



HP-UX Filter Metadata Provider

Provider overview

Filter Metadata Provider provides information about HP defined/Admin-defined filters in Filter Metadata Repository.

Description

The FMD Provider provides the facility to predefine a filter in the repository. It also ensures that all the important or chosen indications are logged to the Event-Archive. FMD creates a HP-advised subscription when SFM is installed on a system.

This provider have following salient features

1. It will provide a repository, a XML File, called Filter Metadata Repository that will contain the WQL/CQL strings representing the filters. There will be two types of filters in the repository namely HP-Defined filters and Admin-Defined filters. The salient features of these filters are as follows
 - a. HP-Defined Filters
 - i. These Filters are defined/suggested by HP. These filters will be present in the repository at the installation time. I.e. HP will distribute them and will manage them.
 - ii. System administrator can't delete/modify/create HP-Defined filters. Administrator can enable/disable HP-Defined filter. When a FMD Provider client request for known filters, only enabled filters will be provided to the FMD client. In this profile, system administrator means "root" user.
 - b. Admin-Defined filters
 - i. HP doesn't advise/distribute/manage these filters. So, at the time of installation, no Admin-Defined filter will be present in the FMD repository.
 - ii. For a given system, the system administrator advises these filters. Administrator creates/deletes/modifies these filters using the "Command Line Interface" (CLI) provided by "System Fault Management" (SFM) product.
 - iii. Admin-Defined filters can be enabled/disabled by system administrator. Only enabled filters will be visible to FMD provider's client.
2. The HP-Defined/Admin-Defined filters can be queried from FMD provider. On query, the provider will look for enabled HP-Defined/Admin-Defined filters in FMD repository. For each enabled filter in FMD repository, it will return an instance of "HP_KnownFilter" whose "Dependent" property will refer to an instance of "CIM_IndicationFilter" that have "Query" property set to WQL/CQL string obtained from FMD repository. The above instances of CIM_IndicationFilter will be known as HP-Known filters.

The CIM_IndicationFilter instance, referenced by HP_KnownFilter instance, will have following important properties

- a. "Query" property set to WQL/CQL string obtained from Filter Metadata Repository.
- b. "Description" property set to filter description obtained from Filter Metadata repository.
- c. "SourceNameSpace" set to filter source namespace obtained from FMD repository.
- d. "Name" property is derived as follows

[HP/ADMIN] - <Filter Name > @ <Filter UID> - V<version>

"Filter Name" and "Filter UID" is obtained from FMD repository.

FMD provider defines the "version" part of the "Name" property. This portion will be referred as "version" of HP-Known filter in CIMOM repository.

3. For each enabled HP-Known HP-Defined filter, there will be a default persistent subscription to Event Archive. In this profile, these subscriptions will be referred to as HP-Known Subscription. Admin-Defined HP-Known filters will not have default persistent subscription to Event Archive.
4. When a filter is modified/enabled in the FMD repository, the FMD provider has to update the corresponding HP-Known filter in the CIMOM repository. An instance of CIM_IndicationFilter can't be updated as long as there is a client subscription associated with that instance. If the HP-Known filter has subscriptions, other than HP-Known, subscription associated with it than FMD provider will preserve them. Preservation of subscription means that FMD provider can't update the existing HP-Known filter. Hence, FMD provider will create a new version of HP-Known filter. By creation of new version of HP-Known filter we mean that a new instance of CIM_IndicationFilter will be created whose "Name" property's "version" part will have higher number than existing HP-Known filter's "Name" property 's "version" part.

There can be only one version of filter in FMD repository. But, FMD provider can have multiple versions of HP-Known filter present in the CIMOM repository. If the "[HP/ADMIN] - <filter name> @ <filter UID > - V" part of "Name" property of two CIM_IndicationFilter instance is same than the two instances are considered to be two different version of the same HP-Known filter. In other words, if only the "version" part of "Name" property of two filters varies than these filter are two different version of the same HP-Known filter.

The latest version of a HP-Known filter is the one whose "Name" property's "version" part has the highest number. The latest version of HP Known filter, instance of CIM_IndicationFilter, is associated with filter present in FMD repository. The earlier versions of the HP-Known filter are not associated with any filter present in FMD repository.

The HP-Known subscription will always be associated with the latest version of HP-Known filter.

When client query for HP-Known filters from FMD provider it will return only the latest version of HP-Known filter. If client is interested in previous version of HP-Known filters than he/she has to directly query CIMOM for CIM_IndicationFilter. He/She can then find out the previous version of a HP-Known filter by examining the format of "Name" property of CIM_IndicationFilter. Client must not use the previous version of HP-Known filter to create new subscriptions.

5. When the Filter is deleted / disabled in the FMD Repository then FMD Provider tries to delete the corresponding HP-Known subscription and HP-Known Filter in the CIMOM Repository.
6. When a filter is added in the FMD Repository then FMD Provider tries to add the corresponding HP-Known filter and HP-Known subscription to CIMOM Repository.
7. FMD provider manages HP-Known filter instances and HP-Known subscription instances. In CIMOM repository, HP-Known filter instances are identified using the "Name" property format of CIM_IndicationFilter. It is important that any client should not use the format of "Name" property for any instance of CIM_IndicationFilter. It's also important that "Name" property of HP-Known filters shouldn't be modified by anybody.
8. The "root" user owns the HP-Known filters (instances of CIM_IndicationFilter), HP-Known subscriptions (instances of CIM_IndicationSubscription and instance of CIM_IndicationHandlerCIMXML that refers to Event Archive. The "root" user should not modify/delete these instances.
9. The FMD provider doesn't provide any method for following activities
 - a. Add/Remove/Modify Admin-Defined Filters.
 - b. Enable/Disable HP-Defined filters.
 - c. Ability to patch/upgrade the FMD repository.
 - d. Ability to import or export Admin-Defined Filter.

For these tasks separate CLIs (Command Line Interface) is provided. Only administrator will be allowed to use CLI. Whenever Administrator changes the filters in FMD Repository the FMD

provider will be indicated through SFM product's internal mechanism. Filter Metadata provider will then synchronize the FMD repository and CIMOM repository.

10. FMD provider doesn't ensure that all the HP-Defined/Admin-Defined filters in the FMD repository are mutually exclusive. I.e., it is not guaranteed that an indication will be qualified by one and only one HP-Known filter.
11. The FMD repository and CIMOM repository can be out of synch due to two reasons
 - a. Admin has changed the FMD repository (Both HP-Defined/Admin-Defined process can be added/deleted/modified)
 - i. By applying a patch or by installing a new version of product.
 - ii. By changing the filters using the CLIs.
 - b. The Admin has accidentally deleted/modified HP-Known filter or HP-Known subscription in CIMOM repository

On each client call, FMD provider will synchronize the CIMOM repository and FMD repository.

After the Synchronization process client can be assured of following

- a. For each enabled filter in FMD repository, there is an instance of CIM_IndicationFilter (latest version) in CIMOM repository. This Client can be assured that latest version of HP-Known filter in CIMOM repository has properties that are in synch with corresponding filter in FMD repository.
- b. For each HP-Known HP-Defined filter's latest version, there is an HP-Known subscription. No other version of HP-Known HP-Defined filter will have HP-Known subscription. There is no HP-Known subscription for a disabled filter in FMD repository.
- c. FMD provider has tried to delete all version of HP-Known filter that is deleted or disabled in FMD repository. If no instance of CIM_IndicationSubscription is referring to an instance of CIM_IndicationFilter than FMD provider will delete that instance of CIM_IndicationFilter.
- d. FMD provider has tried to delete other than latest version of an enabled HP-Known filter.

Following intrinsic methods, of CIM instance provider, are supported by Filter Metadata Provider

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

Following intrinsic methods, of CIM instance provider, are not supported by Filter Metadata Provider

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

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

Associations are instrumented using the instance provider framework.

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

Supported managed resources

HP-Defined or Admin-Defined Filters in Filter Metadata Repository.

Instances of CIM_IndicationFilter that are referred by HP_KnownFilter instance and created as corresponding enabled Filter String is present in the Filter Metadata Repository.

Setting up this provider

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

If Admin wants to have some Admin-Defined filters than he should add Admin-Defined filter to Filter Metadata Repository.

Installing this provider

This Provider is part of System Fault Management product.

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:

- o The provider library is libfmd.1. This will be available in /opt/sfm/lib/.
- o The CIM MOF files, containing the definitions of the HP-specific MOF classes, (namely HP_FMD.mof) will be available in /var/opt/sfm/schemas/mof. This directory will also include the provider registration file, namely HP_FMDReg.mof. Note: All the HP-specific MOF classes will be registered under the "root/cimv2" namespace.
- o /opt/sfm/schema/fmd directory will contain the Filter Metadata Repository named "FilterRepository.fmd".
- o The /opt/sfm/bin directory will contain the CLIs.
- o The /opt/sfm/bin directory will contain "sfmconfig" utility.
- o The /var/opt/sfm/conf/ directory will contain the (XML) configuration files of the Filter Metadata Provider, and all the modules that this provider uses.
- o The /opt/sfm/msgcat/ directory will contain the catalog files for all the supported locales.
- o The /var/opt/sfm/log/ directory will contain log files generated during the execution of the CPU Instance Provider.

Refer to the System Fault Management Release Notes at <http://docs.hp.com/en/diag> for the list of supported systems

Configuring this provider

1. Filter Metadata Provider uses a common configuration file along with other providers in SFM. So editing the configuration file will affect the other providers as well. The configuration file can be found in - /var/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> <!-- Possible Values are INFORMATIONAL,
WARNING, ERROR, CRITICAL, STOPLOGGING -->
    <Target> /var/opt/sfm/log/sfm.log </Target>
    <FileSize> 20480 </FileSize> <!-- sets the max. file size in KB. Min allowed value 2KB,
Max allowed value , 1048576 KB (1 GB) -->
    <NBackupFiles> 3 </NBackupFiles> <!-- Number of files to roll over. Min allowed value 1,
Max allowed value 10 -->
  </LoggerConfig>
</SFMConfig>
```

In order to change the logging configuration, the following steps are to be followed:

- a. Edit the configuration file /var/opt/sfm/conf/FMLoggerConfig.xml to change the threshold logging level and/or target.
 - i. 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:
STDOUT: All log messages are delivered to console.
The complete path to the file where the log messages are to be written
- c. Run /opt/sfm/bin/sfmconfig command, to specify the changed configuration file. For

example

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

2. Following CLIs (Command Line Interface) are provided for Admin to manage Filter Metadata Repository

- `fmdcontrol list -t {HP|ADMIN|ALL}`

This command will list all the enabled/disabled filters in the Filter Metadata Repository

- `fmdcontrol patch -p <patch file>`

This command will apply the HP released Patch to Filter Metadata Provider repository.

- `fmdcontrol add -n <filter name> -s {ENABLE|DISABLE} -q <query> -i {WQL|CQL} -ns <name space> -d <description>`

This command will add an Admin-Defined filter to Filter Metadata Repository.

- `fmdcontrol delete -n <filter name> -u <unique id>`

This command will delete an Admin-Defined filter in Filter Metadata Repository.

- `fmdcontrol enable -n <filter name> -u <unique id> -t {HP|ADMIN}`

- `fmdcontrol disable -n <filter name> -u <unique id> -t {HP|ADMIN}`

The above commands enable/disable an HP-Defined or Admin-Defined filter in the FMD Repository.

- `fmdcontrol modify -n <filter name> -u <unique id> [-s {ENABLE|DISABLE}] [-q <query>] [-i {WQL|CQL}] [-ns <name space>] [-d <description>]`

This command will modify an Admin-Defined Filter. The filter name is the unique key for any filter in Filter Metadata Repository. This command also allows the Admin to enable/disable HP-Defined Filter.

- `fmdcontrol import -f <import file> -r {YES|NO}`

- `fmdcontrol export -f <export file>`

The above two commands will help the Admin to export the Admin-Defined filter to a file. These Filters can later be imported in the FMD Repository. This way Admin can define the filters at one node and can apply the same filters to all the managed nodes.

The CLI commands will inform the Filter Metadata Provider about the change in Filter Metadata Repository. The Provider will in-turn synchronize the CIM_IndicationFilter instance in CIMOM and Filter Metadata Repository.

3. The `/var/opt/sfm/conf/FMDCConfig.xml` file provides following important configurable properties.

a. TerminationPolicy

By default, the FMDProvider preserves the HP-Known filters and HP-Known subscriptions across cimserver/provider reboot. This is indicated by "RETAIN" value for this property.

If one wants to remove the HP-Known Filter/Subscription whenever provider is unloaded/cimserver is restarted then one must user "REMOVE" value for this property.

Use `sfmconfig` to dynamically change the provider configuration. There are other configurable

Properties in the `FMDCConfig.xml` file, but the administrator is not supposed to change them.

Using this provider

Client should enumerate instances for "HP_KnownFilter" class. The "Dependent" Property of "HP_KnownFilter" class will point to latest instance of HP-Known filter that corresponds to the enabled filter defined in Filter Metadata Repository. The "FilterType" property of "HP_KnownFilter" class will tell whether it is HP-Defined or Admin-Defined filter.

For HP-Defined enabled filter client is advised not to create subscription to Event Archive. As, the FMD provider will create default FMD provider will create it.

Client is suppose to use filter description present in CIM_IndicationFilter "Description" property while choosing a filter. Client is not encouraged to base his decision on WQL string of the filter.

Schema supported by this 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.

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

Property name	Property inheritance	Property value (and data source)
HP_FilterFactory REF Antecedent [key]	CIM_Dependency	Refer to instance of HP_FilterFactory.
CIM_IndicationFilter REF Dependent [key]	CIM_Dependency	Refer to instance of CIM_IndicationFilter, which represents an enabled HP-Defined/Admin-Defined filter in the Filter Metadata Repository. The instance of CIM_IndicationFilter is created and managed by Filter Metadata Provider.
uint16 "FilterType"	HP_KnownFilter	If CIM_IndicationFilter, mentioned above, represents an HP-Defined filter than this property will be set to HP-Defined(2). If CIM_IndicationFilter, mentioned above, represents an Admin-Defined filter than this property is set to Admin-Defined (3).

Table 2: CIM_IndicationFilter supported properties. (Properties that are not supported are not mentioned. Also, this profile only discuss about the CIM_IndicationFilter instances that are created and managed by Filter Metadata Provider)

Property name	Property inheritance	Property value (and data source)
String Query	CIM_IndicationFilter	This property provides the WQL string that is obtained from Filter Metadata Repository.
String QueryLanguage	CIM_IndicationFilter	Hardcoded to "WQL"
String SourceNameSpace	CIM_IndicationFilter	The source namespace will be obtained from FMD repository.
String Name [Key]	CIM_IndicationFilter	Name" property is derived as follows [HP/ADMIN] - <Filter Name > @ <Filter UID> - V<version> "Filter Name" and "Filter UID" is obtained from FMD repository. FMD provider defines the "version" part of the "Name" property.
String CreationClassName [Key]	CIM_IndicationFilter	Hardcoded to "CIM_IndicationFilter".
String SystemName [Key]	CIM_IndicationFilter	Computer system host name obtained using getHostName() system call.
String SystemCreationClassName [Key]	CIM_IndicationFilter	Hardcoded to "PG_ComputerSystem".
String Caption	CIM_ManagedElement	Same as Name property.
String Description	CIM_ManagedElement	The Description of the filter as is obtained from the Filter Metadata Repository.
String ElementName	CIM_ManagedElement	The Element Name will be hard coded to "HP Known HP-Defined Filter" / "HP Known Admin-Defined filter"

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

This class represents the Filter Metadata Repository.

Property name	Property inheritance	Property value (and data source)
String ElementName	CIM_ManagedElement	Hardcoded to "HP Filter Metadata Repository"
String Caption	CIM_ManagedElement	Hardcoded to "HP Filter Metadata Repository"
String Description	CIM_ManagedElement	Provides the general description of the class.
Datetime LastUpdateTime	HP_FilterFactory	This property tells last modification time of Filter Metadata Repository.
String Revision	HP_FilterFactory	This property tells the revision number of Filter Metadata Repository.
String SystemCreationClass [key]	HP_FilterFactory	Hardcoded to "PG_ComputerSystem".
String SystemName [key]	HP_FilterFactory	Computer system host name obtained using getHostName() system call.
String CreationClassName [key]	HP_FilterFactory	Hardcoded to "HP_FilterFactory"

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.wbemsolutions.com/tutorials/DMTF>
- System Fault Management Administrator's guide
<http://docs.hp.com/en/diag>.

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