



Disk Provider

Provider Overview

The disk provider reports information about direct attached storage drives (primarily hard disk drives) installed on a computer system.

Description

Disk Provider is an instance provider that provides information related to hard disks on PA-RISC and Integrity servers. This provider is based on Web-based Enterprise Management (WBEM) standards, and is compliant with the Common Information Model (CIM) 2.8 schema, proposed by the Distributed Management Task Force (DMTF).

Disk Provider allows any client compliant with the CIM 2.8 Schema, to query for information about the managed system's disks.

Disk Provider implements the Disk-related CIM classes, proposed in the DMTF CIM 2.8 revision. In addition to the properties that belong to the standard CIM classes, Disk 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 Disk Provider:

- HP_DiskDrive

HP_DiskDrive (subclass of CIM_DiskDrive) represents "logical" information about the disks, including status, serial number, product id, etc.

- HP_DiskCollection

HP_DiskCollection represents the collection of HP_DiskDrive instances.

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

- HP_RealizesPCISlot (subclass of CIM_Realizes): This class identifies which logical disk (HP_DiskDrive) instance is associated to which Physical PCISlot (HPUX_PCIDevice) instance. HPUX_PCIDevice is obtained by an association with IO Tree Provider
- HP_MemberOfDiskCollection: This class represents the association between the collection class (HP_DiskCollection) and the disk instance (HP_DiskDrive).
- HP_DiskGroupHostedCollection: This class represents the association between the computer system (CIM_ComputerSystem) and the collection class (HP_DiskCollection).

The MOF classes mentioned above (i.e. all MOF classes prefixed with "HP_") are HP-specific extensions to the CIM Schema, and are registered in the "root/cimv2" namespace.

The following example illustrates the relationship between the MOF classes mentioned above. On an HP Server containing two SCSI Hard Disks, the CIM Instances returned by Disk Provider are as follows:

- 2 instances of HP_DiskDrive (one for each of disks visible to the running HPUX kernel).
- 2 instances of HP_RealizesPCISlot (each one associating one of the 2 HP_DiskDrive instances with the single HPUX_PCIDevice instance).
- 1 instance of HP_DiskCollection.
- 2 instances of HP_MemberOfDiskCollection (1 for each association between the collection class and HP_DiskDrive instances).
- 1 instance of HP_DiskGroupHostedCollection.

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

- enumerateInstanceNames()

- o enumerateInstances()
- o getInstance()

The following CIM operations are not supported by Disk Provider:

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

Disk 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 this provider, see the SFM Release Notes at: <http://docs.hp.com/en/diag>

Release History

Starting from December 2006, Disk Provider is available in the SysFaultMgmt bundle.

Supported Managed Resources

This provider provides information about system disks.

Note that Disk 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

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

Installing this Provider

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

Ensure that the appropriate version of HPWBEM services and OnlineDiag are installed as mentioned in the requirements section.

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

For complete instructions on how to install the SysFaultMgmt bundle, see the System Fault Management Administrator's Guide at <http://docs.hp.com/en/diag>

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

- The provider library is libsfmproviders.1. This is available in /opt/sfm/lib/, along with all the other libraries it uses to implement Disk provider. A symbolic link is made in /opt/wbem/providers/lib/libsfmprovider.sl to link to the libsfmprovider.1 library in /opt/sfm/lib/.
- The CIM MOF files, containing the definitions of the HP-specific MOF classes, (namely HP_DiskDrive.mof) will be available in /opt/sfm/schemas/mof. This directory will also include the provider registration file, namely SFMProvidersR.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 Disk Provider. This includes the "sfmconfig" utility that is used for sending notifications to Disk Provider (e.g. on updation to the configuration file).
- The /opt/sfm/conf/ directory will contain the (XML) configuration files of the System Fault Management 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 Disk Provider).
- The /opt/sfm/log/ directory will contain log files generated during the execution of Disk Provider.

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

Configuring this Provider

Disk Provider uses a common configuration file along with CPU Provider, Memory Instance Provider, Environmental Instance Provider and EMSWrapper Indication Provider. So editing the configuration file will affect the other three 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>
    <FileSize> 20480 </FileSize>
    <NBackupFiles> 3 </NBackupFiles>
  </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 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 the super users should have the write permission to it.

2. Run /opt/sfm/bin/sfmconfig command to specify the changed configuration file. i.e.

```
$ /opt/sfm/bin/sfmconfig -c /opt/sfm/conf/FMLoggerConfig.xml
```

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

Using this Provider

Any HP WBEM services A.2.05 compliant client will be able to use the MOF classes supported by the provider.

Schema Supported by this Provider

Disk provider supports the CIM_DiskDrive MOF class defined by the DMTF organization.

The "Description" section explains in brief the different MOF classes supported by Disk 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 2.8 schema specifications.

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

Note:

The Disk Instance Provider supports all key properties that correspond to the CIM classes.

All non-key properties that are not supported by the Disk Instance Provider are also listed below with comment "Not Supported".

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

Property Name	Property Inheritance	Property Value
string Caption	Inherited from CIM_ManagedElement	This value is always returned as "SCSI Disk".
string Description	Inherited from CIM_ManagedElement	This string is set to "This is a SCSI Hard Disk, with the following details: ", followed by details for the disk, <ul style="list-style-type: none"> 1. Hardware Path 2. Product ID 3. Serial Number
string ElementName	Inherited from CIM_ManagedElement	This string is set to "Hard disk".
String Name	Inherited from CIM_ManagedSystemElement	This string is set to "Hard Disk".
string status	Inherited from CIM_ManagedSystemElement	Not Supported
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 2.8 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"}
string StatusDescriptions[]	Inherited from CIM_ManagedSystemElement	This contains string descriptions for the status values returned in the Operational Status array described above. Each value in the StatusDescriptions array corresponds to the (localized) verbose status description for the value at the same index in the OperationalStatus array. The Strings describing some of the possible values in the OperationalStatus Array are as follows: <ul style="list-style-type: none"> 1. The Description string corresponding to a value of "2" in the OperationalStatus array is: "Disk is OK". 2. The Description string corresponding to a value of "6" in the OperationalStatus array is: "Disk is in Error".
uint16 EnabledState	CIM_EnabledLogicalElement	Not Supported
string OtherEnabledState	CIM_EnabledLogicalElement	Not Supported
uint16 RequestedState	CIM_EnabledLogicalElement	Not Supported

uint16 EnabledDefault	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_DiskDrive".
string DeviceID [Key]	Inherited from CIM_LogicalDevice	This string is set to the hardware path of the Disk
string OtherIdentifyingInfo[]	Inherited from CIM_LogicalDevice	This contains the information, which can be used to identify a disk. Values filled in will be Serial Number, ProductID, Vendor ID and Firmware Revision in the same order
string IdentifyingDescriptions[]	Inherited from CIM_LogicalDevice	An array of free form strings providing explanations and details behind the entries in the OtherIdentifyingInfo array. The values will correspond to the values filled in OtherIdentifyingInfo array.
Boolean PowerManagementSupported	Inherited from CIM_LogicalDevice	Not Supported
uint16 PowerManagementCapabilities[]	Inherited from CIM_LogicalDevice	Not Supported
uint16 Availability	Inherited from CIM_LogicalDevice	NotSupported
uint16 StatusInfo	Inherited from CIM_LogicalDevice	NotSupported
uint32 LastErrorCode	Inherited from CIM_LogicalDevice	NotSupported
string ErrorDescription	Inherited from CIM_LogicalDevice	NotSupported
Boolean ErrorCleared	Inherited from CIM_LogicalDevice	Not Supported
uint64 PowerOnHours	Inherited from CIM_LogicalDevice	Not Supported
uint64 TotalPowerOnHours	Inherited from CIM_LogicalDevice	Not Supported
uint16 AdditionalAvailability[]	Inherited from CIM_LogicalDevice	Not Supported
uint64 MaxQuiesceTime	Inherited from CIM_LogicalDevice	Not Supported
uint16 Capabilities[]	Inherited from CIM_MediaAccessDevice	Not Supported
string CapabilityDescriptions[]	Inherited from CIM_MediaAccessDevice	Not Supported
string ErrorMethodology	Inherited from CIM_MediaAccessDevice	Not Supported
string CompressionMethod	Inherited from CIM_MediaAccessDevice	Not Supported
uint32 NumberOfMediaSupported	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 MaxMediaSize	Inherited from CIM_MediaAccessDevice	This gives the maximum size of the disk in kBytes
uint64 DefaultBlockSize	Inherited from CIM_MediaAccessDevice	The size of each block of the media

uint64 MaxBlockSize	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 MinBlockSize	Inherited from CIM_MediaAccessDevice	Not Supported
boolean NeedsCleaning	Inherited from CIM_MediaAccessDevice	Not Supported
boolean MediaIsLocked	Inherited from CIM_MediaAccessDevice	Not Supported
uint16 Security	Inherited from CIM_MediaAccessDevice	Not Supported
datetime LastCleaned	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 MaxAccessTime	Inherited from CIM_MediaAccessDevice	Not Supported
uint32 UncompressedDataRate	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 LoadTime	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 UnloadTime	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 MountCount	Inherited from CIM_MediaAccessDevice	Not Supported
datetime TimeOfLastMount	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 TotalMountTime	Inherited from CIM_MediaAccessDevice	Not Supported
string UnitsDescription	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 MaxUnitsBeforeCleaning	Inherited from CIM_MediaAccessDevice	Not Supported
uint64 UnitsUsed	Inherited from CIM_MediaAccessDevice	Not Supported
string HardwarePath	Inherited from HP_DiskDrive	This is the hardware path of the disk.
string SerialNumber	HP_DiskDrive	This property identifies a unique Serial Number for a disk instance
string ProductID	HP_DiskDrive	This property identifies the product identifier for a disk instance
string VendorID	HP_DiskDrive	This property identifies the vendor identifier for a disk instance
string SmartEnabled	HP_DiskDrive	This property identifies whether the disk is SMART enabled or not
string FirmwareRevision	HP_DiskDrive	This property identifies the firmware revision for the disk
string Capacity	HP_DiskDrive	This property identifies the maximum size of the disk in GBytes

Table 2: HP_RealizesPCISlot properties

Table 2 describes the properties of the HP_RealizesPCISlot association class (associating HP_DiskDrive and HPUX_PCIDrive). 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
HPUX_PCIDrive ref Antecedent	Property of HP_RealizesPCISlot	Object path of the HPUX_PCIDrive Instance.
HP_DiskDrive ref Dependent	Property of HP_RealizesPCISlot	Object path of the DiskDrive Instance.

Table 3: HP_DiskCollection properties

Table 3 describes the properties of the HP_DiskCollection. 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
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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_DiskCollection"
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.
String[] GroupStatusDescriptions	Inherited from HP_GroupSystemSpecificCollection	Some of the possible values are "All member devices are OK." "At least one member device is Degraded." "At least one member device is Stressed."

Table 4: HP_MemberOfDiskCollection properties.

Table 4 describes the properties of the HP_MemberOfDiskCollection association class (associating HP_DiskCollection & HP_DiskDrive). 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_DiskCollection ref Collection	Property of CIM_MemberOfCollection	Object path of the HP_DiskCollection Instance.
HP_DiskDrive ref Member	Property of CIM_MemberOfCollection	Object path of the HP_DiskDrive Instance.

table 5: HP_DiskGroupHostedCollection properties

Table 5 describes the properties of the HP_DiskGroupHostedCollection association class (associating CIM_ComputerSystem and HP_DiskCollection). 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)
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CIM_ComputerSystem ref Antecedent	Property of HP_GroupHostedCollection	Object path of the CIM_ComputerSystem
HP_GroupSystemSpecificCollection ref Dependent	Property of HP_GroupHostedCollection	Object path of the HP_DiskCollection Instance.

Table 6: Intrinsic methods for all the CIM classes supported by Disk Provider

Table 6 describes the intrinsic methods supported by this provider. It has three columns. The first is the method name, the second is a description of the provider's actions based on invoking that method, and the third is a list of any exceptions that could result from invoking the method. Each row describes a method.

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

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

For more information

- WBEM information
For a CIM tutorial, go <http://www.wbemsolutions.com/tutorials/CIM/>
- For more information on SFM, see System Fault Management Administrator's Guide at <http://docs.hp.com/en/diaq>

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

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