElement	
HP_HostedMemoryRedundancySet	
SMX_HostedMemoryRedundancySet	
OwningElement	References SMX_ComputerSystem
OwnedElement	References SMX_MemoryRedundancySet

1-2-23 SMX_SystemMemoryModuleSlot Class

The SMX_SystemMemoryModuleSlot class represents an association between SMX_MemoryModuleSlot and SMX_ComputerSystemChassis. There is an instance of this class for each memory module slot on the chassis system board (whether the slot is occupied or not). Only system board resident memory module slots are instantiated.

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_Component	
CIM_Container	

HP_SystemMemoryModuleSlot	
SMX_SystemMemoryModuleSlot	
GroupComponent	References SMX_ComputerSystemChassis
PartComponent	References SMX_MemoryModuleSlot

1-2-24 SMX_SystemMemoryBoardSlot Class

The SMX_SystemMemoryBoardSlot class represents an association between SMX_MemoryBoardSlot and SMX_ComputerSystemChassis. There is an instance of this class for each memory board slot in the chassis (whether the slot is occupied or not).

The following table lists the properties implemented.

Property Name	Property Implementation
CIM_Component	
CIM_Container	
HP_SystemMemoryBoardSlot	
SMX_SystemMemoryBoardSlot	
GroupComponent	References SMX_ComputerSystemChassis
PartComponent	References SMX_MemoryBoardSlot

1-3 Provider Indications

Indications Generated by the Provider — Generates WBEM indications described in the following sections.

1-3-1 Common Properties for Provider Indications

The following table describes the properties that are common to all of the SMX Memory Provider indications that are implemented for HP server platforms where available:

Property Name	Property Implementation
CIM_Indication	
IndicationIdentifier	GUID string generated at the time of indication
IndicationTime	Time of indication
CIM_AlertIndication	

Property Name	Property Implementation
EventTime	Time of the event or time of the indication if event time unknown
SystemName	SMX_ComputerSystem.Name
SystemCreationClassName	SMX_ComputerSystem.CreationClassName
HP_AlertIndication	
ProviderVersion	Provider Version in the format VV.UU.FF. For example: 01.11.00
NetworkAddresses	Contains a list of all the IP addresses of the computer system generating the indication
OSType	On ESX, 39 (VM) On Linux, 36 (Linux)
OSVersion	The operating system version of the computer system generating the indication in the following format: <*major*>.<*minor*>.<*build*>
SystemFirmwareVersion	Array of firmware versions of the computer system generating the indication
SystemSerialNumber	Serial number of the computer system generating the indication
SystemProductID	Product ID of the computer system generating the indication
SystemModel	Model name of the computer system generating the indication
SystemGUID	Platform GUID of the computer system generating the indication
SystemVirtualUUID[]	If Synergy is enabled, this will contain the logical UUID for the system.
SystemVirtualSerialNumber[]	If Synergy is enabled, this will contain the logical Serial Number for the system.
EnclosureName	HP_BladeEnclosureCS.Name
RackName	Rack name, if one exists
RackUUID	Rack Unique Identifier, if one exists
BladeName	HP_ComputerSystem.Name
BladeBay	HP_BladeCSLocation.LocationInformation[0]

1-3-2 SMX_MemoryIndication: Memory Module Predictive Failure

Property Name	Property Implementation
CIM_Indication	
PerceivedSeverity	5 (Major)
CIM_AlertIndication	
Description	A memory module has failed or is predicted to fail. (MemoryModuleCaption) where MemoryModuleCaption is the SMX_MemoryModule.Caption for the failing memory module
AlertingManagedElement	WBEM Path of SMX_MemoryModule instance representing the memory module
AlertingElementFormat	2 (CIMObjectPath)
AlertType	5 (Device Alert)
EventID	1
ProviderName	HPMemory
RecommendedActions	Check the memory configuration and replace memory as necessary.
HP_AlertIndication	
Summary	Memory module has failed or is predicted to fail
EventCategory	3 (Memory)
ProbableCause	1 (Other)
ProbableCauseDescription	Memory Module Failed or Predicted to Fail

1-3-3 SMX_MemoryIndication: Memory Board Error

Property Name	Property Implementation
CIM_Indication	
PerceivedSeverity	5 (Major)
CIM_AlertIndication	
Description	A memory board has an error. (MemoryBoardCaption) Where: MemoryBoardCaption is the SMX_MemoryBoard.Caption for

Property Name	Property Implementation
	the failing memory board.
AlertingManagedElement	WBEM Path of SMX_MemoryBoard instance representing the memory board
AlertingElementFormat	2 (CIMObjectPath)
AlertType	5 (Device Alert)
EventID	2
ProviderName	HP Memory
RecommendedActions	Check the memory configuration and replace the memory board and memory modules as necessary.
HP_AlertIndication	
Summary	Memory board error
EventCategory	3 (Memory)
ProbableCause	1 (Other)
ProbableCauseDescription	Memory Board Error

1-3-4 SMX_MemoryIndication: Memory Redundancy Degraded

Property Name	Property Implementation
CIM_Indication	
PerceivedSeverity	5 (Major)
CIM_AlertIndication	
Description	The AMP system is operating with degraded redundancy. The targeted configuration has degraded or is operating with memory modules that have failed or predicted to fail. (TargetConfiguration/CurrentConfiguration) Where: TargetConfiguration is SMX_MemoryRedundancySet.TargetConfiguration.
AlertingManagedElement	WBEM Path of SMX_MemoryRedundancySet instance representing the Memory Redundancy.
AlertingElementFormat	2 (CIMObjectPath)
AlertType	5 (Device Alert)
EventID	3

Property Name	Property Implementation
ProviderName	HP Memory
RecommendedActions	Check the Advanced Memory Protection configuration and replace the memory board and memory modules as necessary.
HP_AlertIndication	
Summary	Advanced Memory Protection degraded
EventCategory	3 (Memory)
ProbableCause	88 (Loss of Redundancy)
ProbableCauseDescription	Advanced Memory Protection Degraded

1-3-5 SMX_MemoryIndication: Memory Recovered from Degraded Redundancy

Property Name	Property Implementation
CIM_Indication	
PerceivedSeverity	2 (Information)
CIM_AlertIndication	
Description	The AMP system is operating normally in the targeted configuration. If redundancy was previously degraded, redundancy has been restored. (TargetConfiguration) Where: TargetConfiguration is SMX_MemoryRedundancySet.TargetConfiguration.
AlertingManagedElement	WBEM Path of SMX_MemoryRedundancySet instance representing the Memory Redundancy.
AlertingElementFormat	2 (CIMObjectPath)
AlertType	5 (Device Alert)
EventID	4
ProviderName	HP Memory
RecommendedActions	No action is recommended.
HP_AlertIndication	
Summary	Advanced Memory Protection redundancy is now fully operational

Property Name	Property Implementation
EventCategory	3 (Memory)
ProbableCause	1 (Other)
ProbableCauseDescription	Advanced Memory Protection now Fully Operational

1-4 Physical Location

Memory Physical Location is a string representing the physical location of a Memory device, such as DIMM, slot, socket, board, or extender. This string should represent the physical location of the device with which an end-user can uniquely locate the device. Most of these strings will be represented in customer documentation, silkscreen labels, or hood tags.

The following table lists the properties implemented. Any combination of the following applicable descriptors could be used to better define the device location.

All Systems	HP Integrity Cellular Servers	HP BladeServers in C3000 / C7000 Enclosures
`Socket=<num>`	`Cabinet=<num>`	`Blade=<num>`
`MemoryBoard=<memory_extender_slot_num>`	`Cell=<num>`	-
`ProcessorBoard=<associated_processor_board>`	-	-
`System Mainboard` (referring to System Board/motherboard)	-	-