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Foreword

The *Indications Profile* (DSP1054) was prepared by the DMTF WBEM Infrastructure Modeling Working Group.

DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems management and interoperability.

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Contributors:

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- Aaron Merkin – IBM (former editor)

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Introduction

The information in this specification should be sufficient for a provider or consumer of this data to unambiguously identify the classes, properties, methods, and values that shall be instantiated to subscribe, advertise, produce, or consume an indication using the DMTF Common Information Model (CIM) Schema.

The target audience for this specification is implementers who are writing CIM-based providers or consumers of management interfaces that represent the components described in this document.

Indications Profile

1 Scope

The *Indications Profile* defines the CIM elements that are used to subscribe for indications of unsolicited events and a server-side implementation uses to advertise the possible indications, as well as the content of an indication used to report events in a managed system.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

2.1 Approved References

DMTF DSP0004, *CIM Infrastructure Specification 2.5,*
http://www.dmtf.org/standards/published_documents/DSP0004_2.5.pdf

DMTF DSP0200, *CIM Operations over HTTP 1.3,*
http://www.dmtf.org/standards/published_documents/DSP0200_1.3.pdf

DMTF DSP0207, *WBEM URI Mapping 1.0*,
http://www.dmtf.org/standards/published_documents/DSP0207_1.0.pdf

DMTF DSP1001, *Management Profile Specification Usage Guide 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1001_1.0.pdf

DMTF DSP1033, *Profile Registration Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1033_1.0.pdf

IETF RFC3986, Uniform Resource Identifier (URI): Generic Syntax, Jan. 2005,
http://www.ietf.org/rfc/rfc3986.txt

2.2 Other References

ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*,
http://isotc.iso.org/livelink/livelink.exe?func=ll&objId=4230456&objAction=browse&sort=subtype

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply. For the purposes of this document, the terms and definitions given in DSP1033 and DSP1001 also apply.

3.1

can

used for statements of possibility and capability, whether material, physical, or causal

3.2
cannot
used for statements of possibility and capability, whether material, physical, or causal

3.3
conditional
indicates requirements to be followed strictly to conform to the document when the specified conditions are met

3.4
mandatory
indicates requirements to be followed strictly to conform to the document and from which no deviation is permitted

3.5
may
indicates a course of action permissible within the limits of the document

3.6
need not
indicates a course of action permissible within the limits of the document

3.7
optional
indicates a course of action permissible within the limits of the document

3.8
referencing profile
indicates a profile that owns the definition of this class and can include a reference to this profile in its "Related Profiles" table

3.9
shall
indicates requirements to be followed strictly to conform to the document and from which no deviation is permitted

3.10
shall not
indicates requirements to be followed strictly in order to conform to the document and from which no deviation is permitted

3.11
should
indicates that among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

3.12
should not
indicates that a certain possibility or course of action is deprecated but not prohibited

3.13
bulk subscription
an indication subscription to a filter collection that includes more than one indication filter

3.14
CIM element
CIM classes (including associations), properties (including references), methods, or indications

NOTE: For the purpose of this document, CIM qualifiers and schemas are not considered CIM elements.

3.15
deprecated
indicates that an element or profile behavior has been outdated by newer constructs

NOTE: Deprecated elements may become obsolete in future versions of the profile. Authors should avoid using deprecated elements and attributes. Server implementations should continue to support deprecated elements for backward compatibility.

3.16
dynamic filter
an instance of CIM_IndicationFilter that is created by a client application at runtime
These instances may come and go depending on the client application.

3.17
event
the occurrence of a phenomenon of interest to a management application
Events are not published in CIM directly but may be represented by a model change or the instantiation of a CIM_Indication subclass.

3.18
indication
the communication and record of the detection of an event of interest
The indication may only represent an aspect of the event and not the entire event. Multiple indications may be communicated for a specific event.

3.19
indication filter
a logical construct that specifies a filter on indications, used to control whether indications are delivered to a subscriber

3.20
match
(CIM property values) indicates that a property is equal to one or more values

3.21
obsolete
indicates that an item was defined in prior standards but has been removed from this standard

3.22
organization
consortium, standards group, or company creating a DMTF profile specification

3.23
pattern
(CIM property values) supplied pattern that the value of a property shall follow

3.24
query
a filter to constrain the events for which indications are generated

3.25
static filter
an instance of CIM_IndicationFilter that is created by a profile implementation at load time
These instances usually do not change.

3.26
subscribe
the mechanism whereby a client registers for delivery of indications

3.27
WBEM Server
a Web Based Enterprise Management (WBEM) implementation that provides Web-based management functionality that conforms to a set of management and Internet standard technologies developed to unify the management of distributed computing environments

4 Abbreviated Terms and Document Conventions

4.1 Abbreviated Terms

The following abbreviations are used in this document.

4.1.1
CQL
CIM Query Language

4.1.2
QoS
Quality of service

4.1.3
URI
Uniform Resource Identifier

4.1.4
WBEM
Web Based Enterprise Management

4.2 Document Conventions

4.2.1 Typographical Conventions

Experimental Material

Some of the content considered for inclusion in this specification has yet to receive sufficient review to satisfy the adoption requirements set forth by the DMTF. This content is included in this specification as an aid to implementers who are interested in likely future developments. The content marked as experimental may change as implementation experience is gained. It is likely that the content will be included in an upcoming revision of the specification. Until that time, the content is purely informational and therefore it is clearly labeled as "Experimental" within the text.

The following typographical convention indicates experimental content:

EXPERIMENTAL

Experimental content appears here.

EXPERIMENTAL

In tables or figures where the typographical convention cannot be used, the "Experimental" label is used alone.

5 Synopsis

Profile name: Indications

Version: 1.0.1

Organization: DMTF

CIM Schema Version: 2.22

Central Class: CIM_IndicationService

Scoping Class: CIM_System

The *Indications Profile* extends the management capability of the referencing profiles by adding the capability to subscribe for indications of unsolicited events. It enables a server-side implementation to advertise the possible indications. The *Indications Profile* defines the content of indications from autonomous and component profiles implemented by CIM-based management instrumentation.

The Central Instance of this profile shall be an instance of CIM_IndicationService. The Scoping Instance shall be the instance of CIM_System with which the Central Instance is associated through CIM_HostedService.

Table 1 identifies profiles on which this profile has a dependency.

Table 1 – Related Profiles

Profile Name	Organization	Version	Relationship	Behavior
Profile Registration	DMTF	1.0	Mandatory	See 10.19.

6 Description

The *Indications Profile* describes the necessary properties and methods to describe the indications supported by managed elements and how a client subscribes to those indications.

6.1 Overview of Profile Elements

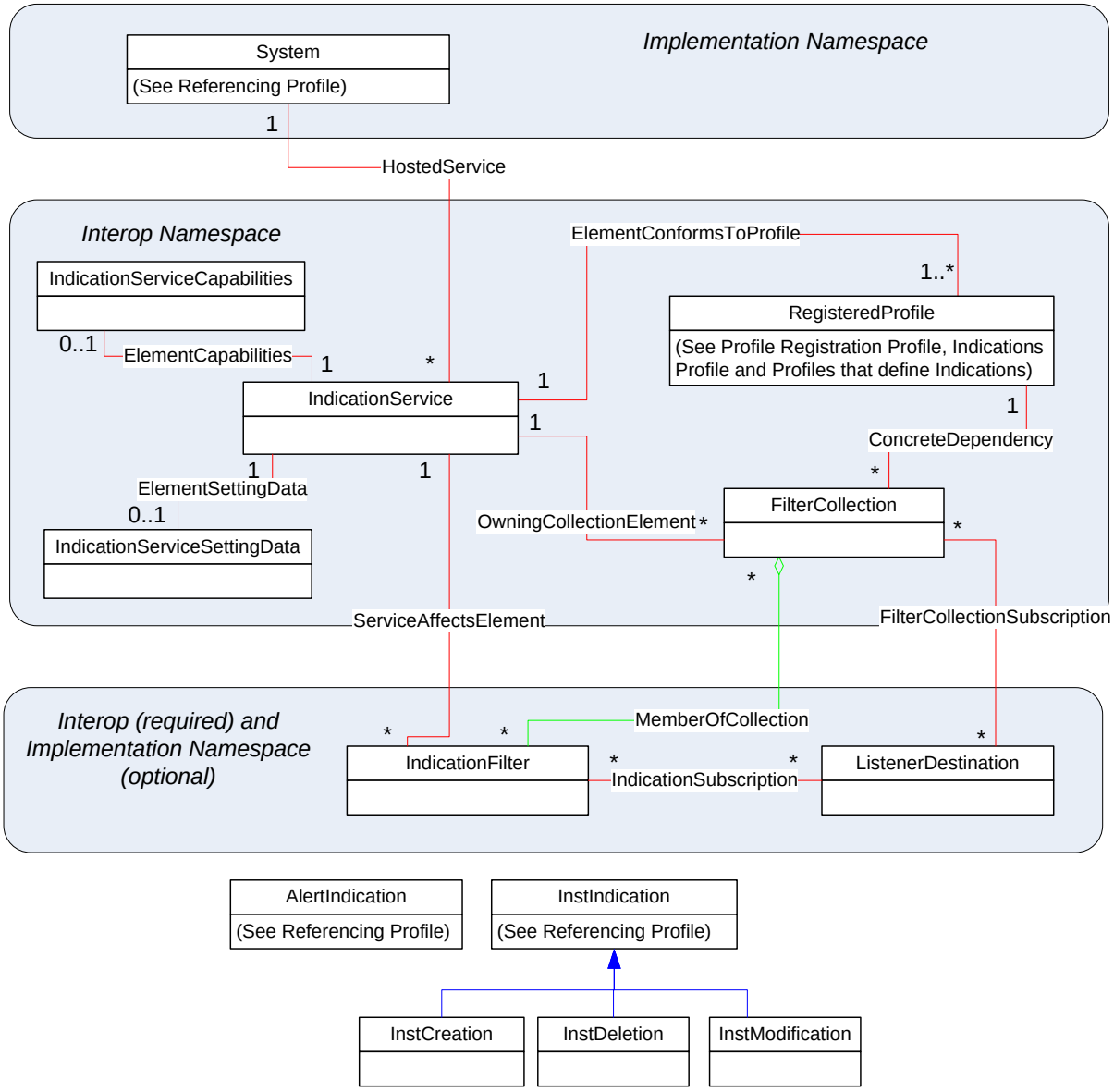
An event is some phenomenon of interest. An indication is an observation of characteristics of that event. For example, an event could be the fact that your house caught fire. An indication could report the fact that smoke or heat is observed; these are, as the observer knows, the consequence of the fire. Alternatively, the indication may report that your house has caught file.

Since CIM report many characteristics of management elements in several classes and an event is likely to change several instances and properties, a change to any instance reports some of the characteristics of the event. As such, any given life cycle indication reports observations.

AlertIndications instances are capable to reporting the event directly whether or not any characteristics of the event are modeled by an implementation. As such, an AlertIndication can report the event directly, but may not be able to convey any observations of the effect of the event.

Figure 1 represents the UML class diagram for the *Indications Profile*. For better clarity and understanding, see DSP1033 for information about profile registration and namespaces.

394 For simplicity, the *CIM_* prefix has been removed from the names of the classes in Figure 1.



395

396 **Figure 1 – Indications Profile: Class Diagram**

397 CIM_IndicationFilter, CIM_FilterCollection, and CIM_ListenerDestination are instantiated in the Interop
398 namespace. Creating the CIM_IndicationFilter, CIM_FilterCollection, and CIM_ListenerDestination
399 instances in the Interop namespace (see DSP1033) makes it easier for clients to discover filters,
400 collections of filters, and existing listener destinations that have been instantiated or are available.

401 CIM_IndicationService represents the ability of the server-side implementation to support the delivery of
402 indications. If the *Indications Profile* is implemented, there shall be at least one instance of
403 CIM_IndicationService.

404 CIM_IndicationServiceCapabilities is an optional element that represents the capabilities of the
405 CIM_IndicationService.

CIM_IndicationServiceSettingData is an optional element that is used to model the initial configuration of the CIM_IndicationService.

A CIM_IndicationFilter instance represents the potential of an implementation to produce an indication as described by the filter's query. The filter's query logically selects a particular modeled change, such as the creation of a CIM_AlertIndication or the change to the existing instance, amongst a population of all such changes. It appears to an observer that the implementation is monitoring all changes all the time. CIM_IndicationFilters may be created by either the implementation (static filters) or the management client (dynamic filters) (see 6.3).

CIM_FilterCollection is used to describe a collection of filters supported in the context of a given profile (see 6.4).

CIM_ListenerDestination represents the location and method of delivering an indication to the client that may be subscribed to one or more indication filters. The Destination address in the CIM_ListenerDestination may be different that the network address of the client that created the subscription.

CIM_IndicationSubscription represents the request that indications described by IndicationFilter or inferred by IndicationFilterCollection are delivered to a particular ListenerDestination.

CIM_FilterCollectionSubscription represents an active subscription of a destination (represented by CIM_ListenerDestination) to a collection of indication filters (represented by CIM_FilterCollection).

CIM_ConcreteDependency is used to scope instances of CIM_FilterCollection with instances of CIM_RegisteredProfile that identify the profile that provides context to the indication filters.

CIM_MemberOfCollection may be used to aggregate instances of CIM_IndicationFilter into one or more instances of CIM_FilterCollection.

CIM_OwningCollectionElement is used to scope instances of CIM_FilterCollection to the instance of CIM_IndicationService.

6.2 Client Indication Subscriptions

Using the behavior defined in the *Indications Profile*, client applications are able to receive indications from managed elements by subscribing to one or more indication filters (which define query strings that select specific instances of subclasses of CIM_Indication).

6.2.1 Creating a Subscription

A client implements three steps to subscribe for indications:

1. Determine if there is an existing indication filter for the subscription. The indication filter may be explicitly modeled with an instance of CIM_IndicationFilter or implicitly represented by a CIM_FilterCollection that is defined to contain the indication filter. If an appropriate indication filter does not exist, and dynamic filters are supported, the client can create a dynamic filter.
2. Determine if the desired destination is already covered by looking for an instance of CIM_ListenerDestination that represents the destination. If one does not exist, the client may create one.
3. Create an instance of CIM_IndicationSubscription or CIM_FilterCollectionSubscription between the CIM_ListenerDestination and CIM_IndicationFilter or CIM_FilterCollection.

6.2.2 Bulk Subscriptions

A bulk subscription is a single subscription that encompasses one or more indication filters. Bulk subscriptions are implemented as an instance of CIM_FilterCollectionSubscription that associates an

instance of CIM_ListenerDestination to an instance of CIM_FilterCollection. Subscribing to a filter collection is equivalent to individually subscribing to each indication filter in the collection and results in an indication being sent for every indication filter triggered by an event.

6.2.3 Recursive Subscriptions

An instance of CIM_FilterCollection implicitly contains indication filters that may be represented explicitly by instances of CIM_IndicationFilter. An instance of CIM_FilterCollection may contain additional CIM_FilterCollection instances. Subscription to a CIM_FilterCollection instance is interpreted as a single subscription to all contained indication filters and all contained instances of CIM_FilterCollection. Thus, if the same destination is explicitly subscribed to an instance of CIM_FilterCollection and is also explicitly subscribed to a contained instance of CIM_IndicationFilter or CIM_FilterCollection, the destination can receive duplicate notifications.

6.2.4 Subscriptions whose Filter Semantics Overlap

The same indication destination may be represented with more than one instance of CIM_ListenerDestination. The filter semantics between to subscriptions may overlap. The same indication filter may be represented multiple times. It may be represented explicitly by more than one instance of CIM_IndicationFilter or implicitly by one or more CIM_FilterCollection instances. This potential overlap makes it possible for more than one subscription to cause a particular indication to be delivered to a particular destination. The server-side implementation does not perform any crosschecking to prevent the delivery of overlapping indications. Therefore, it is the responsibility of a client to ensure that the subscriptions they create does not result in overlapping filters for the same destination. It is the responsibility where the same indication can be produced from multiple indication filters.

6.2.5 Dynamic Contents of Filter Collections

A subscription to a CIM_FilterCollection instance is interpreted as a subscription to the filters contained within the collection. Although the indication filters implicitly contained in the collection do not change, it is possible that the indication filters explicitly contained (CIM_IndicationFilter or nested CIM_FilterCollection instances) may change. A snapshot of the contained filters at the time of the creation of the subscription is not maintained. Therefore, as the contents of the CIM_FilterCollection instance change, the set of filters to which the subscription actually applies may change.

6.3 Indication Filters

The class CIM_IndicationFilter represents a filter for selecting indications and contains a query string that defines selection criteria for events. Indication filters are used to identify the events created by managed elements and delivered by the server-side implementation to the client. Filters can be created by either the implementation (static filters) or by a client (dynamic filters).

6.3.1 Filter Query

Filters identify the type of event to listen for and the CIM elements to be included in the indication delivered to any subscribed clients. Filters are specified in the form of a query string that is contained in the Query property of a CIM_IndicationFilter instance.

The query defines the model changes or events that are being listened for. The query may define the model properties sent with the indication. A query also defines the source classes for the properties and what logic is used to combine the instances. A query is defined using the rules of a query language, like CIM Query Language (CQL). Profiles that define indications specify the exact string that represents the filter query.

Following are examples of a properly formatted CQL filter query:

EXAMPLE 1: "SELECT * FROM CIM_AlertIndication" – This query statement specifies that all supported properties of the CIM_AlertIndication instance can be delivered to clients that have subscribed to this indication when such an event occurs.

EXAMPLE 2: "SELECT * FROM CIM_InstCreation WHERE SourceInstance ISA CIM_StorageVolume" – This query statement specifies that all supported properties of the CIM_InstCreation instance can be delivered to clients and the CIM_InstCreation instance shall be delivered when the value of the SourceInstance property is an instance of CIM_StorageVolume.

6.3.2 Static Filters

Static filters are instances of CIM_IndicationFilter that are instantiated by an implementation. Static filters represent the events for which an implementation is capable of generating indications. These static filters enable a client to discover the supported indications of a given profile.

- **Mandatory Indication Filter**

  An indication filter defined in a profile as a mandatory indication filter is required to be supported if at least one indication filter defined in the profile is supported.

- **Optional Indication Filter**

  An indication filter defined in a profile as an optional indication filter may be supported.

- **Conditional Indication Filter**

  An indication filter defined in a profile as a conditional indication filter is supported if certain conditions are satisfied.

- **Vendor Defined Indication Filter**

  An implementation may support instances of CIM_IndicationFilter that are not defined by a profile.

6.3.3 Dynamic Filters

Dynamic filters are instances of CIM_IndicationFilter that are defined by a management client and maintained by the server-side implementation. Client-defined filters enable a client to receive only the indications of interest. However, dynamic filters depend on the implementation being able to interpret the filter created by the client. Not all implementations, especially footprint-sensitive implementations, can act on the query defined in the filter.

While dynamic filters may be supported by an implementation, clients should first look for an existing instance of CIM_IndicationFilter that satisfies a need before attempting to create a dynamic filter. Adding unnecessary additional filters may adversely affect the performance of indication delivery by the implementation.

Finally, clients should check the indication service FilterCreationEnabled property value to determine if the implementation supports client-instantiated dynamic filters before attempting the CreateInstance operation to create the filter (see 9.2 for this use case). If the property value is False, the implementation does not support filter creation.

6.4 Filter Collections

This clause describes filter collections in general and the three specific types of collections.

6.4.1 General

A filter collection comprises indication filters and other filter collections. Filter collections are represented by instances of CIM_FilterCollection, which is derived from CIM_Collection and inherits the CIM_Collection behavior.

A client may subscribe to a filter collection directly. A subscription to a filter collection is recursively a subscription to all of the indication filters defined in the collection and any aggregated filter collections. An indication filter that is contained in a collection need not be explicitly modeled with an instance of CIM_IndicationFilter and associated through an instance of CIM_MemberOfCollection to the CIM_FilterCollection instance for the client to receive indications matching the filter. If a client is subscribed to a filter collection, for a given event the client can receive a discrete indication for each indication filter in the collection the event matches.

Profiles may define three types of filter collections: mandatory, conditional/optional, and additional profile specific. Each filter collection can be defined to include one or more indication filters. If an implementation supports at least one indication that satisfies a filter contained in a collection, the collection can be instantiated.

Filter collections defined in a profile are associated with the instance of CIM_RegisteredProfile that represents the profile through an instance of CIM_ConcreteDependency. An instance of CIM_FilterCollection is associated with the instance of CIM_IndicationService through an instance of CIM_OwningCollectionElement.

The instances of CIM_FilterCollection are associated with zero or more instances of CIM_IndicationFilter by using the CIM_MemberOfCollection association to represent the collection of filters supported in the context of the associated CIM_RegisteredProfile.

6.5 When to Instantiate CIM_IndicationFilter

To accommodate implementation footprint concerns about the cost of instantiating all of the potential instances of CIM_IndicationFilter, the following approach is available to reduce the number of indication filters instantiated. This approach applies to mandatory and conditional/optional indication definitions in profiles.

Because a profile could define filter collections for the mandatory and conditional or optional indications defined in a profile, a client application could subscribe to a collection to receive all of the indications generated by the indication filters that are in that collection. In this case, it is not necessary to explicitly instantiate the instances of the CIM_IndicationFilter that represent each indication filter. This approach allows the actual instantiation of indication filter instances for mandatory and conditional or optional indications to be optional.

Following are two reasons to explicitly instantiate instances of CIM_IndicationFilter that represent static filters that are supported:

- To enable a client application that does not have a priori knowledge of the indication filters specified by a profile to determine the indication filters supported for implementations of the profile
- To enable a client to subscribe to individual filters instead of all filters in a collection

An implementation may instantiate individual instances of CIM_IndicationFilter to satisfy the first goal without supporting individual subscription. The CIM_IndicationFilter.IndividualSubscriptionSupported property indicates whether subscription to the individual filter is supported.

Profiles may mandate specific instances of CIM_IndicationFilter and additionally mandate that individual subscription be supported. One reason for taking this approach is to enable clients to subscribe to the most important events within the profile, which may be a subset of those supported. See ANNEX A for more information about specifying indication constraints in referencing profiles.

6.6 Listener Destinations

A few implementation paradigms may be supported by an implementation for management of listener destinations. An implementation may support listener destination management through creation and deletion of instances of CIM_ListenerDestination. Alternately, an implementation may statically create instances of CIM_ListenerDestination and support the specification of desired destinations through modification of the instance of CIM_ListenerDestination. Implementations may support a hybrid model, in which they allow creation, modification, and deletion of instances of CIM_ListenerDestination. If an implementation statically creates instances of CIM_ListenerDestination and supports client modification, the CIM_ListenerDestination.Destination property should be NULL until it is modified by a client. If a client wants to indicate that a CIM_ListenerDestination is no longer in use, and is available to be used to specify a new destination, the client should set the value of the CIM_ListenerDestination.Destination property to NULL.

6.7 Indication Service

The CIM_IndicationService class represents the ability of the WBEM Server to send supported indications to a subscribing client application.

Various aspects of the service behavior are modeled, including

- support for client-instantiated filters
- definition of indication delivery retry attempts
- definition of indication delivery retry intervals
- support for subscription removal action
- definition of the subscription removal time interval

6.7.1 CIM_IndicationService.FilterCreationEnabled

The FilterCreationEnabled property controls whether clients can create indication filters. If this value is set to False, only the indication filters that exist can be subscribed to. If this value is True, clients may attempt to create filters. The implementation shall reject the client filter creation attempt if the filter specified cannot be supported. Implementations may preset this setting and not allow this value to be modified.

6.7.2 CIM_IndicationService.DeliveryRetryAttempts

The DeliveryRetryAttempts property defines the number of times that the indication service is going to try to deliver an indication to a particular listener destination. This value does not include the original delivery attempt; thus, if this value is set to 0, the indication service tries to deliver the indication only once. Implementations may preset this setting and not allow this value to be modified.

6.7.3 CIM_IndicationService.DeliveryRetryInterval

The DeliveryRetryInterval property defines the minimal time interval in seconds for the indication service to wait before delivering an indication to a particular listener destination that previously failed. The implementation may take longer due to QoS or other processing. Note that implementations may preset this setting and not allow this value to be modified.

6.7.4 CIM_IndicationService.SubscriptionRemovalAction

The SubscriptionRemovalAction property defines the removal action for subscriptions that have two failed indication deliveries without any successful indication deliveries in between and the time between the failed deliveries exceeded the timeout defined in the SubscriptionRemovalTimeInterval property. Implementations may preset this setting and not allow this value to be modified.

6.7.5 CIM_IndicationService.SubscriptionRemovalTimeInterval

The SubscriptionRemovalTimeInterval property defines the minimum time between two failed indication deliveries without any successful indication deliveries in between before the SubscriptionRemovalAction goes into effect.

6.7.6 CIM_IndicationServiceSettingData

The CIM_IndicationServiceSettingData class represents the configuration settings for the CIM_IndicationService class.

6.8 Indication Types and Processing

The two types of indications are

- lifecycle indications
- alert indications

Figure 2 depicts the indication class hierarchy. For simplicity, the *CIM_* prefix has been removed from the class names.

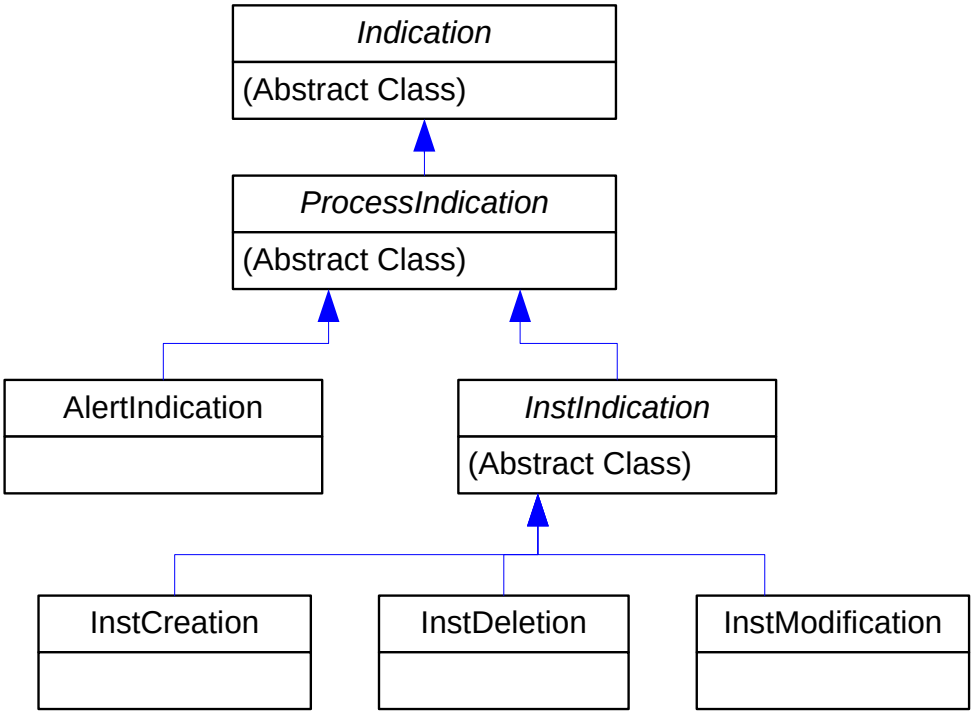


Figure 2 – Indication Class Diagram

6.8.1 Lifecycle Indications

Lifecycle indications are indications that provide notification of changes in the lifecycle of CIM instances and CIM class definitions. Only lifecycle indications related to changes in CIM instances are within the scope of this profile. Lifecycle indications related to changes in CIM instances are reported using instances of CIM_InstCreation, CIM_InstDeletion, or CIM_InstModification. They are used to convey changes in the model that reflect observations of changes in the managed element.

6.8.2 Alert Indications

Alert indications draw the attention of subscribing client applications to the occurrence of an event. Alert indications may describe aspects of an event that may or may not have other representation in CIM.

6.9 Subscription Management Authorization

This profile makes no explicit provisions for managing the permissions of a client with respect to its ability to create, modify, or delete indication subscriptions. Any coordination between management clients or access management to govern the ability of one client to make changes that affect the indications delivered to another client are outside the scope of this profile.

7 Implementation

This clause details the requirements related to the arrangement of instances and their properties for implementations of this profile. Methods are listed in Clause 8 ("Methods") and properties are listed in Clause 10 ("CIM Elements").

7.1 CIM_IndicationService

CIM_IndicationService represents a component of the WBEM Server Service that represents support for indication subscription.

7.1.1 General Requirements

One or more instances of CIM_IndicationService shall be instantiated in the Interop namespace.

7.1.2 Profile Default Configuration

To encourage consistent behavior across implementations of the indication service, a common default configuration for each instance of CIM_IndicationService is defined. Unless the CIM_IndicationService has been explicitly configured to behave differently, the following default values should be used for selected properties of CIM_IndicationService:

- DeliveryRetryAttempts matches 3.
- DeliveryRetryInterval matches 20.
- SubscriptionRemovalAction matches 2 (Remove).
- SubscriptionRemovalTimeInterval matches 2,592,000.

  NOTE: 2,592,000 seconds is equivalent to 30 days.

7.2 CIM_IndicationServiceSettingData (Optional)

The CIM_IndicationServiceSettingData class is used for the initial configuration settings for the indication service. An instance of CIM_IndicationServiceSettingData may be associated with the instance of CIM_IndicationService through an instance of CIM_ElementSettingData.

7.3 Indication Filters

Support for an indication filter may be explicitly modeled with an instance of CIM_IndicationFilter. Support for an indication filter may be implicitly modeled by instantiating an instance of CIM_FilterCollection that is defined by a profile to contain the indication filter. Indication filters shall be defined as mandatory, optional, or conditional in a profile.

If an indication filter is defined as mandatory, the indication filter shall be supported if a server-side implementation of a profile supports at least one indication filter defined in the profile.

If an indication filter is defined as optional or conditional, the indication filter may be supported.

7.4 CIM_IndicationFilter

CIM_IndicationFilter represents the potential of an implementation to produce a particular indication. The filter may also describe the model changes that can result in that indication. For life cycle indications, the model change described in the query precedes the production of an indication communicating that change. For other types of indications, the model change may be the production of the indication instance itself.

7.4.1 General Requirements

On a create instance operation request, if the specified CIM_IndicationFilter instance is supported by the implementation, it shall be created in the requested namespace. It shall also be created in the Interop namespace if the requested and Interop namespaces are different. All such instances shall have the same keys.

A creation of a CIM_IndicationFilter shall fail if its semantics are unable to be supported in the namespaces listed in SourceNamespaces property entries. If the operation fails, no instances shall be created.

Instantiation of a CIM_IndicationFilter may be initiated either by the implementation or by a client application.

Each instance of CIM_IndicationFilter shall be associated with exactly one instance of CIM_IndicationService through an instance of CIM_ServiceAffectsElement.

One or more instances of CIM_IndicationFilter may be instantiated by either an implementation or the client application. Each instance of CIM_IndicationFilter shall be associated with exactly one instance of CIM_IndicationService through an instance of CIM_ServiceAffectsElement.

If the CIM_IndicationFilter.IndividualSubscriptionSupported property has the value True, the instance of CIM_IndicationFilter may be associated with one or more instances of CIM_ListenerDestination through an instance of CIM_IndicationSubscription. If the CIM_IndicationFilter.IndividualSubscriptionSupported property has the value False, the instance of CIM_IndicationFilter shall not be associated with any instances of CIM_ListenerDestination through an instance of CIM_IndicationSubscription.

Each instance of CIM_IndicationFilter may be associated with one or more instances of CIM_FilterCollection that represent vendor-supplied indications or other vendor-defined indication collections.

7.4.2 Indication Filter Validity

An instance of CIM_IndicationFilter shall be considered valid under the following conditions:

- The value of the QueryLanguage property identifies a query language supported by the indication service.
- The value of the Query property is well formed according to the supported query language. LifeCycle Indication Filters shall include a WHERE clause.
- The server-side implementation is capable of producing indications that are selected by the filter.

7.4.3 Static Filter Creation

An implementation may instantiate instances of CIM_IndicationFilter for conditional, optional, or vendor-specific indications that are supported in the context of a profile implementation but that are beyond the scope of the indication requirements of that profile. If non-mandatory indications are supported, they shall be categorized into instances of CIM_FilterCollection that match the requirement from the profile (Mandatory, Conditional/Optional) or that are vendor-specific. See 7.6 for CIM_FilterCollection instantiation requirements.

Autonomous profiles may define filters that include indications outside the immediate scope of the profile (for example, SELECT * FROM CIM_AlertIndication). Implementations may instantiate vendor-defined filters that are outside the scope of any particular profile.

If an instance of CIM_IndicationFilter represents a static filter that is mandatory in the defining profile, it shall be associated through an instance of CIM_MemberOfCollection with the instance of CIM_FilterCollection that is implemented as defined in 7.6. If an instance of CIM_IndicationFilter represents a static filter that is optional or conditional in the defining profile, it shall be associated through an instance of CIM_MemberOfCollection with the instance of CIM_FilterCollection that is implemented as defined in 7.6.

7.4.4 Dynamic Filter Creation

Constraints on the creation of dynamic filters are specified in 8.6.1.

Client filters are instantiated by a management application by using the intrinsic method CreateInstance. The management application populates the Query property with a properly formatted query per the requirements of the query language specified in the QueryLanguage property.

7.4.5 Subscribing to Dynamic Filters

Clients subscribe to dynamic filters by creating an instance of CIM_IndicationSubscription that references the CIM_IndicationFilter instance that represents the dynamic filter and an instance of CIM_ListenerDestination that represents the desired destination (see 8.9.1).

7.4.6 CIM_IndicationFilter.Query

When an instance of CIM_IndicationFilter is created, the Query property shall be populated with a properly formed query per the requirements of the query language identified in the QueryLanguage property.

EXPERIMENTAL

7.4.7 CIM_IndicationFilter.SourceNamespaces

For static filters, the SourceNamespaces property shall be formatted according to the format used by the WBEM Server.

If an instance of CIM_IndicationFilter is implemented in the Interop namespace, the SourceNamespaces property shall contain the name of each namespace in which indications can be produced or that contains CIM_ManagedElement instances for which indications can be produced, where the indications match the filter specified by the CIM_IndicationFilter instance.

If an instance of CIM_IndicationFilter is implemented in an implementation namespace, the SourceNamespaces property does not need to be populated if the indication originates in the same namespace as the filter.

As part of defining dynamic filters, the SourceNamespaces array property is filled in by the application client upon creation of the indication filter or upon subsequent modifications of the indication filter instance.

EXPERIMENTAL

7.4.8 CIM_IndicationFilter.Name

If an instance of CIM_IndicationFilter is created, the Name property shall be populated with a properly formed <OrgID>:<LocalID> structured value as defined in the MOF class definition for CIM_IndicationFilter.

For instances of CIM_IndicationFilter defined by DMTF profiles, the value shall be formatted as follows:

"DMTF:"<RegisteredName> ":" <unique identifier>

where

<RegisteredName> is the value assigned by the defining profile to the CIM_RegisteredProfile.RegisteredName property for the instance of CIM_RegisteredProfile that is used to advertise implementation of the profile.

<unique identifier> is a string value unique within the scope of the defining profile.

If the incorporating profile is not a DMTF management profile, the CIM_IndicationFilter.Name property shall be formatted as follows:

<OrgID> : <LocalID>, where <OrgID> and <LocalID> are separated by a colon (:) and <OrgID> shall include a copyrighted, trademarked, or otherwise unique name that is owned by the business entity that is creating or defining the value or that is a registered ID assigned to the business entity by a recognized global authority. In addition, to ensure uniqueness, <OrgID> shall not contain a colon (:). If this algorithm is used, the first colon to appear in the value shall appear between <OrgID> and <LocalID>. The <LocalID> is chosen by the business entity and shall be used uniquely.

7.5 CIM_ListenerDestination

CIM_ListenerDestination represents a destination for the delivery of indications.

7.5.1 General Requirements

On a create instance request, an instance of CIM_ListenerDestination shall be created in the namespace specified in the request. If the specified namespace is not the interop namespace, an addiitonal instance of CIM_ListenerDestination shall be created in the interop namespace. Each such instance shall have the same keys.

Creation of a CIM_ListenerDestination shall fail if its semantics are unable to be supported in the interop namespace or its creation namespace.

Instantiation of a CIM_ListenerDestination may be initiated either by the implementation or by a client application.

Each instance of CIM_ListenerDestination shall be associated with exactly one instance of CIM_IndicationService through an instance of CIM_ServiceAffectsElement.

Any instance of CIM_ListenerDestination may be associated with one or more instances of CIM_IndicationFilter through an instance of CIM_IndicationSubscription, with one or more instances of CIM_FilterCollection through an instance of CIM_FilterCollectionSubscription, or both.

If an instance of CIM_ListenerDestination is not associated with any instance of CIM_IndicationFilter or CIM_FilterCollection, the client application should reuse the instance of CIM_ListenerDestination and not create a new one.

7.5.2 CIM_ListenerDestination.Destination

If the value of the CIM_ListenerDestination.Destination property is not NULL, the property value shall be a valid IETF Uniform Resource Identifier value (as defined in RFC 3986). The implementation shall reject a value that does not include the scheme, host and port as part of the URI Location.

7.5.3 CIM_ListenerDestination.PersistenceType

The CIM_ListenerDestination.PersistenceType property shall contain a value of 3 (Transient), 2 (Permanent), or NULL. A value of NULL shall default to Permanent behavior.

The PersistenceType property describes the durability of the destination for indication delivery. When the PersistenceType property value is NULL or is explicitly set to 2 (Permanent), it indicates to the WBEM Server that the delivery destination for the subscribed indications is long-lived and shall be available for indication delivery (for example, the destination identifies a system log file). An inability of the WBEM Server to deliver an indication to a Permanent destination shall be treated as an error condition.

A client may choose to set the value of the PersistenceType property to 3 (Transient) to indicate to the WBEM Server that the delivery destination for the subscribed indications is short-lived (for example, a task progress meter in a graphical management application). Instances of CIM_ListenerDestination that have the PersistenceType property set to 3 (Transient) shall be deleted if the WBEM Server cannot deliver a subscribed indication to the client destination (based on the CIM_IndicationServiceSettingData.DeliveryRetryAttempts property). All instances of CIM_IndicationSubscription or CIM_FilterCollectionSubscription that reference the instance of CIM_ListenerDestination shall be deleted as well.

7.6 CIM_FilterCollection

CIM_FilterCollection is used to define a collection of indication filters supported in the context of a particular profile or implementation.

Each instance of CIM_FilterCollection shall be instantiated in the Interop Namespace.

Creation of a CIM_FilterCollection shall fail if its semantics are unable to be supported in the interop namespace.

Either a CIM client or the implementation may create instances of CIM_FilterCollection.

7.6.1 Relationship with Indication Service

Every instance of CIM_FilterCollection shall be associated with exactly one instance of CIM_IndicationService through an instance of CIM_OwningCollectionElement.

7.6.2 Nested Filter Collections

An instance of CIM_FilterCollection may be associated with one or more instances of CIM_FilterCollection through an instance of CIM_MemberOfCollection.

7.6.3 Relationship with Registered Profile

Each instance of CIM_FilterCollection shall be associated with exactly one instance of CIM_RegisteredProfile through an instance of CIM_ConcreteDependency where the instance of CIM_RegisteredProfile represents the registration of the profile to which the indications pertain. This allows a client to discover all of the mandatory, optional, conditional, and vendor-specific indication filters supported by the implementation of a particular profile.

7.6.4 CIM_FilterCollection.CollectionName

The CollectionName property shall be generated as a structured value property of the form `<OrgID> : <CollectionID>` as specified by the MOF definition of the CIM_FilterCollection class.

For instances of CIM_FilterCollection defined by DMTF profiles, the value for CollectionName shall be formatted as follows:

`"DMTF:" <unique identifier>`

where:

`<unique identifier>` is a string value unique within the scope of the defining profile.

If the incorporating profile is not a DMTF management profile, the CIM_FilterCollection.CollectionName property shall be formatted as follows:

`<OrgID> : <LocalID>`, where `<OrgID>` and `<LocalID>` are separated by a colon (:) and `<OrgID>` shall include a copyrighted, trademarked, or otherwise unique name that is owned by the business entity that is creating or defining the value or that is a registered ID assigned to the business entity by a recognized global authority. In addition, to ensure uniqueness, `<OrgID>` shall not contain a colon (:). If this algorithm is used, the first colon to appear in the value shall appear between `<OrgID>` and `<LocalID>`. `<LocalID>` is chosen by the business entity and shall be used uniquely.

7.7 WBEM Server Requirements

WBEM Server may support indications. However, if a WBEM Server supports indications, the WBEM Server shall

- Instantiate a single instance of CIM_IndicationService
- Support the indications of the *Indications Profile* as specified in the CIM Elements table in Clause 10
- Support the ability to subscribe for indications using the classes defined in the *Indications Profile*
- Support indication filters in the Interop namespace
- support indications as defined in profiles that are advertised as implemented in the Interop namespace

A WBEM Server may support client-instantiated indication filters (instances of CIM_Indication filter or CIM_FilterCollection).

7.8 CIM_IndicationSubscription

On a create instance request, if the corresponding CIM_IndicationSubscription instance is supported, it shall be created in the requested namespace. It shall also be created in the interop namespace if the requested namespace and the Interop namespace are different. Additionally, for each source namespace

871 listed in the corresponding CIM_IndicationFilter instance found in the Interop namespace a corresponding
872 instance of CIM_IndicationSubscription should be instantiated between the corresponding
873 CIM_IndicationFilter instance in the source namespace and the associated CIM_ListenerDestination
874 instance in that same namespace if it exists.

875 A creation of a CIM_IndicationSubscription shall fail if its semantics are unable to be supported in the
876 Interop namespace or its creation namespace.

877 Instantiation of a CIM_IndicationSubscription may be initiated either by the implementation or by a client
878 application.

879 7.8.1 CIM_IndicationSubscription.OnFatalErrorPolicy

880 A client uses the CIM_IndicationSubscription.OnFatalErrorPolicy property to define the desired behavior
881 for a subscription when a failure occurs that implies that some aspect of indication generation processing
882 or dispatch is no longer functioning and indications may be lost. A value of 4 (Remove) requires that an
883 implementation abide by the CIM_IndicationService.SubscriptionRemovalAction setting (see 7.1) and
884 behavior. The default value for this property should be 4 (Remove) if the client application does not
885 specify a value.

886 7.8.2 CIM_IndicationSubscription.RepeatNotificationPolicy

887 The RepeatNotificationPolicy property of the CIM_IndicationSubscription class defines the desired
888 behavior for handling indications that report the occurrence of the same underlying event (for example,
889 the disk is still generating I/O errors and has not yet been repaired). This also includes multiple
890 indications that are generated from a single indication filter. Repeated indications are indications in which
891 all the indication instance property values are the same except for the IndicationIdentifier and
892 IndicationTime properties.

893 The use of the RepeatNotificationCount, RepeatNotificationInterval, and RepeatNotificationGap
894 properties defined in the CIM_IndicationSubscription class depends on the value of the
895 RepeatNotificationPolicy property.

896 The RepeatNotificationPolicy may vary by implementation (or even IndicationFilter). However, it shall be
897 specified on all subscriptions. The valid values for an implementation are as follows:

898 - 2 (None)
899 - 3 (Suppress)
900 - 4 (Delay)

901 A profile may restrict these values further for any given indication filter, but it shall not expand the values
902 to other policies due to interoperability constraints. For example, a profile may restrict InstCreation filters
903 for CIM_ComputerSystem to 2 (None) and restrict InstModification filters on CIM_StorageVolume to
904 Suppress or Delay. However, profiles shall not define Unknown as a valid setting for the
905 RepeatNotificationPolicy property.

906 RepeatNotificationPolicy = None

907 If the value of the RepeatNotificationPolicy property is 2 (None), special processing of repeat indications
908 shall not be performed.

909 RepeatNotificationPolicy = Suppress

910 If the value of the RepeatNotificationPolicy property is 3 (Suppress), indications are delivered up to the
911 value of the RepeatNotificationCount property; after that, all subsequent indications are suppressed for
912 the time interval defined in the RepeatNotificationInterval property. When the time interval expires,
913 suppression expires. Any indication that matches the filter is included in the calculation of the indication

count that is compared with the RepeatNotificationCount value. A new interval starts when the next indication for this event is received after the previous interval has expired.

RepeatNotificationPolicy = Delay

If the value of the RepeatNotificationPolicy property is 4 (Delay) and an indication is generated, this indication shall be suppressed if, including this indication, RepeatNotificationCount or fewer indications for the same event have been generated during the time interval defined by RepeatNotificationInterval. If this indication is the RepeatNotificationCount + 1 indication instance generated, this indication shall be delivered and all subsequent indications for this event shall be ignored until the RepeatNotificationGap has elapsed. A RepeatNotificationInterval may not overlap a RepeatNotificationGap time interval.

7.9 CIM_FilterCollectionSubscription

On a create instance request, if the corresponding CIM_ FilterCollectionSubsctiption instance is supported, it shall be created in the creation namespace, and if different, the Interop namespace.

A creation of a CIM_FilterCollectionSubscription shall fail if its semantics are unable to be supported in the Interop namespace or its creation namespace.

Instantiation of a CIM_FilterCollectionSubscription may be initiated either by the implementation or by a client application.

7.10 Indication Delivery

Indication delivery is based on a publish/subscribe event paradigm. Thus, the subscriber (client or destination) may not always be available at the time the indication occurs. If the listener is not available when the WBEM Server attempts to deliver the indication, the WBEM Server may make additional attempts to deliver the indication. It is implementation specific whether the deliver of an indication is preempted when concurrently the subscription is disabled or deleted when the indication is being attempted. Once WBEM Server has successfully delivered the indication, it shall not attempt to do so again. The number and interval of retry attempts are specified by the DeliveryRetryAttempts and DeliveryRetryInterval properties of CIM_IndicationServiceSettingData class, and may or may not be configurable.

Instances of CIM_ListenerDestination that have PersistenceType property set to 3 (Transient) shall be deleted if the WBEM Server cannot deliver a subscribed indication to the client destination (based on the CIM_IndicationServiceSettingData.DeliveryRetryAttempts property). All instances of the CIM_IndicationSubscription or CIM_FilterCollectionSubscription associations that reference the instance of CIM_ListernerDestination shall be deleted as well, unsubscribing the transient client from the indications.

7.11 Using Message Registries

A message registry is an XML document that contains entries that consist of standard message identifiers and static and dynamic message elements. An instance of CIM_AlertIndication may contain a standard message. The OwningEntity, MessageID, Message, and MessageArguments properties of the CIM_AlertIndication class are used to describe the content of an alert indication that is produced by instrumentation for a managed element. See DSP0228, Message Registry XML Schema Specification, for further provisions.

If an instance of CIM_AlertIndication contains a standard message, the following constraints shall be met:

- The MessageID property shall contain the message identifier from the registry.
- The OwningEntity property shall contain the identifier of the organization that defined the registry.

- The MessageArguments property shall contain the dynamic content of the message as defined by the message registry. The absolute ordering of the dynamic content shall be maintained.
- The Message property may contain the formatted message from the registry.

7.12 Indication Subscription Removal

The WBEM Server may remove an indication subscription if the delivery destination (that is, CIM_ListenerDestination.Destination) cannot be reached within the number of delivery retry attempts and the retry interval specified in the CIM_IndicationServiceSettingData instance's DeliveryRetryAttempts and DeliveryRetryInterval properties. The removal of an indication subscription is governed by the CIM_IndicationService.SubscriptionRemovalAction property value. If the SubscriptionRemovalAction property has a value of 2 (Remove), the subscription shall be removed after two failed indication deliveries occur without any successful indication deliveries in between and with the time between the deliveries exceeding the timeout specified in the CIM_IndicationService.SubscriptionRemovalTimeInterval property.

A client may remove an indication subscription by performing a DeleteInstance operation on the association instance created to activate the indication subscription (that is, the instance of CIM_IndicationSubscription or CIM_FilterCollectionSubscription). If there are no other subscriptions to this destination, the client may additionally remove the CIM_ListenerDestination that identified the indication delivery destination or leave that instance for future indication subscription.

7.13 Implementation of Profile Specifications

An implementation shall deliver all supported lifecycle indications to all clients that are subscribed to filters that select the supported alert indications.

An implementation shall deliver all supported alert indications to all clients that are subscribed to filters that select the supported alert indications.

7.14 CIM_IndicationServiceCapabilities

An instance of CIM_IndicationServiceCapabilities shall be instantiated when the implementation supports the direct modification of any properties of the indication service. The CIM_IndicationServiceCapabilities instance shall be associated with the affected instance of CIM_IndicationService through an instance of CIM_ElementCapabilities. If the implementation does not support the direct modification of any properties on the indication service, the implementation may not instantiate an instance of CIM_IndicationServiceCapabilities. The absence of an instance of CIM_IndicationServiceCapabilities associated with the CIM_IndicationService indicates that modification of properties of the CIM_IndicationService by a client is not supported.

7.15 Indication.IndicationFilterName Property

At the time of the creation of an indication, an implementation may not have the information about the indication filters and/or filer collections that match the created indication. After the creation of the indication, the information about the indication filters and/or filter collections that matched the indication becomes known. Before the delivery of the indication, the information about all the matched indication filters shall be included in the IndicationFilterName property. The IndicationFilterName property contains the indication filter names (values of property CIM_IndicationFilter.Name) for the indication that matched the indication filters listed in this array. For each active subscription to each of the matched indication filters and/or filter collections, the indication shall be delivered. A management client may use this property to match the indication received with semantics known a priori by the client. A management profile ought to list the indications that a profile implementation can produce and why. A client implementation of this profile uses this property to determine what indication was produced, as documented in the profile, and why.

If the IndicationFilter class is implemented, then the IndicationFilterName property of each instance of CIM_Indication shall contain the names of the indication filters that matched the indication. Otherwise, this property shall contain implementation specific name(s) that allow the client to match the indication with the implementation specific semantics.

7.16 Advertising Profile Conformance

Each instance of CIM_IndicationService shall be associated with exactly one instance of CIM_RegisteredProfile, where the instance of CIM_RegisteredProfile is implemented as defined in 10.19.

7.17 Indications for the Indications Profile

This clause details the constraints for supporting indications specific to the *Indications Profile*.

7.17.1 Mandatory Indications

No mandatory indications are specified in this profile; therefore, there is no definition of a mandatory filter collection.

7.17.2 Conditional and Optional Indications

This clause describes the requirements for conditional and optional indications for implementations of the Indications Profile.

Conditional/Optional Filter Collection

There may be an instance of CIM_FilterCollection in which the CIM_FilterCollection.CollectionName property has the value "DMTF:Indications:Conditional/Optional".

Listener Destination Removal

There may be an indication filter as defined in this clause. Subscribers to this indication filter can be informed when a listener destination is deleted.

7.17.2.1.1 Indication Filter Name

The indication filter name shall be "DMTF:Indications:ListenerDestinationRemoval".

7.17.2.1.2 Filtered Events

The indication filter shall filter for notification of the deletion of instances of CIM_ListenerDestination.

7.17.2.1.3 Query

The CIM_IndicationFilter.Query property may have the value "SELECT * FROM CIM_InstDeletion WHERE SourceInstance ISA CIM_ListenerDestination".

Indication Subscription Removal

There may be an indication filter as defined in this clause.

Subscribers to this indication are going to be informed when a subscription is deleted. An indication is not going to be sent to the clients who have unsubscribed because the subscription is absent.

7.17.2.1.4 Indication Filter Name

The indication filter name shall be "DMTF:Indications:IndicationSubscriptionRemoval".

7.17.2.1.5 Filtered Events

The indication filter shall filter for notification of the deletion of instances of CIM_IndicationSubscription.

7.17.2.1.6 Query

The CIM_IndicationFilter.Query property may have the value "SELECT * FROM CIM_InstDeletion WHERE SourceInstance ISA CIM_IndicationSubscription".

Filter Collection Subscription Removal

There may be an indication filter as defined in this clause.

Subscribers to this indication are going to be informed when a subscription to a filter collection is deleted. An indication is not going to be sent to the clients who have unsubscribed because the subscription is absent.

7.17.2.1.7 Indication Filter Name

The indication filter name shall be "DMTF:Indications:FilterCollectionSubscriptionRemoval".

7.17.2.1.8 Filtered Events

The indication filter shall filter for notification of the deletion of instances of CIM_FilterCollectionSubscription.

7.17.2.1.9 Query

The CIM_IndicationFilter.Query property may have the value "SELECT * FROM CIM_InstDeletion WHERE SourceInstance ISA CIM_FilterCollectionSubscription".

8 Methods

This section details the requirements for supporting intrinsic operations for the CIM elements defined by this profile. No extrinsic methods are defined by this profile.

8.1 Profile Conventions for Operations

For each profile class (including associations), the implementation requirements for operations, including those in the following default list, are specified in class-specific subclauses of this clause.

The default list of operations is as follows:

- GetInstance
- Associators
- AssociatorNames
- References
- ReferenceNames
- EnumerateInstances
- EnumerateInstanceNames

8.2 CIM_HostedService

Table 2 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 2, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

Table 2 – Operations: CIM_HostedService

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.3 CIM_IndicationService

Table 3 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 3, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

Table 3 – Operations: CIM_IndicationService

Operation	Requirement	Messages
ModifyInstance	Conditional	See 8.3.1.

8.3.1 CIM_IndicationService—ModifyInstance

This section details the requirements for the ModifyInstance operation applied to an instance of CIM_IndicationService.

General

Support for the ModifyInstance operation is conditional. The ModifyInstance operation shall be supported for an instance of CIM_IndicationService if an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and at least one of the following properties of the CIM_IndicationServiceCapabilities instance has a value of True:

- FilterCreationEnabledIsSettable
- DeliveryRetryAttemptsIsSettable
- DeliveryRetryIntervalIsSettable
- SubscriptionRemovalActionIsSettable
- SubscriptionRemovalTimeIntervalIsSettable

CIM_IndicationService.FilterCreationEnabled

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the FilterCreationEnabledIsSettable property of the CIM_IndicationServiceCapabilities instance has a

value of True, the implementation shall allow the ModifyInstance operation to change the value of the FilterCreationEnabled property of the CIM_IndicationService instance.

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the FilterCreationEnabledIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of False, the implementation shall not allow the ModifyInstance operation to change the value of the FilterCreationEnabled property of the CIM_IndicationService instance.

CIM_IndicationService.DeliveryRetryAttempts

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the DeliveryRetryAttemptsIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of True, the implementation shall allow the ModifyInstance operation to change the value of the DeliveryRetryAttempts property of the CIM_IndicationService instance.

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the DeliveryRetryAttemptsIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of False, the implementation shall not allow the ModifyInstance operation to change the value of the DeliveryRetryAttempts property of the CIM_IndicationService instance.

CIM_IndicationService.DeliveryRetryInterval

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the DeliveryRetryIntervalIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of True, the implementation shall allow the ModifyInstance operation to change the value of the DeliveryRetryInterval property of the CIM_IndicationService instance.

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the DeliveryRetryIntervalIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of False, the implementation shall not allow the ModifyInstance operation to change the value of the DeliveryRetryInterval property of the CIM_IndicationService instance.

CIM_IndicationService.SubscriptionRemovalAction

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the SubscriptionRemovalActionIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of True, the implementation shall allow the ModifyInstance operation to change the value of the SubscriptionRemovalAction property of the CIM_IndicationService instance.

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the SubscriptionRemovalActionIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of False, the implementation shall not allow the ModifyInstance operation to change the value of the SubscriptionRemovalAction property of the CIM_IndicationService instance.

CIM_IndicationService.SubscriptionRemovalTimeInterval

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the SubscriptionRemovalTimeIntervalIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of True, the implementation shall allow the ModifyInstance operation to change the value of the SubscriptionTimeInterval property of the CIM_IndicationService instance.

If an instance of CIM_IndicationServiceCapabilities is associated with the CIM_IndicationService instance and the SubscriptionRemovalTimeIntervalIsSettable property of the CIM_IndicationServiceCapabilities instance has a value of False, the implementation shall not allow the ModifyInstance operation to change the value of the SubscriptionTimeInterval property of the CIM_IndicationService instance.

8.4 CIM_IndicationServiceCapabilities

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

8.5 CIM_IndicationServiceSettingData

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

8.6 CIM_IndicationFilter

Table 4 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 4, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

Table 4 – Operations: CIM_IndicationFilter

Operation	Requirement	Messages
CreateInstance	Conditional	See 8.6.1.
DeleteInstance	Conditional	See 8.6.2.
ModifyInstance	Optional	See 8.6.3.

8.6.1 CIM_IndicationFilter—CreateInstance

This section details the requirements for the CreateInstance operation applied to an instance of CIM_IndicationFilter.

General Requirements

The WBEM Server shall return a status code of CIM_ERROR_NOT_SUPPORTED in response to the CreateInstance method invoked by the client if the indication service is unable to support the indication filter. If an error is returned, the subscription is not activated.

If the CIM_IndicationFilter is valid and the indication service is able to support it, the server-side implementation shall create an instance CIM_ServiceAffectsElement that associates the CIM_IndicationFilter instance to the instance of CIM_IndicationService.

If a client attempts to create an instance of CIM_IndicationFilter by using the CreateInstance operation and the implementation determines that the query is invalid or not supportable, the implementation shall reject the operation and return a status code of CIM_ERROR_INVALID_PARAMETER in a CIM_Error instance response.

If a client attempts to create an instance of CIM_IndicationFilter by using the CreateInstance operation and dynamic filters are not supported by the WBEM Server in this case, the WBEM Server shall reject the operation and return a status code of CIM_ERROR_NOT_SUPPORTED in a CIM_Error instance response.

If a client attempts to create an instance of CIM_IndicationFilter by using the CreateInstance operation and the implementation is able to determine that an identical instance of CIM_IndicationFilter exists, the implementation should reject the operation and return a status code of CIM_ERROR_ALREADY_EXISTS in a CIM_Error instance response. The existing CIM_IndicationFilter instance object path shall be specified in the returned CIM_Error.ErrorSource instance property.

Clients should not populate the key properties of CIM_IndicationFilter when performing the CreateInstance operation. If the client populates the key properties of CIM_IndicationFilter, the implementation shall ignore these properties.

Conditional Requirement

The CreateInstance operation shall be supported for CIM_IndicationFilter if either of the following conditions is met:

- The CIM_IndicationService.FilterCreationEnabled property has the value True.
- An associated instance of CIM_IndicationServiceCapabilities exists, and the CIM_IndicationServiceCapabilities.FilterCreationEnabledIsSettable property has the value True.

8.6.2 CIM_IndicationFilter—DeleteInstance

This section details the requirements for the DeleteInstance operation applied to an instance of CIM_IndicationFilter.

General Requirements

If the instance of CIM_IndicationFilter is referenced by one or more instances of CIM_IndicationSubscription, the DeleteInstance operation shall not delete the CIM_IndicationFilter instance. If the CIM_IndicationFilter instance is not deleted, the operation shall return an error.

If an instance of CIM_IndicationFilter is deleted, all instances of CIM_ServiceAffectsElement that reference the instance of CIM_IndicationFilter shall also be deleted by the server-side implementation.

If a client attempts to delete a static instance of CIM_IndicationFilter by using the DeleteInstance operation, the WBEM Server shall reject the operation and return a status code of CIM_ERROR_NOT_SUPPORTED.

Conditional Requirement

The DeleteInstance operation shall be supported for CIM_IndicationFilter if either of the following conditions is met:

- The CIM_IndicationService.FilterCreationEnabled property has the value True.
- An associated instance of CIM_IndicationServiceCapabilities exists, and the CIM_IndicationServiceCapabilities.FilterCreationEnabledIsSettable property has the value True.

8.6.3 CIM_IndicationFilter—ModifyInstance

The ModifyInstance operation may be supported for an instance of CIM_IndicationFilter that represents a dynamic filter. The ModifyInstance operation may be supported for an instance of CIM_IndicationFilter that represents a static filter that is not defined by a profile. The ModifyInstance operation shall not be supported for an instance of CIM_IndicationFilter that represents a static filter defined by a profile.

8.7 CIM_FilterCollection

All operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

8.8 CIM_ListenerDestination

Table 5 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 5, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

Table 5 – Operations: CIM_ListenerDestination

Operation	Requirement	Messages
CreateInstance	Optional	See 8.8.1.
DeleteInstance	Optional	See 8.8.2.
ModifyInstance	Optional	See 8.8.3.

8.8.1 CIM_ListenerDestination—CreateInstance

This section details the requirements for the CreateInstance operation applied to an instance of CIM_ListenerDestination.

Upon successful creation of the instance of CIM_ListenerDestination, the server-side implementation shall create an instance of CIM_ServiceAffectsElement in which the AffectedElement property value references the instance of CIM_ListenerDestination created and the Service property references the instance of the CIM_IndicationService that can manage the listener destination information.

If as many instances of CIM_ListenerDestination exist as the value of the CIM_IndicationServiceCapabilities.MaxListenerDestination property, the CreateInstance method shall fail.

8.8.2 CIM_ListenerDestination—DeleteInstance

This section details the requirements for the DeleteInstance operation applied to an instance of CIM_ListenerDestination.

If the instance of CIM_ListenerDestination is referenced by one or more instances of CIM_IndicationSubscription or CIM_FilterCollectionSubscription, the DeleteInstance operation shall not delete the CIM_ListenerDestination instance. Otherwise, if the CIM_ListenerDestination instance is not deleted, the operation shall return an error.

When an instance of CIM_ListenerDestination is deleted, all instances of CIM_ServiceAffectsElement in which the AffectedElement property value references the instance of CIM_ListenerDestination to be deleted shall also be deleted.

8.8.3 CIM_ListenerDestination—ModifyInstance

The ModifyInstance operation may be supported for an instance of CIM_ListenerDestination.

8.9 CIM_IndicationSubscription

Table 6 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 6, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

1240 **Table 6 – Operations: CIM_IndicationSubscription**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None
CreateInstance	Conditional. See 8.9.1.	None
DeleteInstance	Conditional. See 8.9.2.	None
ModifyInstance	Optional. See 8.9.3.	None

1241 ### 8.9.1 CIM_IndicationSubscription—CreateInstance

1242 This section details the requirements for the CreateInstance operation applied to an instance of
1243 CIM_IndicationSubscription.

1244 Support for the CreateInstance operation is conditional. The CreateInstance operation shall be supported
1245 if at least one instance of CIM_IndicationFilter is associated with the CIM_IndicationService through an
1246 instance of CIM_ServiceAffectsElement, where the CIM_IndicationFilter.IndividualSubscriptionSupported
1247 property has the value True.

1248 The CreateInstance operation shall return a status code of CIM_ERROR_NOT_SUPPORTED if the
1249 referenced instance of CIM_IndicationFilter is not valid. If an error is returned, the subscription is not
1250 activated. Successful creation of an instance of CIM_IndicationSubscription activates the client
1251 application's subscription for delivery of the indications selected by the specified indication filter to the
1252 specified destination.

1253 The CreateInstance operation shall return a status code of CIM_ERROR_NOT_SUPPORTED if the value
1254 of the CIM_IndicationFilter.IndividualSubscriptionSupported property is False for the referenced instance
1255 of CIM_IndicationFilter.

1256 ### 8.9.2 CIM_IndicationSubscription—DeleteInstance

1257 This section details the requirements for the DeleteInstance operation applied to an instance of
1258 CIM_IndicationSubscription.

1259 Support for the DeleteInstance operation is conditional. The DeleteInstance operation shall be supported
1260 if at least one instance of CIM_IndicationFilter is associated with the CIM_IndicationService instance
1261 through an instance of CIM_ServiceAffectsElement, where the
1262 CIM_IndicationFilter.IndividualSubscriptionSupported property has the value True.

1263 Upon deletion of an instance of CIM_IndicationSubscription, the client application subscription is
1264 deactivated and the destination is considered unsubscribed.

1265 ### 8.9.3 CIM_IndicationSubscription—ModifyInstance

1266 The ModifyInstance operation may be supported for an instance of CIM_IndicationSubscription.

1267 ## 8.10 CIM_FilterCollectionSubscription

1268 Table 7 lists implementation requirements for operations. If implemented, these operations shall be
1269 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 7, all operations in
1270 the default list in 8.1 shall be implemented as defined in DSP0200.

1271 NOTE: Related profiles may define additional requirements on operations for the profile class.

1272 **Table 7 – Operations: CIM_FilterCollectionSubscription**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None
CreateInstance	Mandatory. See 8.10.1.	None
DeleteInstance	Mandatory. See 8.10.2.	None
ModifyInstance	Optional. See 8.10.3.	None

1273 ### 8.10.1 CIM_FilterCollectionSubscription—CreateInstance

1274 This section details the requirements for the CreateInstance operation applied to an instance of
1275 CIM_FilterCollectionSubscription.

1276 Successful creation of an instance of CIM_FilterCollectionSubscription activates the client application's
1277 subscription for delivery of the indications selected by the indication filters that are members of the
1278 collection subscribed to. Subscriptions are also recursively activated to collections that are members of
1279 the collection subscribed to.

1280 ### 8.10.2 CIM_FilterCollectionSubscription—DeleteInstance

1281 This section details the requirements for the DeleteInstance operation applied to an instance of
1282 CIM_FilterCollectionSubscription.

1283 When an instance of CIM_FilterCollectionSubscription is deleted, the client application subscription is
1284 deactivated and the client is considered unsubscribed.

1285 ### 8.10.3 CIM_FilterCollectionSubscription—ModifyInstance

1286 The ModifyInstance operation may be supported for an instance of CIM_FilterCollectionSubscription.

1287 ## 8.11 CIM_ServiceAffectsElement

1288 Table 8 lists implementation requirements for operations. If implemented, these operations shall be
1289 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 8, all operations in
1290 the default list in 8.1 shall be implemented as defined in DSP0200.

1291 NOTE: Related profiles may define additional requirements on operations for the profile class.

1292 **Table 8 – Operations: CIM_ServiceAffectsElement**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.12 CIM_MemberOfCollection

Table 9 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 9, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

Table 9 – Operations: CIM_MemberOfCollection

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.13 CIM_ElementSettingData

Table 10 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 10, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

Table 10 – Operations: CIM_ElementSettingData

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.14 CIM_OwningCollectionElement

Table 11 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 11, all operations in the default list in 8.1 shall be implemented as defined in DSP0200.

NOTE: Related profiles may define additional requirements on operations for the profile class.

1310 **Table 11 – Operations: CIM_OwningCollectionElement**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

1311 ## 8.15 CIM_ConcreteDependency

1312 Table 12 lists implementation requirements for operations. If implemented, these operations shall be
1313 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 12, all operations
1314 in the default list in 8.1 shall be implemented as defined in DSP0200.

1315 NOTE: Related profiles may define additional requirements on operations for the profile class.

1316 **Table 12 – Operations: CIM_ConcreteDependency**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

1317 ## 8.16 CIM_HostedService

1318 Table 13 lists implementation requirements for operations. If implemented, these operations shall be
1319 implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 13, all operations
1320 in the default list in 8.1 shall be implemented as defined in DSP0200.

1321 NOTE: Related profiles may define additional requirements on operations for the profile class.

1322 **Table 13 – Operations: CIM_HostedService**

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

1323 # 9 Use Cases

1324 This clause provides informative use cases and object diagrams.

1325 ## 9.1 Object Diagrams

1326 For simplicity, the prefix *CIM_* has been removed from the names of the classes.

1327 Figure 3 is an object diagram showing a possible implementation of the profile. In this diagram, the
1328 optional indications defined are supported. This support is indicated by the existence of fc2 associated

through the CIM_ConcreteDependency instance with rp1. Mandatory indication filters and an optional vendor-defined collection of filters are defined for the *CPU Profile* as well. This is indicated by the existence of fc3 and fc4 associated with rp2 through the CIM_ConcreteDependency instance.

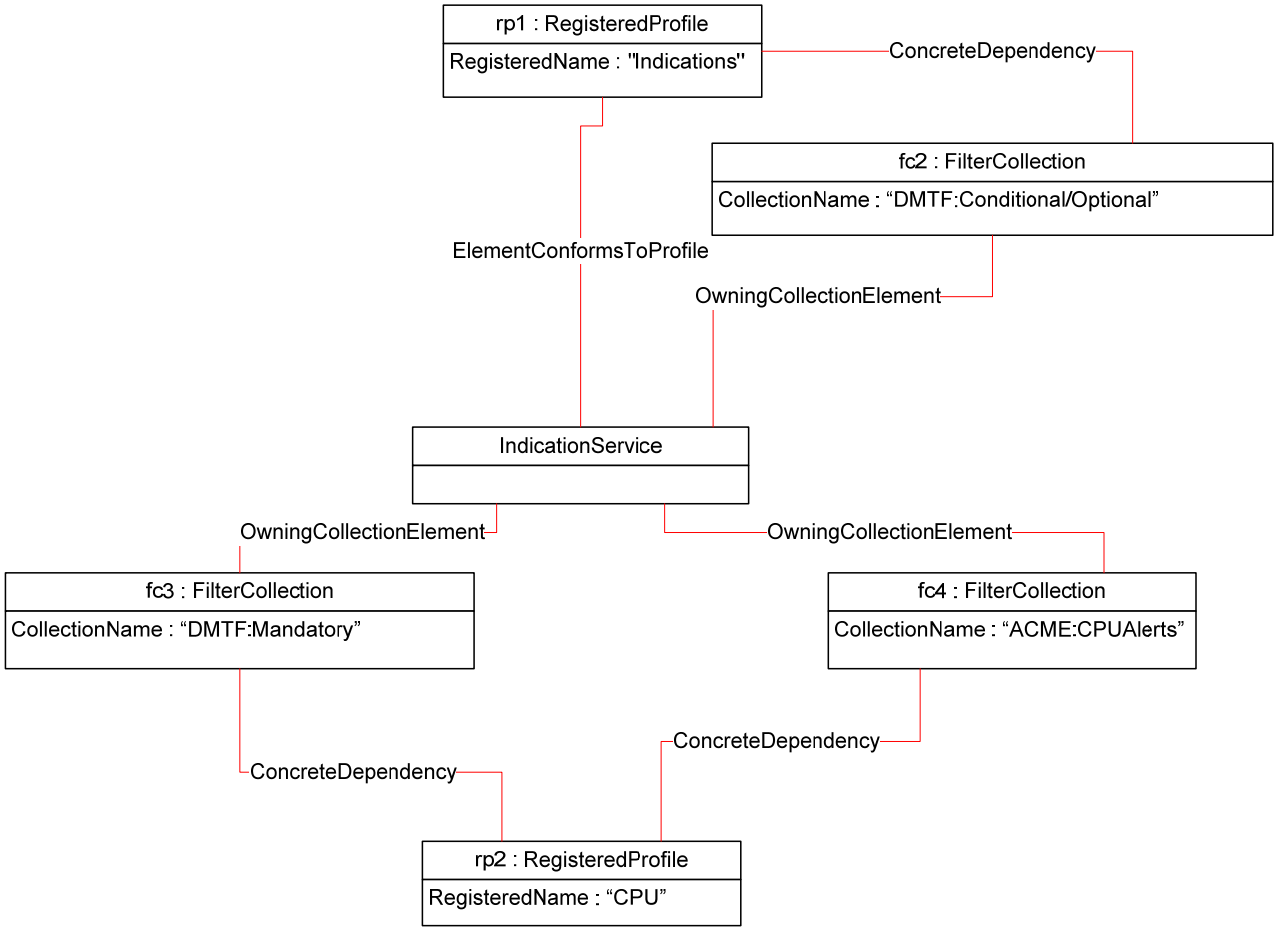


Figure 3 – Filter Collections Instance Diagram

Figure 4 is an object diagram showing an implementation that supports mandatory indications defined in the *Fan Profile*. The implementation has explicitly instantiated instances of CIM_IndicationFilter to represent three of the mandatory indication filters. if2 and if3 are filters for lifecycle indications. if1 is a filter for alert indications related to changes in the status of fan redundancy.

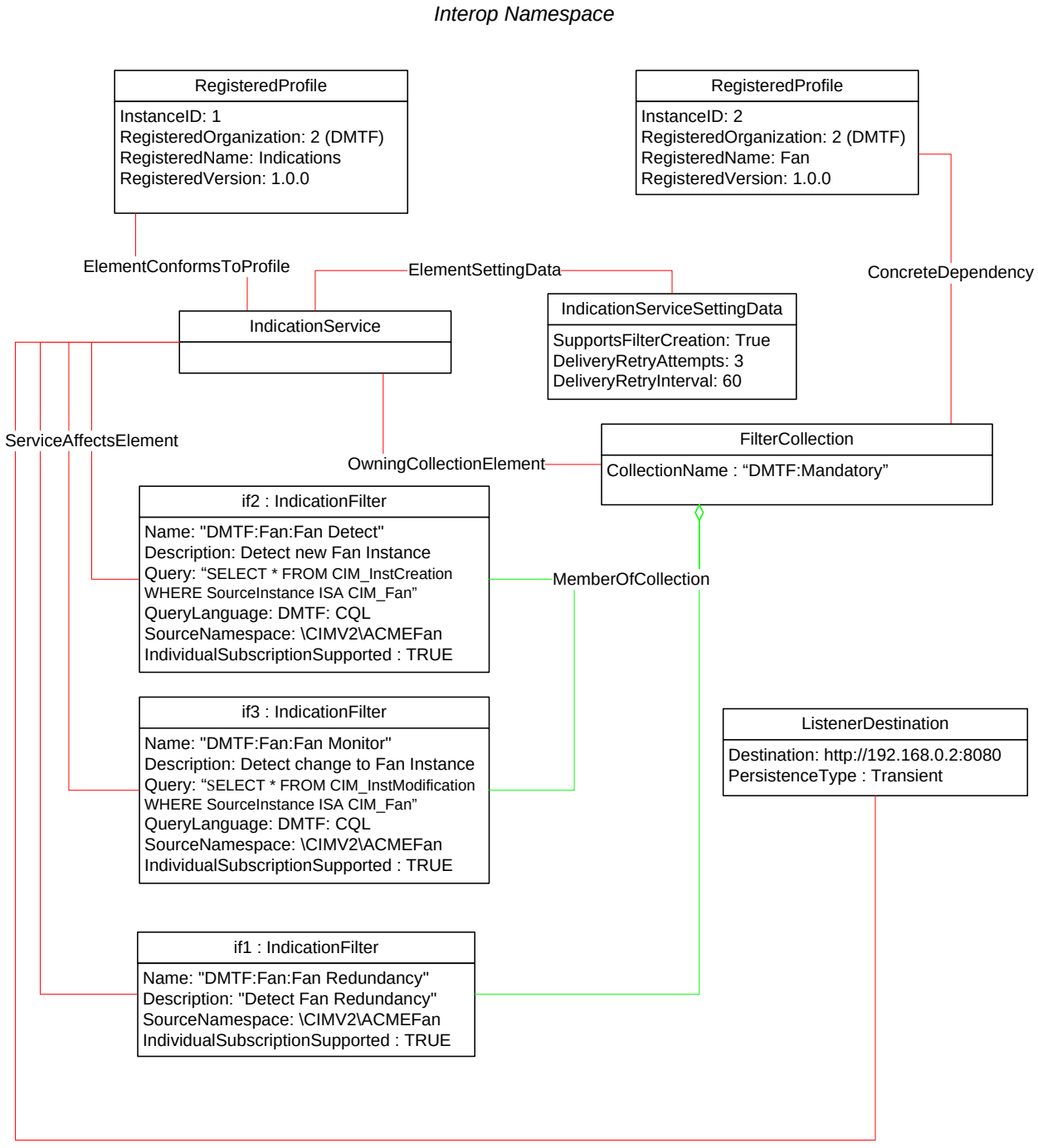


Figure 4 – Indications Profile Instance Diagram

Figure 5 shows the same implementation as Figure 4 with the addition of individual subscriptions for each of the individually modeled indication filters. The three individual indication instances, ind1, ind2, and ind3, match these indication filters.

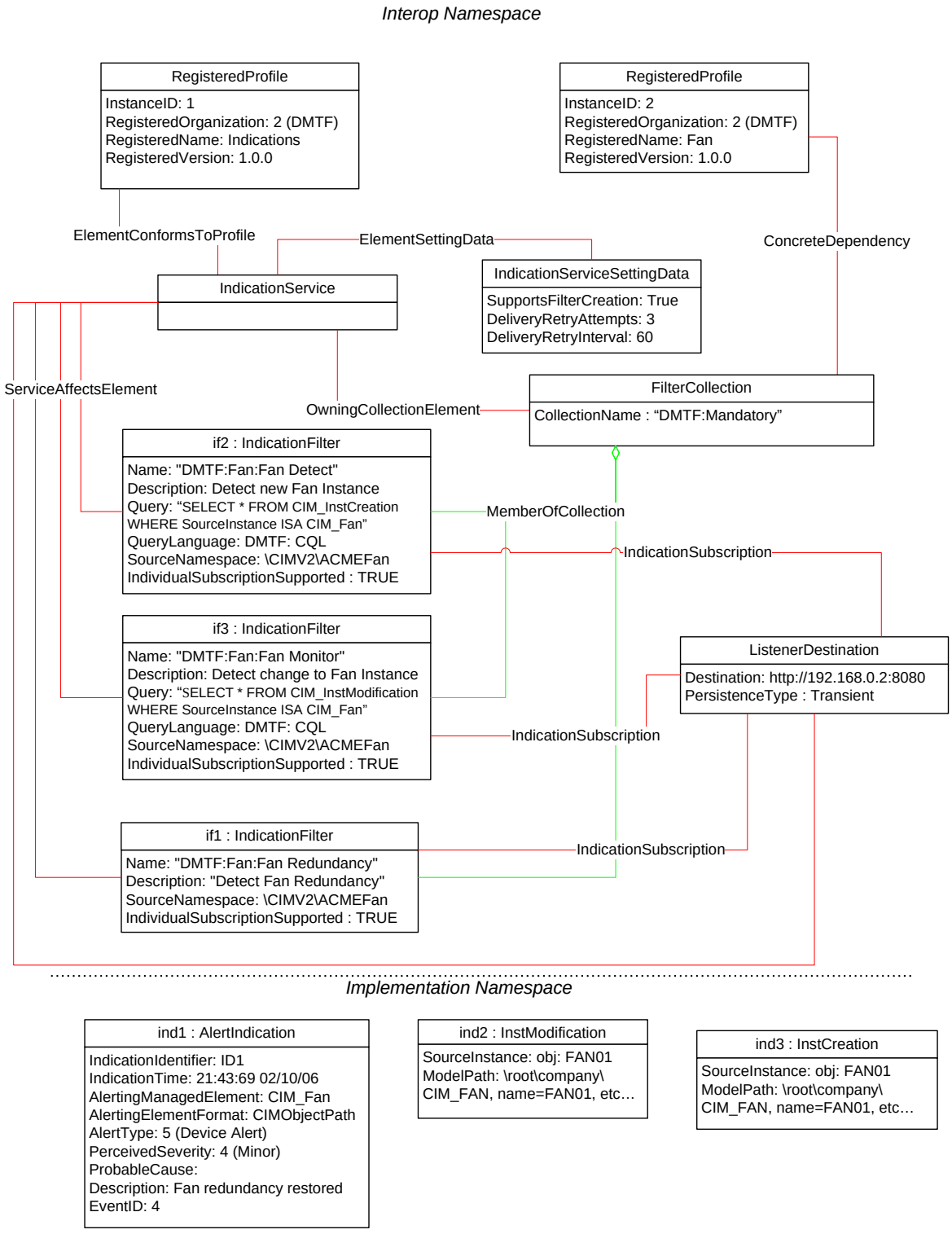


Figure 5 – Individual Subscriptions

Figure 6 is an object diagram for the same implementation as Figure 4 with the addition of a collection subscription. The three individual indication instances, ind1, ind2, and ind3, match the indication filters contained in the CIM_FilterCollection instance.

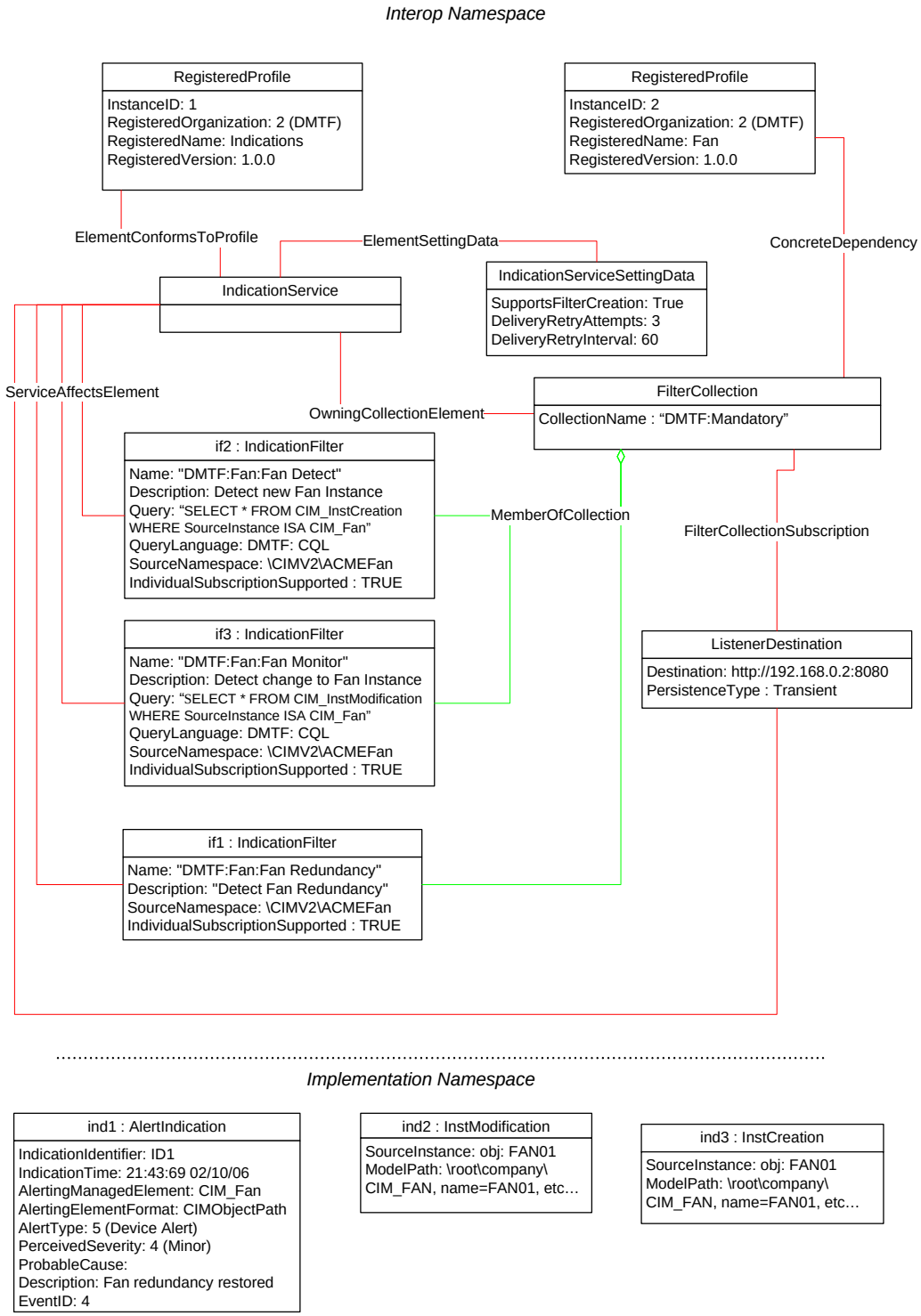


Figure 6 – Collection Subscription

Figure 7 is an object diagram for the same implementation shown in Figure 4. A subscription has been created for the filter collection as well as an individual subscription to if1. This results in the duplicate notification ind1 and ind2.

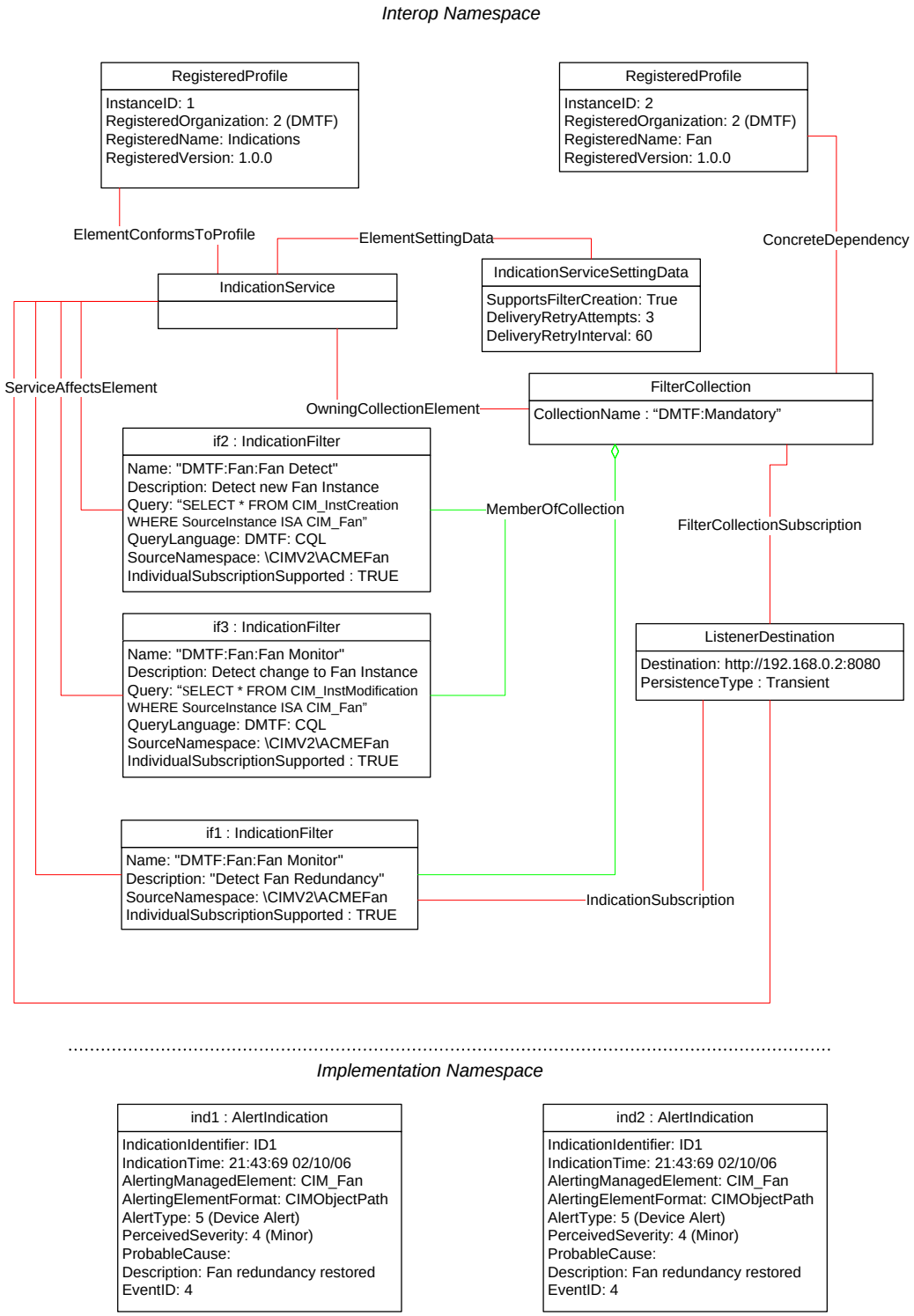


Figure 7 – Duplicate Subscriptions

Figure 8 is an object diagram for an implementation that supports a fixed number of listener destinations. A management client selects one of the existing instances of CIM_ListenerDestination and modifies it appropriately to specify a desired destination for indication delivery. The implementation supports three listener destinations, which is indicated by the CIM_IndicationServiceCapabilities.MaxListenerDestinations property. The implementation statically creates instances of CIM_ListenerDestination. ld3 is currently configured to represent a transient listener destination. ld1 and ld2 are not configured and could be used by a client to identify desired destinations.

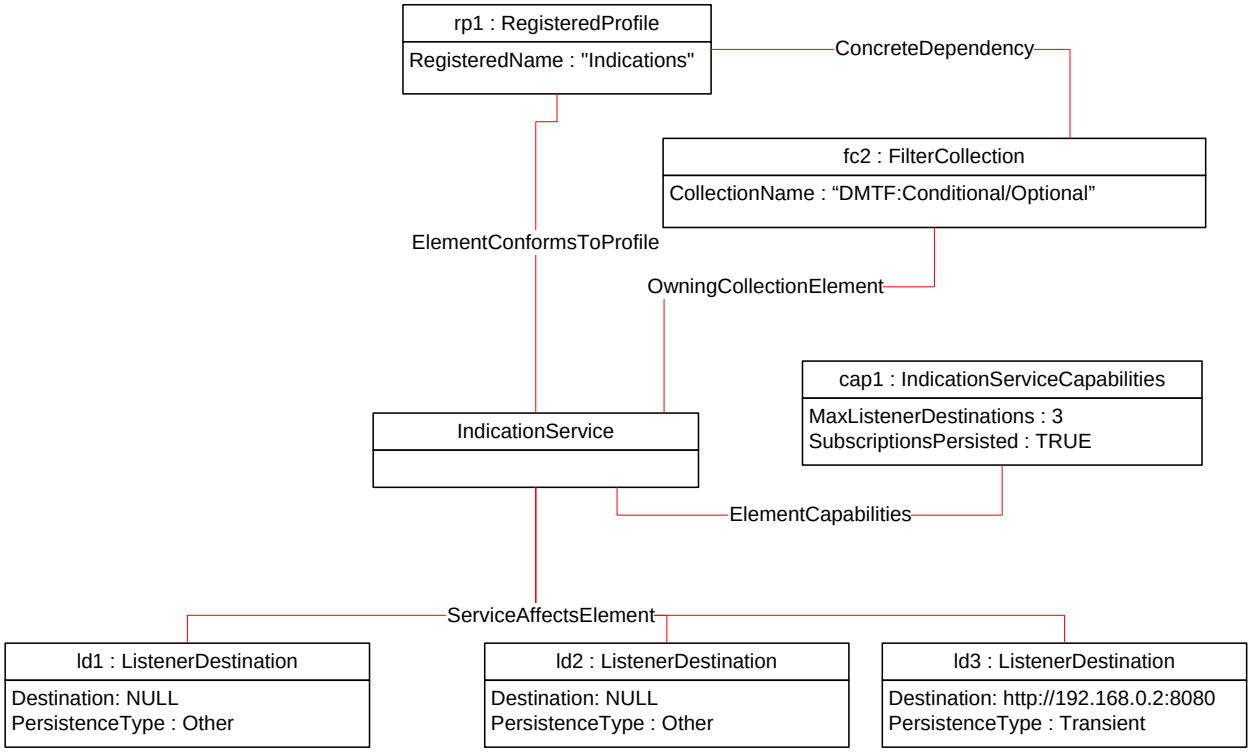


Figure 8 – Statically Provided Listener Destinations

9.2 Determine Whether Dynamic Filters Are Supported

Given an instance of CIM_IndicationService, a client can determine if dynamic filters are supported as follows:

1) Query the CIM_IndicationService.FilterCreationEnabled property. If the property has the value True, dynamic filters are supported.
2) If the property is False, find the associated instance of CIM_IndicationServiceCapabilities.
3) If an instance is found, query the value of the FilterCreationEnabledIsSettable property.
4) If FilterCreationEnabledIsSettable is True, modify the CIM_IndicationService, setting the FilterCreateEnabled property to True.
5) If the modification is successful, creating dynamic filters is supported. If the modification is unsuccessful, creating dynamic filters is not supported.

9.3 Create a Dynamic Filter for Alert Indications

Given the Owning Entity and Message Identifier for a standard message, a client can create a dynamic filter for an alert indication as follows:

1) Determine if dynamic filter creation is supported using the steps in 9.2.
2) If dynamic filter creation is supported, determine the query languages supported for indication filters using the steps in 9.17.
3) Using one of the supported query languages, create an instance of CIM_IndicationFilter in which the QueryLanguage property identifies one of the supported query languages and the Query property constrains the CIM_AlertIndication.OwningEntity and CIM_AlertIndication.MessageId properties to be the desired values.

9.4 Select a Listener Destination for Delivery of Indications

Given a destination to which the client wants to have indications delivered, a client can ensure that an appropriate CIM_ListenerDestination exists, as follows:

1) Find all instances of CIM_ListenerDestination that are associated with the CIM_IndicationService through an instance of CIM_ServiceAffectsElement.
2) For each instance of CIM_ListenerDestination, query the Destination property to determine if it represents the desired destination for indication delivery.

If an instance of CIM_ListenerDestination is not found, the client can use CreateInstance (or an equivalent operation) to create a new instance of CIM_ListenerDestination for indication delivery by specifying an appropriate instance of CIM_ListenerDestination as input to the operation.

9.5 Create a Subscription for a Single Filter

Given a desired destination for indication delivery and a desired filter, a client can create a subscription for an indication filter as follows:

1) Find all instances of CIM_IndicationFilter that are associated with the CIM_IndicationService instance through an instance of CIM_ServiceAffectsElement.
2) For each instance of CIM_IndicationFilter, evaluate the QueryLanguage and Query properties to determine if the CIM_IndicationFilter represents the desired indication filter.
3) If an instance of CIM_IndicationFilter is found, query the IndividualSubscriptionSupported property to determine if the server-side implementation supports subscribing to this filter individually. If the property is True, individual subscription to this filter is supported. If the property is False, subscription to the individual filter is not supported and a dynamic filter needs to be created using the steps in 9.3.
4) Using the steps in 9.4, select an instance of CIM_ListenerDestination that represents the desired destination.
5) Use CreateInstance (or an equivalent) operation to create an instance of CIM_IndicationSubscription that references the CIM_IndicationFilter from step 3) and the CIM_ListenerDestination from step 4).

9.6 Subscribe for All Mandatory Indications for a Profile

A client can subscribe for all of the mandatory indications defined for a profile as follows:

1) Determine if mandatory indications are supported for the profile.
2) If mandatory indications are supported for the profile, use the steps in 9.18 to subscribe to the CIM_FilterCollection instance that represents the mandatory filters.

9.7 Determine Whether a Subscription Exists for a Given Filter and Destination

A client can determine whether a subscription exists for a particular destination and filter as follows:

1) Find all instances of CIM_ListenerDestination that are associated with the CIM_IndicationService instance through an instance of CIM_ServiceAffectsElement.
2) For each instance of CIM_ListenerDestination, if the Destination property identifies the destination of interest, perform the following steps:
    a) Find all instances of CIM_IndicationFilter that are associated with the CIM_ListenerDestination instance through an instance of CIM_IndicationSubscription.
    b) For each instance of CIM_IndicationFilter, if the QueryLanguage and Query properties match the filter of interest, a subscription exists for the given filter and destination.
    c) Find all instances of CIM_FilterCollection that are associated with the CIM_ListenerDestination instance through an instance of CIM_IndicationFilterSubscription.
    d) For each instance of CIM_FilterCollection, evaluate the CIM_FilterCollection.CollectionName property to determine if the client has knowledge of filters contained in the collection.
3) If the client has knowledge, determine whether the CIM_FilterCollection instance contains the filter of interest. If it does, a subscription exists for the given filter and destination.
4) If the client does not have knowledge, find all instances of CIM_IndicationFilter that are associated with the CIM_FilterCollection instance through an instance of CIM_MemberOfCollection. For each instance of CIM_IndicationFilter, if the Query property matches the filter of interest, a subscription exists for the given filter and destination.

9.8 Determine the Components for Which Lifecycle Indications Are Available

Given an instance of CIM_IndicationFilter that filters for lifecycle indications, a client can determine the components for which the specified lifecycle indications can be provided, as follows:

1) Find the instances of CIM_FilterCollection with which the CIM_IndicationFilter instance is associated through an instance of CIM_MemberOfCollection.
    a) For each instance of CIM_FilterCollection, find the associated instances of CIM_RegisteredProfile.
    b) For each instance of CIM_RegisteredProfile, find the instances of CIM_ManagedElement that are in the scope of the profile.
    c) For each instance of CIM_ManagedElement, determine if it is implemented in a namespace identified by one of the values of the CIM_IndicationFilter.SourceNamespaces property, or if it is in the same namespace as the instance of CIM_IndicationFilter.
    d) For each instance of CIM_ManagedElement, determine if it matches the query specified by the QueryLanguage and Query properties of the CIM_IndicationFilter.

    If it matches the query, lifecycle indications filtered by the CIM_IndicationFilter are available for the CIM_ManagedElement instance.
2) If the instance of CIM_IndicationFilter is not associated with any instances of CIM_FilterCollection, determine the namespaces to which the filter applies by querying the value of the SourceNamespaces property.

    If the SourceNamespaces property is empty, the CIM_IndicationFilter applies to the namespace in which it is instantiated.

If the SourceNamespaces property is not empty, the CIM_IndicationFilter applies to each identified namespace.

3) For each instance of CIM_ManagedElement, determine if it matches the query specified by the Query property of the CIM_IndicationFilter. If it matches the query, lifecycle indications filtered by the CIM_IndicationFilter are available for the CIM_ManagedElement instance.

9.9 Subscribe for Indications of a Particular Severity

A client can subscribe for all indications of a particular severity as follows:

Construct a query to select all instances of CIM_AlertIndication in which the PerceivedSeverity property has the desired value. Use this query as the input in the steps in 9.5.

9.10 Find the Scoping System for Which an Alert Indication Originated

Given an instance of CIM_AlertIndication, a client can determine the scoping system for which an indication originated, as follows:

1) Starting with the value of the CIM_AlertIndication.AlertingManagedElement property, retrieve the CIM element identified.

2) Using knowledge of profile definitions that contain the element, determine the profile with which the CIM element is conformant.

3) Use the algorithm defined for the profile to find the Scoping Instance.

9.11 Remove a Subscription

Given an instance of CIM_IndicationSubscription that represents an indication subscription, a client can remove the subscription as follows:

1) Invoke the DeleteInstance operation on the instance of CIM_IndicationSubscription.

2) If the previously referenced instance of CIM_IndicationFilter was a dynamic filter created by the client, no other instances of CIM_IndicationSubscription reference it, and the client does not plan to create a new subscription for this filter, the client can delete the CIM_IndicationFilter.

3) If the previously referenced instance of CIM_ListenerDestination was created by the client, no other instances of CIM_IndicationSubscription or CIM_FilterCollectionSubscription reference it, and the client does not plan to create a new subscription for this destination, the client can delete the CIM_ListenerDestination.

9.12 Remove a Listener Destination

A client can remove a listener destination as follows:

1) Remove each indication subscription configured for the destination by using the steps in 9.11.

2) Remove the listener destination by invoking the DeleteInstance operation on the instance of CIM_ListenerDestination.

9.13 Determine the Query That Triggered an Alert Indication

Given an instance of CIM_AlertIndication, a client can determine the indication filter that triggered an indication to be delivered, as follows:

1) Query the value of the CIM_AlertIndication.IndicationFilterName.

   If the value of the property identifies an indication filter of which the client has knowledge, the client knows the filter that caused the indication to be triggered.

If the value of the property does not identify an indication filter of which the client has knowledge, the client can find the indication filter as follows:

a) Use the value of the CIM_AlertIndication.AlertingManagedElement property to find the WBEM Server from which the indication originated.

b) Find the instance of CIM_IndicationService in the Interop Namespace of the WBEM Server.

c) Find all instances of CIM_IndicationFilter that are associated with the CIM_IndicationService instance through an instance of CIM_ServiceAffectsElement.

d) For each instance of CIM_IndicationFilter, determine if the value of the name property matches the value of the CIM_AlertIndication.IndicationFilterName property.

   If it matches, the instance of CIM_IndicationFilter triggered the indication.

   If a matching instance of CIM_IndicationFilter is not found, it is not possible for a client to determine the query.

e) Query the value of the CIM_IndicationFilter.Query and CIM_IndicationFilter.QueryLanguage properties to determine the query that resulted in the indication.

9.14 Configure the Number of Retries for Indication Delivery

A client can configure the number of retries attempted by an indication service as follows:

1) Find the instance of CIM_IndicationServiceCapabilities that is associated with the CIM_IndicationService instance through an instance of CIM_ElementCapabilities.

2) Query the value of the CIM_IndicationServiceCapabilities.DeliveryRetryAttemptsIsSettable property.

   1) If the value is True, use ModifyInstance to change the value of the CIM_IndicationService.DeliveryRetryAttempts to the desired value.

   2) If the value is False, the number of retries attempted by the CIM_IndicationService cannot be changed.

9.15 Modify a Dynamic Filter

A client can modify a dynamic filter as follows:

1) If the client maintained the object path of the instance of CIM_IndicationFilter that represents the dynamic filter, the client can invoke the DeleteInstance operation to remove the dynamic filter.

2) If the client has not maintained the object path, the client can find the dynamic filter to replace as follows:

   a) Find all instances of CIM_IndicationFilter that are associated with the CIM_IndicationService instance through an instance of CIM_ServiceAffectsElement.

   b) For each instance of CIM_IndicationFilter, determine if it matches the dynamic filter previously created.

   c) If it matches, attempt to modify the dynamic filter by using the ModifyInstance operation.

   d) If the ModifyInstance operation is not supported, invoke the DeleteInstance operation to remove it.

   e) Use the CreateInstance operation, specifying the desired attribute values, to create a new instance of CIM_IndicationFilter.

f) Replicate any CIM_IndicationSubscription instances that referenced the deleted instance of CIM_IndicationFilter, referencing the newly created CIM_IndicationFilter instance.

9.16 Filter for Indications from a Specific Namespace

A client can create a dynamic filter to receive indications from a specific namespace by using the steps in 9.3 with the additional constraint of specifying a value for the CIM_IndicationFilter.SourceNamespaces property.

9.17 Determine the Query Language Supported for Filtering Indications

A client can determine the query languages supported for filtering indications as follows:

1) Start with an empty set of supported query languages.

2) Find all instances of CIM_IndicationFilter that are associated with the CIM_IndicationService instance through an instance of CIM_ServiceAffectsElement.

3) For each instance of CIM_IndicationFilter, if the value of the CIM_IndicationFilter.QueryLanguage property is not included in the set from step 1), add it.

NOTE: The supported query languages can alternately be determined through knowledge of the implementation or through a combination of CIM elements and operations that are outside the scope of this profile.

9.18 Subscribe to All Events in a Collection

Given an instance of CIM_FilterCollection that represents a collection of indication filters and a desired destination for delivery of all indications in the collection, a client can create a subscription to all events in the collection as follows:

1) Select an instance of CIM_ListenerDestination that represents the desired destination by using the steps in 9.4.

2) Given the instance of CIM_ListenerDestination, create a subscription by creating an instance of CIM_FilterCollectionSubscription by using the CreateInstance operation (or equivalent), specifying the desired configuration of the subscription and references to the CIM_ListenerDestination instance and the CIM_FilterCollection instance.

9.19 Subscribe for All of the Indications Defined in a Profile

Given an instance of CIM_ListenerDestination that represents a desired destination for indication delivery, a client can subscribe for all of the indications defined for implementations of a profile, as follows:

1) Enumerate instances of CIM_RegisteredProfile in the Interop namespace.

2) For each instance of CIM_RegisteredProfile, query the values of the RegisteredName, RegisteredVersion, and RegisteredOrganization properties to determine if the instance identifies the profile of interest.

3) If the instance of CIM_RegisteredProfile identifies the profile of interest:

   a) Find all instances of CIM_FilterCollection that are associated with the CIM_RegisteredProfile instance through and instance of CIM_ConcreteDependency.

      If no instances of CIM_FilterCollection are found, indications are not supported for the profile.

   b) For each instance of CIM_FilterCollection found, determine if it is referenced by an instance of CIM_MemberOfCollection, where it is the value of the Member reference.

      1) If the CIM_FilterCollection instance is the value of the Member reference, find the CIM_FilterCollection instance that is the value of the Collection reference.

- If the CIM_FilterCollection instance that is the value of the Collection reference is not associated with the CIM_RegisteredProfile instance from step 2), create an instance of CIM_FilterCollectionSubscription that references the CIM_FilterCollection instance that is the Member reference and the CIM_ListenerDestination instance that identifies the desired destination.
- If the CIM_FilterCollection that is the value of the Collection reference is associated with the CIM_RegisteredProfile instance, skip it.

2) If the CIM_FilterCollection is not the value of the Member reference, create an instance of CIM_FilterCollectionSubscription that references the CIM_FilterCollection instance and the CIM_ListenerDestination instance that identifies the desired destination.

9.20 Determine the Maximum Number of Listener Destinations

Given an instance of CIM_IndicationService, a client can determine the maximum number of supported listener destinations as follows:

1) Find the associated instance of CIM_IndicationServiceCapabilities.

2) If an instance is found, query the value of the MaxListenerDestinations property.

   If an instance is not found, the maximum number of listener destinations is unknown.

10 CIM Elements

Table 14 shows the instances of CIM Elements for this profile. Instances of the CIM Elements shall be implemented as described in Table 14. Clauses 7 ("Implementation") and 8 ("Methods") may impose additional requirements on these elements.

Table 14 – CIM Elements: Indications Profile

Element Name	Requirement	Description
Classes		
CIM_AlertIndication	Optional	See 10.1.
CIM_ConcreteDependency	Conditional	See 10.2.
CIM_ElementCapabilities	Conditional	See 10.3.
CIM_ElementSettingData	Conditional	See 10.4.
CIM_FilterCollection	Optional	See 10.5.
CIM_FilterCollectionSubscription	Optional	See 10.6.
CIM_HostedService	Mandatory	See 10.7.
CIM_IndicationFilter	Optional	See 10.8.
CIM_IndicationService	Mandatory	See 10.9.
CIM_IndicationServiceCapabilities	Optional	See 7.14 and 10.10.
CIM_IndicationServiceSettingData	Optional	See 7.2 and 10.11.
CIM_IndicationSubscription	Conditional	See 10.12.
CIM_InstCreation	Optional	See 10.13.
CIM_InstDeletion	Optional	See 10.14.
CIM_InstModification	Optional	See 10.15.
CIM_ListenerDestination	Mandatory	See 10.16.

Element Name	Requirement	Description
CIM_MemberOfCollection	Optional	See 10.17.
CIM_OwningCollectionElement	Conditional	See 10.18.
CIM_RegisteredProfile	Mandatory	See 10.19.
CIM_ServiceAffectsElement	Conditional	See 10.20.
Indications		
SELECT * FROM CIM_InstDeletion WHERE SourceInstance ISA CIM_IndicationSubscription	Optional	See 7.17.2.3.
SELECT * FROM CIM_InstDeletion WHERE SourceInstance ISA CIM_FilterCollectionSubscription	Optional	See 7.17.2.4.
SELECT * FROM CIM_InstDeletion WHERE SourceInstance ISA CIM_ListenerDestination	Optional	See 7.17.2.2.

10.1 CIM_AlertIndication

CIM_AlertIndication is a specialized type of CIM_Indication that contains information about the severity, cause, recommended actions, and other data of a real world event. Profiles that define support for asynchronous notification of events can constrain this class and may require it. Table 15 contains the requirements for elements of this class.

Table 15 – Class: CIM_AlertIndication

Elements	Requirement	Notes
IndicationIdentifier	Mandatory	An identifier for the indication used for correlated indications
IndicationTime	Mandatory	The time and date of creation of the indication. The property may be set to NULL if it cannot be determined.
AlertingManagedElement	Mandatory	The identifying information for the element that changed, as a WBEM-URI-TypedInstancePath (as defined in DSP0207), of the entity for which this Indication is generated
AlertingElementFormat	Mandatory	Matches “WBEMURI”
IndicationFilterName	Mandatory	See 7.15.
AlertType	Mandatory	Primary classification of the indication. This value depends on the content of the alert message and typically should be 5 (Device Alert) or 6 (Environmental Alert) for most hardware-related indications.
PerceivedSeverity	Mandatory	Describes the severity of the alert indication
ProbableCause	Mandatory	None
SystemName	Mandatory	Should be the value of the Name property of the scoping system of the managed element that is the AlertingManagedElement
CorrelatedIndications	Optional	IndicationIdentifiers whose notifications are correlated with this one

Elements	Requirement	Notes
OtherAlertType	Conditional	If AlertType matches 1 (Other), this property is mandatory. Pattern ("+.")
OtherSeverity	Conditional	If PerceivedSeverity matches 1 (Other), this property is mandatory.
ProbableCauseDescription	Conditional	If ProbableCause matches 1 (Other), this property is mandatory.
OwningEntity	Mandatory	See 7.11.
MessageID	Mandatory	See 7.11.
MessageArguments	Mandatory	See 7.11.
Message	Optional	See 7.11.

10.2 CIM_ConcreteDependency

CIM_ConcreteDependency is used to associate instances of CIM_FilterCollection to instances of CIM_RegisteredProfile. This association identifies the profile that provides context and scope to a collection of indication filters. The existence of instances of CIM_ConcreteDependency is conditional on the existence of instances of CIM_FilterCollection. Table 16 contains the requirements for elements of this class.

Table 16 – Class: CIM_ConcreteDependency

Elements	Requirement	Notes
Antecedent	Mandatory	Key: Shall reference the instance of CIM_RegisteredProfile that represents the profile for which the set of indications is supported Cardinality 1
Dependent	Mandatory	Key: Shall reference the instance of CIM_FilterCollection that represents the set of indications supported for this profile Cardinality *

10.3 CIM_ElementCapabilities

CIM_ElementCapabilities is used to associate an instance of CIM_IndicationServiceCapabilities with an instance of CIM_IndicationService. An instance of CIM_ElementCapabilities is conditional on the existence of an instance of CIM_IndicationServiceCapabilities. Table 17 contains the requirements for elements of this class.

Table 17 – Class: CIM_ElementCapabilities

Elements	Requirement	Notes
ManagedElement	Mandatory	Key: Shall reference the Central Instance Cardinality 1
Capabilities	Mandatory	Key: Shall reference the instance of CIM_IndicationServiceCapabilities that represents the indication service property setting capabilities Cardinality 0..1

10.4 CIM_ElementSettingData

CIM_ElementSettingData is used to associate an instance of CIM_IndicationServiceSettingData with an instance of CIM_IndicationService. An instance of CIM_ElementSettingData is conditional on the existence of an instance of CIM_IndicationServiceSettingData. Table 18 contains the requirements for elements of this class.

Table 18 – Class: CIM_ElementSettingData

Elements	Requirement	Notes
ManagedElement	Mandatory	Key: Shall reference the instance of CIM_IndicationService that represents the WBEM Server's support for indications Cardinality 1
SettingData	Mandatory	Key: Shall reference the instance of CIM_IndicationServiceSettingData that represents the indication service settings Cardinality 0..1
IsDefault	Mandatory	Matches 1 (Is Default)
IsNext	Mandatory	Matches 1 (Is Next)

10.5 CIM_FilterCollection

CIM_FilterCollection represents collections of indication filters. Table 19 contains the requirements for elements of this class.

Table 19 – Class: CIM_FilterCollection

Elements	Requirement	Notes
InstanceID	Mandatory	Key: Shall specify the unique identifier for an instance of this class within the Implementation namespace
CollectionName	Mandatory	See 7.6.

10.6 CIM_FilterCollectionSubscription

CIM_FilterCollectionSubscription is used to associate an instance of CIM_FilterCollection with an instance of CIM_ListenerDestination. The existence of an instance of this class reflects the subscription to a collection of instances of CIM_IndicationFilter. The association shall imply a subscription to all the instances of CIM_IndicationFilter that are members of the collection. Support for this class is conditional on support for CIM_FilterCollection. Table 20 contains the requirements for elements of this class.

Table 20 – Class: CIM_FilterCollectionSubscription

Elements	Requirement	Notes
Filter	Mandatory	Key: Shall reference the instance of CIM_FilterCollection that represents the set of indications to which a client has subscribed Cardinality *

Elements	Requirement	Notes
Handler	Mandatory	Key: Shall reference the CIM_ListenerDestination that represents the location to which indications shall be delivered when they occur Cardinality *
OnFatalErrorPolicy	Mandatory	See 7.8.
OtherOnFatalErrorPolicy	Conditional	Mandatory if the value of OnFatalErrorPolicy is 1 (Other) Pattern (".+")
FailureTriggerTimeInterval	Mandatory	Specifies minimum delay before OnFatalErrorPolicy is implemented
SubscriptionState	Mandatory	None
OtherSubscriptionState	Conditional	Mandatory if the value of SubscriptionState is 1 (Other) Pattern (".+")
RepeatNotificationPolicy	Mandatory	Matches 2 (None), 3 (Suppress), or 4 (Delay)
RepeatNotificationInterval	Conditional	Mandatory if the value of RepeatNotificationPolicy is 3 (Suppress) or 4 (Delay)
RepeatNotificationGap	Conditional	Mandatory if the value of RepeatNotificationPolicy is 4 (Delay)
RepeatNotificationCount	Conditional	Mandatory if the value of RepeatNotificationPolicy is 3 (Suppress) or 4 (Delay)

10.7 CIM_HostedService

CIM_HostedService is used to relate the CIM_IndicationService instance to its scoping CIM_System instance. Table 21 contains the requirements for elements of this class.

Table 21 – Class: CIM_HostedService

Elements	Requirement	Notes
Antecedent	Mandatory	This property shall be a reference to the Scoping Instance. Cardinality 1
Dependent	Mandatory	This property shall be a reference to the Central Instance. Cardinality 1..*

10.8 CIM_IndicationFilter

CIM_IndicationFilter represents static and dynamic indication filters. CIM_IndicationFilter is optional. It is expected that referencing profiles define mandatory instances of CIM_IndicationFilter such that the class is further constrained to be mandatory in the referencing profile. Table 22 contains the requirements for elements of this class.

1650 **Table 22 – Class: CIM_IndicationFilter**

Elements	Requirement	Notes
SystemCreationClassName	Mandatory	Key: Shall be populated by the WBEM Server with the class name of the scoping system. If a value is supplied by the client, it shall be ignored by the WBEM Server.
CreationClassName	Mandatory	Key: Shall be populated by the WBEM Server with the name of the class of which this is an instance. If a value is supplied by the client, it shall be ignored by the WBEM Server.
SystemName	Mandatory	Key: Shall be populated by the WBEM Server with the name of the scoping system. If a value is supplied by the client, it shall be ignored by the WBEM Server.
Name	Mandatory	Key: Shall be populated by the WBEM Server with the unique name of the instance or as specified by profile-defined static filters or by the client application when creating dynamic filters. See 7.4.8.
Query	Mandatory	Specifies the query that defines the filter. See 7.4.6.
QueryLanguage	Mandatory	Specifies the query language used for the filter. See 7.4.6.
SourceNamespaces	Mandatory	Specifies the source namespaces from which indications originate. See 7.4.7.
ElementName	Optional	A user-friendly string that describes the indication. Client modification of this property may or may not be supported.
IndividualSubscriptionSupported	Mandatory	None

1651 ## 10.9 CIM_IndicationService

1652 CIM_IndicationService is a component of the WBEM Server Service that represents support for indication
1653 subscription. This class is the Central Class of the profile. Table 23 contains the requirements for
1654 elements of this class.

1655 **Table 23 – Class: CIM_IndicationService**

Elements	Requirement	Notes
SystemCreationClassName	Mandatory	Key
SystemName	Mandatory	Key
CreationClassName	Mandatory	Key
Name	Mandatory	Key
FilterCreationEnabled	Mandatory	See 7.1.
DeliveryRetryAttempts	Mandatory	See 7.1.
DeliveryRetryInterval	Mandatory	See 7.1.
SubscriptionRemovalAction	Mandatory	See 7.1.
SubscriptionRemovalTimeInterval	Mandatory	See 7.1.

10.10 CIM_IndicationServiceCapabilities

CIM_IndicationServiceCapabilities is an optional element that represents the capabilities of the CIM_IndicationService instance. Table 24 contains the requirements for elements of this class.

Table 24 – Class: CIM_IndicationServiceCapabilities

Element	Requirement	Notes
InstanceID	Mandatory	Key: Shall specify the unique identifier for an instance of this class within the Implementation namespace
FilterCreationEnabledIsSettable	Mandatory	Defines whether the client can modify the FilterCreationEnabled property of the associated CIM_IndicationService instance
DeliveryRetryAttemptsIsSettable	Mandatory	Defines whether the client can modify the DeliveryRetryAttempts property of the associated CIM_IndicationService instance
DeliveryRetryIntervalIsSettable	Mandatory	Defines whether the client can modify the DeliveryRetryInterval property of the associated CIM_IndicationService instance
SubscriptionRemovalActionIsSettable	Mandatory	Defines whether the client can modify the SubscriptionRemovalAction property of the associated CIM_IndicationService instance
SubscriptionRemovalTimeIntervalIsSettable	Mandatory	Defines whether the client can modify the SubscriptionRemovalTimeInterval property of the associated CIM_IndicationService instance
MaxListenerDestinations	Mandatory	Indicates the maximum number of listener destinations
MaxActiveSubscriptions	Mandatory	Indicates the maximum number of active subscriptions
SubscriptionsPersisted	Mandatory	Indicates whether subscriptions are persisted across restarts of the indication service

10.11 CIM_IndicationServiceSettingData

CIM_IndicationServiceSettingData is used to represent the initial configuration of the CIM_IndicationService instance. Table 25 contains the requirements for elements of this class.

Table 25 – Class: CIM_IndicationServiceSettingData

Elements	Requirement	Notes
InstanceID	Mandatory	Key
FilterCreationEnabled	Mandatory	See 7.1.2.
DeliveryRetryAttempts	Mandatory	See 7.1.2.
DeliveryRetryInterval	Mandatory	See 7.1.2.
SubscriptionRemovalAction	Mandatory	See 7.1.2.

Elements	Requirement	Notes
SubscriptionRemovalTimeInterval	Mandatory	See 7.1.2.

10.12 CIM_IndicationSubscription

CIM_IndicationSubscription is used to associate an instance of CIM_IndicationFilter with an instance of CIM_ListenerDestination. The existence of an instance of this class reflects the subscription to a single CIM_IndicationFilter instance. CIM_IndicationSubscription is conditional. Instances of CIM_IndicationSubscription may exist if at least one instance of CIM_IndicationFilter is associated with the Central Instance through an instance of CIM_ServiceAffectsElement. Table 26 contains the requirements for elements of this class.

Table 26 – Class: CIM_IndicationSubscription

Elements	Requirement	Notes
Filter	Mandatory	Key: Shall reference the instance of CIM_IndicationFilter that represents the indication to which a client has subscribed
Handler	Mandatory	Key: Shall reference the CIM_ListenerDestination that represents the location to which the indication shall be delivered when it occurs
OnFatalErrorPolicy	Mandatory	None
OtherOnFatalErrorPolicy	Conditional	Mandatory if the value of OnFatalErrorPolicy is 1 (Other) Pattern (".+")
FailureTriggerTimeInterval	Mandatory	Specifies the minimum delay before OnFatalErrorPolicy is implemented
SubscriptionState	Mandatory	None
OtherSubscriptionState	Conditional	Mandatory if the value of SubscriptionState is 1 (Other) Pattern (".+")
RepeatNotificationPolicy	Mandatory	Matches 2 (None), 3 (Suppress), or 4 (Delay)
RepeatNotificationInterval	Conditional	Mandatory if the value of RepeatNotificationPolicy is 4 (Delay)
RepeatNotificationGap	Conditional	Mandatory if the value of RepeatNotificationPolicy is 3 (Suppress) or 4 (Delay)
RepeatNotificationCount	Conditional	Mandatory if the value of RepeatNotificationPolicy is 3 (Suppress) or 4 (Delay)

10.13 CIM_InstCreation

CIM_InstCreation notifies a handler when a new instance of a class is created. Referencing profiles that require asynchronous notification of instance creation use this class. Table 27 contains the requirements for elements of this class.

1676 **Table 27 – Class: CIM_InstCreation**

Elements	Requirement	Notes
IndicationIdentifier	Mandatory	An identifier for the indication used for correlated indications. The value for this property should be unique for an extended period of time.
IndicationTime	Mandatory	The time and date of creation of the indication. This property shall be populated with a valid datetime value.
SourceInstance	Mandatory	A copy of the instance that changed to generate the indication. SourceInstance contains the current values of the properties selected by the Indication Filter's Query.
SourceInstanceModelPath	Mandatory	The identifying information, as a WBEM-URI-TypedInstancePath (as defined in DSP0207), of the entity for which this Indication is generated
IndicationFilterName	Mandatory	See 7.15.
CorrelatedIndications	Optional	IndicationIdentifiers whose notifications are correlated with this one

1677 ## 10.14 CIM_InstDeletion

1678 CIM_InstDeletion notifies a handler when an instance of a class is deleted. Referencing profiles that
1679 require asynchronous notification of instance deletion use this class. Table 28 contains the requirements
1680 for elements of this class.

1681 **Table 28 – Class: CIM_InstDeletion**

Elements	Requirement	Notes
IndicationIdentifier	Mandatory	An identifier for the indication used for correlated indications. The value for this property should be unique for an extended period of time.
IndicationTime	Mandatory	The time and date of creation of the indication. The property shall be populated with a valid datetime value.
SourceInstance	Mandatory	A copy of the instance that changed to generate the indication. SourceInstance contains the current values of the properties selected by the Indication Filter's Query.
SourceInstanceModelPath	Mandatory	The identifying information, as a WBEM-URI-TypedInstancePath (as defined in DSP0207), of the entity for which this Indication is generated
IndicationFilterName	Mandatory	See 7.15.
CorrelatedIndications	Optional	IndicationIdentifiers whose notifications are correlated with this one

10.15 CIM_InstModification

CIM_InstModification notifies a handler when an instance (of a class defined in the Filter QueryString) is modified or changed. Referencing profiles that require asynchronous notification of instance modification use this class. Table 29 contains the requirements for elements of this class.

Table 29 – Class: CIM_InstModification

Elements	Requirement	Notes
IndicationIdentifier	Mandatory	An identifier for the indication used for correlated indications. The value for this property should be unique for an extended period of time.
IndicationTime	Mandatory	The time and date of creation of the indication. The property shall be set with a valid datetime value.
SourceInstance	Mandatory	A copy of the instance that changed to generate the indication. SourceInstance contains the current values of the properties selected by the Indication Filter's Query.
SourceInstanceModelPath	Mandatory	The identifying information, as a WBEM-URI-TypedInstancePath (as defined in DSP0207), of the entity for which this Indication is generated
IndicationFilterName	Mandatory	See 7.15.
CorrelatedIndications	Optional	IndicationIdentifiers whose notifications are correlated with this one
PreviousInstance	Optional	A copy of the “previous” instance whose change generated the indication. PreviousInstance contains “older” values of an instance's properties (as compared to SourceInstance), selected by the Indication Filter's Query.

10.16 CIM_ListenerDestination

CIM_ListenerDestination represents a destination for the delivery of indications. Table 30 contains the requirements for elements of this class.

Table 30 – Class: CIM_ListenerDestination

Elements	Requirement	Notes
SystemCreationClassName	Mandatory	Key: Shall be populated by the WBEM Server with the class name of the scoping system. If the client supplies a value, the WBEM Server shall ignore it.
SystemName	Mandatory	Key: Shall be populated by the WBEM Server with the name of the scoping system. If the client supplies a value, the WBEM Server shall ignore it.
CreationClassName	Mandatory	Key: Shall be populated by the WBEM Server with the name of the class of which this is an instance. If the client supplies a value, the WBEM Server shall ignore it.
Name	Mandatory	Key: Shall be populated by the WBEM Server with the unique name of the instance. If the client supplies a value, the WBEM Server shall ignore it
PersistenceType	Mandatory	See 7.5.3.

Elements	Requirement	Notes
ElementName	Mandatory	A user-friendly string that describes the destination. Client modification of this property may or may not be supported.
Destination	Mandatory	See 7.5.2.
ProtocolType	Mandatory	Shall be specified by the client as one of the enumerations from the class definition

10.17 CIM_MemberOfCollection

CIM_MemberOfCollection is used to aggregate instances of CIM_IndicationFilter or instances of CIM_FilterCollection to an instance of CIM_FilterCollection. This class identifies an indication or collection of indications as being part of a specific collection of indications. Table 31 contains the requirements for elements of this class.

Table 31 – Class: CIM_MemberOfCollection

Elements	Requirement	Notes
Collection	Mandatory	Key: Shall reference an instance of CIM_FilterCollection Cardinality *
Member	Mandatory	Key: Shall reference an instance of CIM_IndicationFilter or CIM_FilterCollection Cardinality *

10.18 CIM_OwningCollectionElement

CIM_OwningCollectionElement is used to associate instances of CIM_FilterCollection with an instance of CIM_IndicationService. The existence of an instance of CIM_OwningCollectionElement is conditional on the existence of an instance of CIM_FilterCollection. Table 32 contains the requirements for elements of this class.

Table 32 – Class: CIM_OwningCollectionElement

Elements	Requirement	Notes
OwningElement	Mandatory	Key: Shall reference the Central Instance Cardinality 1
OwnedElement	Mandatory	Key: Shall reference an instance of CIM_FilterCollection Cardinality *

10.19 CIM_RegisteredProfile

CIM_RegisteredProfile identifies the *Indications Profile* in order for a client to determine whether support for indications is supported by the managed system instrumentation. The CIM_RegisteredProfile class is defined by the *Profile Registration Profile*. With the exception of the mandatory values specified for the elements in Table 33, the behavior of the RegisteredProfile instance is in accordance with the *Profile Registration Profile*.

1709 **Table 33 – Class: CIM_RegisteredProfile**

Elements	Requirement	Notes
RegisteredName	Mandatory	This property shall have a value of "Indications".
RegisteredVersion	Mandatory	This property shall have a value of "1.0.0".
RegisteredOrganization	Mandatory	This property shall have a value of 2 (DMTF).

1710 ## 10.20 CIM_ServiceAffectsElement

1711 CIM_ServiceAffectsElement is used to associate instances of CIM_IndicationFilter and
1712 CIM_ListenerDestination with an instance of CIM_IndicationService. The existence of
1713 CIM_ServiceAffectsElement is conditional on the existence of at least one instance of
1714 CIM_IndicationFilter, CIM_ListenerDestination, or CIM_FilterCollection. Table 34 contains the
1715 requirements for elements of this class.

1716 **Table 34 – Class: CIM_ServiceAffectsElement**

Elements	Requirement	Notes
AffectingElement	Mandatory	Key: Shall reference the Central Instance Cardinality 1
AffectedElement	Mandatory	Key: Shall be a reference to an instance of CIM_IndicationFilter or CIM_ListenerDestination Cardinality *

1717

ANNEX A
(informative)

Profiles That Define Indications

Profiles that define indications document support in the following ways:

- Profiles shall define supported events in terms of lifecycle and alert indications within the “CIM Elements” table of the profile specification.
- A row included in the “Related Profiles” table of the “Synopsis” clause that specifies the *Indications Profile*. The “Relationship” column in the table contains *Mandatory* if mandatory indications are specified in the profile being defined.
- Normative text provided in the “Implementation” clause of the profile being defined, listing the indications being specified in the profile and in what circumstances they can be produced.
- The “CIM Elements” table in the “CIM Elements” clause of the profile being defined contains an entry for each indication being specified. The entry consists of the query for the indication; whether it is mandatory, conditional, or optional; and a description of the indication. Additionally, if a profile requires an instance of CIM_IndicationFilter to be instantiated to represent the indication, a subclause in Clause 7, "Implementation", is needed to make this normative requirement.
- CIM_IndicationFilter listed as a mandatory, conditional, or optional class within the profile based on requirements for static filters. Further each profile specifies, per indication definition, whether it is required that an implementation instantiate an instance of CIM_IndicationFilter for each indication definition.
- CIM_FilterCollection listed as a mandatory, conditional, or optional class within the profile based on profile requirements.

NOTE: The requirements for backwards compatibility when applied to the specification of indication filters in a profile are such that once an indication filter has been defined in a profile, all subsequent minor versions of the profile continue to specify the indication filter, while a subsequent major version may remove the requirement.

ANNEX B
(informative)

Change Log

Version	Date	Description
1.0.0	12/05/2008	Final Release
1.0.1	09/07/2009	Errata Release