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Indications Profile 1.2

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Disclaimer

- The information in this presentation represents a snapshot of work in progress within the DMTF.
- This information is subject to change. The Standard Specifications remain the normative reference for all information.
- For additional information, see the Distributed Management Task Force (DMTF) Web site.



- Compatible with DSP1054 1.1
 - Many corrections and clarifications
 - New concepts
- Based on DSP1001 (PUG) 1.1
 - Use of adaptations
 - Use of features
- Dual approach
 - Profile specific requirements
 - Simplified adaptation based indication definition
 - Event definition
 - Implied filter and filter collection definition
 - Profile specific filter collections and indication specific filters
 - WBEM server requirements
 - Listeners and subscriptions
 - Indication delivery, optionally through reliable indications
 - Suppression of repeated indication delivery
 - Global filters and filter collections

Profile Usage Guide 1.1: Selected concepts

- Adaptation
 - adapts a class defined in a schema for a particular purpose, i.e., defines a use of the class
 - a named profile element that defines requirements and constraints on a class
 - may be based on other class adaptations
- Feature
 - a named profile element that groups the decisions for the implementation of one or more profile elements into a single decision
 - typically used for modeling the decision to implement a concept that implies implementation requirements for a number of other elements in the profile



Indications profile 1.2: Central concepts

- Events
 - Observable occurrences of phenomena of interest
- Indications
 - Notifications about events
- Indication filters
 - elements within an implementation that control the selection of generated indications for delivery to listeners
- Filter collections
 - elements with an implementation that group indication filters and other filter collections
- Indication gate
 - superterm for indication filter and filter collection; indication gates may be used as targets for subscriptions
- Coverage
 - the set of indications that are filtered by (or can pass) an indication gate
- Listeners
 - receivers of indications
- Listener destinations
 - elements within an implementation that refer to a listener
- Subscriptions
 - elements within an implementation that represent a listener's interest in the set of indications covered by an indication gate
- Indication service
 - an element within an implementation responsible for delivering indications to listeners

- Event
 - An observable occurrence of a phenomenon of interest
 - Root event
 - Related to the managed environment
 - Examples:
 - The emergence of a fire
 - The addition of a fan to a system
 - Secondary event
 - Effected by or a consequence of root events
 - Examples:
 - Smoke observed as the consequence of a fire
 - The creation of a CIM_Fan instance as a consequence of a fan being added to the managed environment

Events in profiles

- Profiles are required to define the events for which they model indications
- The event definition may be part of the indication definition
 - Accomplished by an *event definition query statement*
 - The query statement may reference other elements such as a message definition
 - Examples:
 - `SELECT * FROM CIM_AlertIndication WHERE OwningEntity="DMTF" AND MessageID="PLAT0456"`
 - `SELECT * FROM CIM_InstCreation WHERE SourceInstance`
 - `ISA CIM_Fan`

NOTE: An event definition query statement is different from (not the same as) a filter query statement !!

Indications

- Indication
 - a notification about an event
 - the event reported by an indication is defined by an event definition query statement
 - the event definition query statement
 - is specified as part of an indication adaptation
 - is not exposed in the CIM representation of the indication
 - is different from an indication filter query statement
 - » Indications are not related to specific indication filters
 - » that is, there is not "*the*" indication filter for an indication
 - » however, the concept of *indication specific filters* is designed to model indication filters that filter one specific (kind of) indication, for example, the alert indication reporting the event modeled by message PLAT0456 (FanAddedAlert)
 - indications do not exist in a namespace
 - indications are transitional objects that convey the notification about an event from an implementation to a listener
 - however, indications are required to have an *origin namespace* (detailed later)
- Alert indication
 - a notification about root events
 - may be related to a managed objects that may or may not be represented in CIM
- Lifecycle indication
 - a notification about events in a CIM model (always secondary events)
 - always relates to the CIM representation of managed objects

Origin of indications

- Indications are required to have an originating namespace
 - The namespace is not visible through the CIM representation of the indication, that is, there is no property for showing it
- The implementation decides about the originating namespace, within these constraints:
 - The origin namespace of lifecycle indications shall be the namespace where the related CIM instance exists
 - If an alert indication refers to managed object represented by a CIM instance (AlertingManagedElement), the namespace of that CIM instance should be the origin namespace
 - The creation class of an indication is required to exist in the origin namespace
 - Some implementations allow/require registering an indication implementation for a namespace
- The indication origin is considered during indication filtering

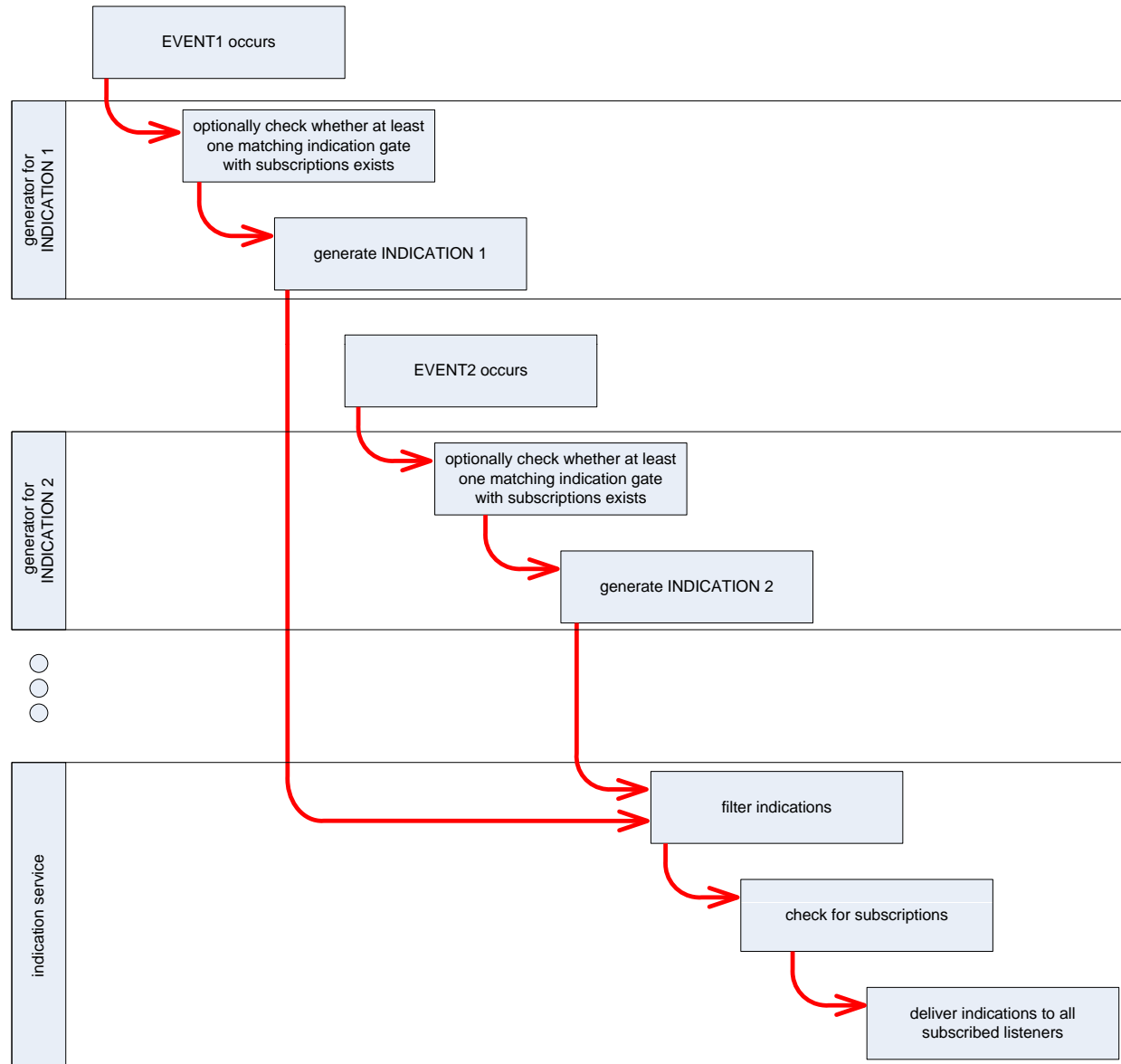
Indication adaptations

- Indication adaptations simplify the definition of indications in referencing profiles
- the Indications profile defines the following base indication adaptations:
 - BasicIndication
 - The base for all indications defined in referencing profiles
 - ReliableIndication
 - An optional additional adaptation with requirements pertaining to reliable indications
 - typically implemented once and generically at the WBEM server level
 - AlertIndication
 - The base for all alert indications defined in referencing profiles
 - LifecycleIndication
 - The base for all lifecycle indications defined in referencing profiles

Indication related functionality I

- Indication generation
 - the process of creating an indication as the event that the indication is designed to report occurs
 - may be inhibited until at least one covering indication filter with subscriptions exist
 - functionality typically implemented on a per indication basis
- Indication filtering
 - the process of selecting indications based on specific filtering rules applied by indication gates, such that only indications within the coverage of the indication gate pass
 - functionality typically implemented once per WBEM server, but parameterized through indication filters and filter collections provided by implementations of referencing profiles
- Indication delivery
 - the process of delivering filtered indications from an implementation to all subscribed listeners
 - functionality typically implemented once per WBEM server

Indication related functionality II



Indication filters

- Indication filters
 - filter indications that are within the filters coverage
- Indication filter coverage
 - the set of indications that can pass the filter
 - defined by means of
 - an indication filter query statement
 - a list of namespace identifications identifying potential indication origin namespaces
- Filtering rule:
 - all generated indications that originate in one of the identified namespaces, and match the indication filter query statement shall pass (or be filtered by) the indication filter
- The existence of an indication filter does not imply that any or all of the covered indications are implemented
 - Example: The filter that covers all alert indications with the filter query `"SELECT * FROM CIM_AlertIndication"` does not imply that any or all possible alert indications are implemented. However, any *generated* alert indication would be filtered by that filter, and be delivered to all subscribed listeners.

IndicationFilter adaptations

- IndicationFilter
 - StaticIndicationFilter
 - IndicationSpecificIndicationFilter
 - A filter filtering a particular indication
 - the definition in the Indications profile provides for instances covering the indications defined in referencing profiles
 - » referencing profiles do not need to define indication filters
 - GlobalIndicationFilter
 - Filter covering all alert indications
 - Filters covering all lifecycle indications
 - Standard base adaptation for adaptation modeling indication filters in referencing profiles
 - DynamicIndicationFilter
 - Optional: Client creatable filters

FilterCollection adaptations

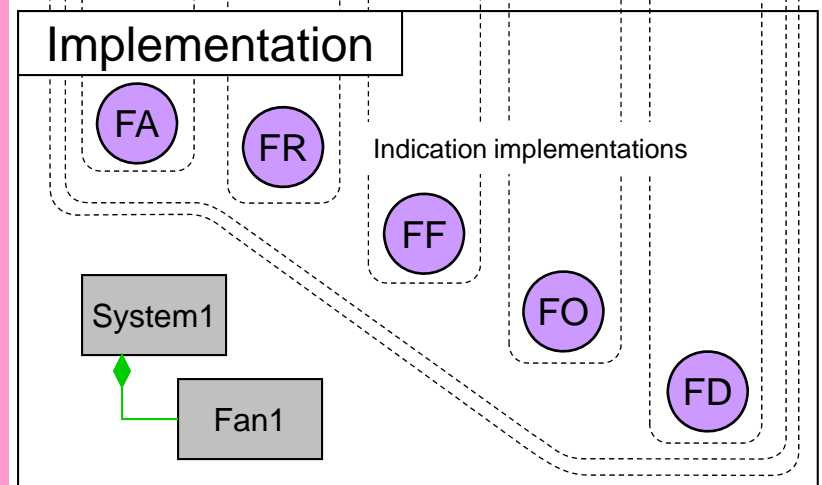
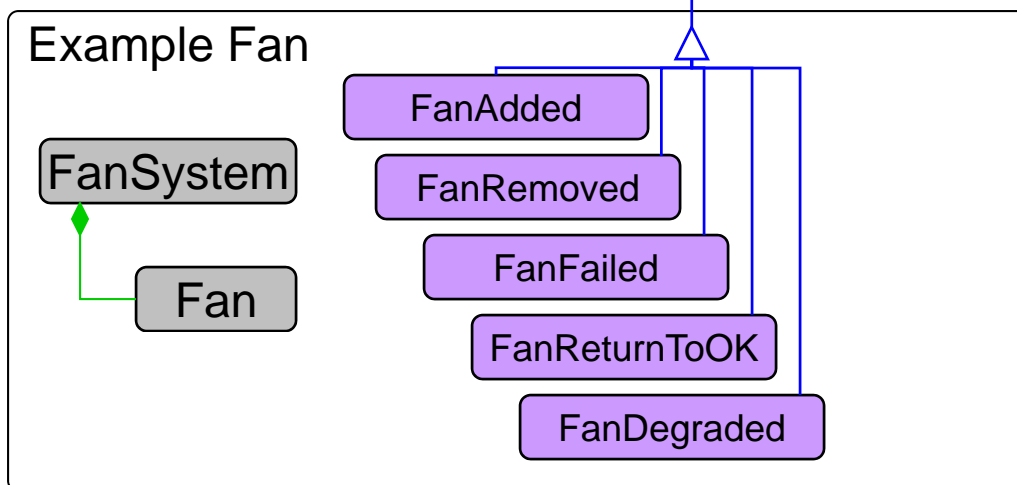
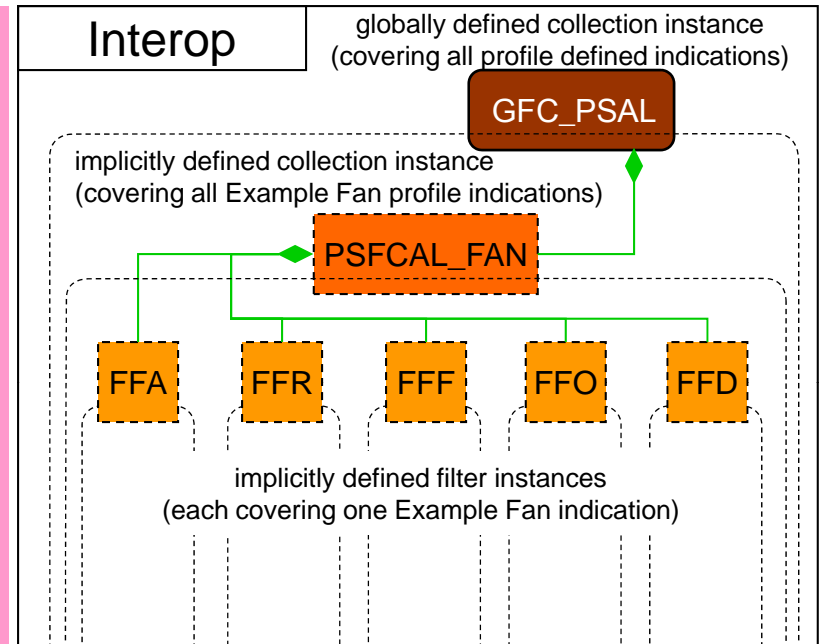
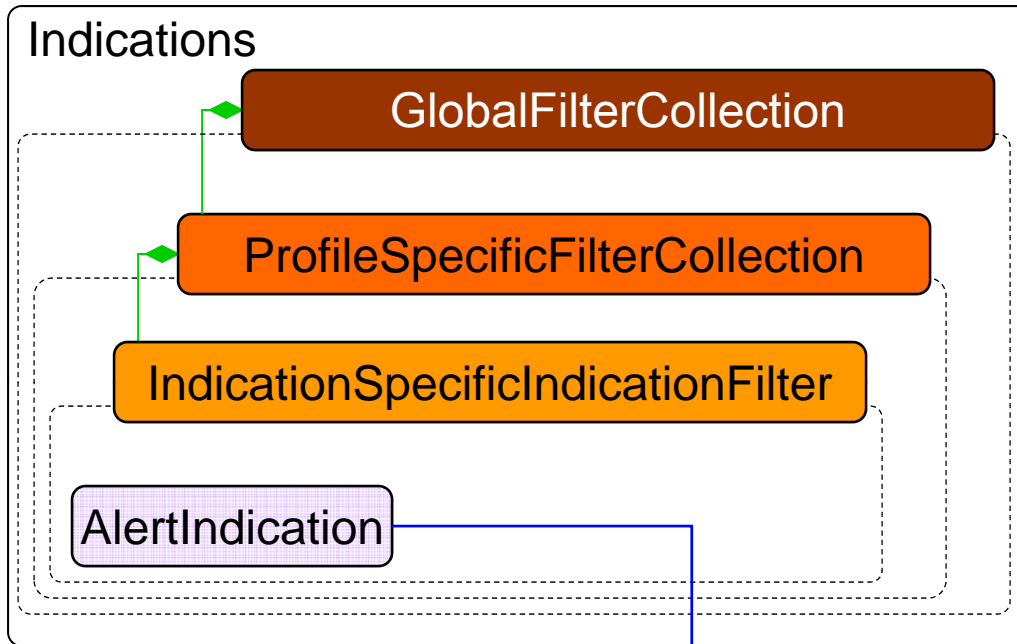
- StaticFilterCollection
 - ProfileSpecificFilterCollection
 - Filter collections covering all alert / lifecycle indications defined in a referencing profile
 - Definition in the Indications profile provides for instances covering the indications defined in referencing profiles
 - » referencing profiles do not need to define indication filters
 - GlobalFilterCollections
 - Filter collections covering all alert / lifecycle indications defined in *all* referencing profiles
 - Filter collections covering all indications defined in *all* referencing profiles
 - Filter collection covering all lifecycle indications
 - (For alert indications, there is a respective filter – not a collection)
- No dynamic filter collections

Defined coverage

- Defined coverage
 - a concept introduced in order to reduce the indication filter and filter collection related instance requirements for small footprint implementations
 - enables the definition of the membership set of a static filter collection by means of *specification in a profile*, but without requiring the CIM representation of collection members and their relationship to the collection
 - because static filter collections can be *identified through their name*, clients with prior knowledge about the defined coverage know the coverage without needing to inspect the CIM representation of contained members
 - listeners without knowledge about the defined coverage need to be aware that indications outside of the coverage as observable by inspecting the CIM representation of contained members may be delivered

Indication specific filters

Profile specific filter collections



Profile Example

Indication adaptations

5 Synopsis

adapts the CIM_AlertIndication class; this implies requirements from the CIM schema definition

based on the AlertIndication adaptation defined in the Indications profile; this implies addnl implementation requirements, including those for filters and filter collections

Table 2 — Adaptation

Adaptations	Requirements	Description
...
FanAddedAlert	CIM_AlertIndication	See 7.2.9
	Indications::AlertIndication	
	PLATMREP::PLAT0456	
...

7 Implementation

Value requirements specific to this particular indication adaptation

based on a message; this implies the event definition, and addnl property constraints

7.2.9 FanAddedIndication: CIM_AlertIndication

... description ... description ... description ... description ...
 The requirement level of the FanAddedAlert indication adaptation is conditional.
 Condition: The FanIndication feature is implemented

Relates the indication to particular managed objects (fans modelled by the Fan adaptation)

Table 22 — FanAddedIndication: Elements

Elements	Requirements	Description
AlertingManagedElement	Mandatory	Value shall reference the Fan instance (see ...) representing the added fan.
MessageID	Mandatory	Value shall be "PLAT0456".

Message definition

```

<MESSAGE NAME="Fan added">
  <MESSAGE_ID PREFIX="PLAT" SEQUENCE_NUMBER="0456"/>
  <MESSAGE_DESCRIPTION>
    This message is for the use case when an implementation has detected a Fan was added.
    The ComputerSystemObjectPath element contains the CIM object path to the computer system.
  </MESSAGE_DESCRIPTION>
  <MESSAGE_COMPONENTS>
    <STATIC_ELEMENT>The Fan </STATIC_ELEMENT>
    <DYNAMIC_ELEMENT NAME="FanElementName" SOURCE_PROPERTY="CIM_Fan.ElementName" .../>
    <STATIC_ELEMENT> has been added.</STATIC_ELEMENT>
    <DYNAMIC_ELEMENT NAME="ComputerSystemObjectPath" DATATYPE="string" ... "/>
  </MESSAGE_COMPONENTS>
  <FIXED_MESSAGE_INSTANCE_VALUES TYPE="ALERT">
    <ALERTING_MANAGED_ELEMENT>
      <DESCRIPTION>Object Path to alerting CIM_Fan instance ...</DESCRIPTION>
    </ALERTING_MANAGED_ELEMENT>
    <ALERT_TYPE>5<DESCRIPTION>Device Alert</DESCRIPTION></ALERT_TYPE>
    <PERCEIVED_SEVERITY>2<DESCRIPTION>Information</DESCRIPTION>
    </PERCEIVED_SEVERITY>
  </FIXED_MESSAGE_INSTANCE_VALUES>
</MESSAGE>

```

event definition

additional constraints for the indication

Preferred phrase: "This message reports the event that a fan was added to a computer system."

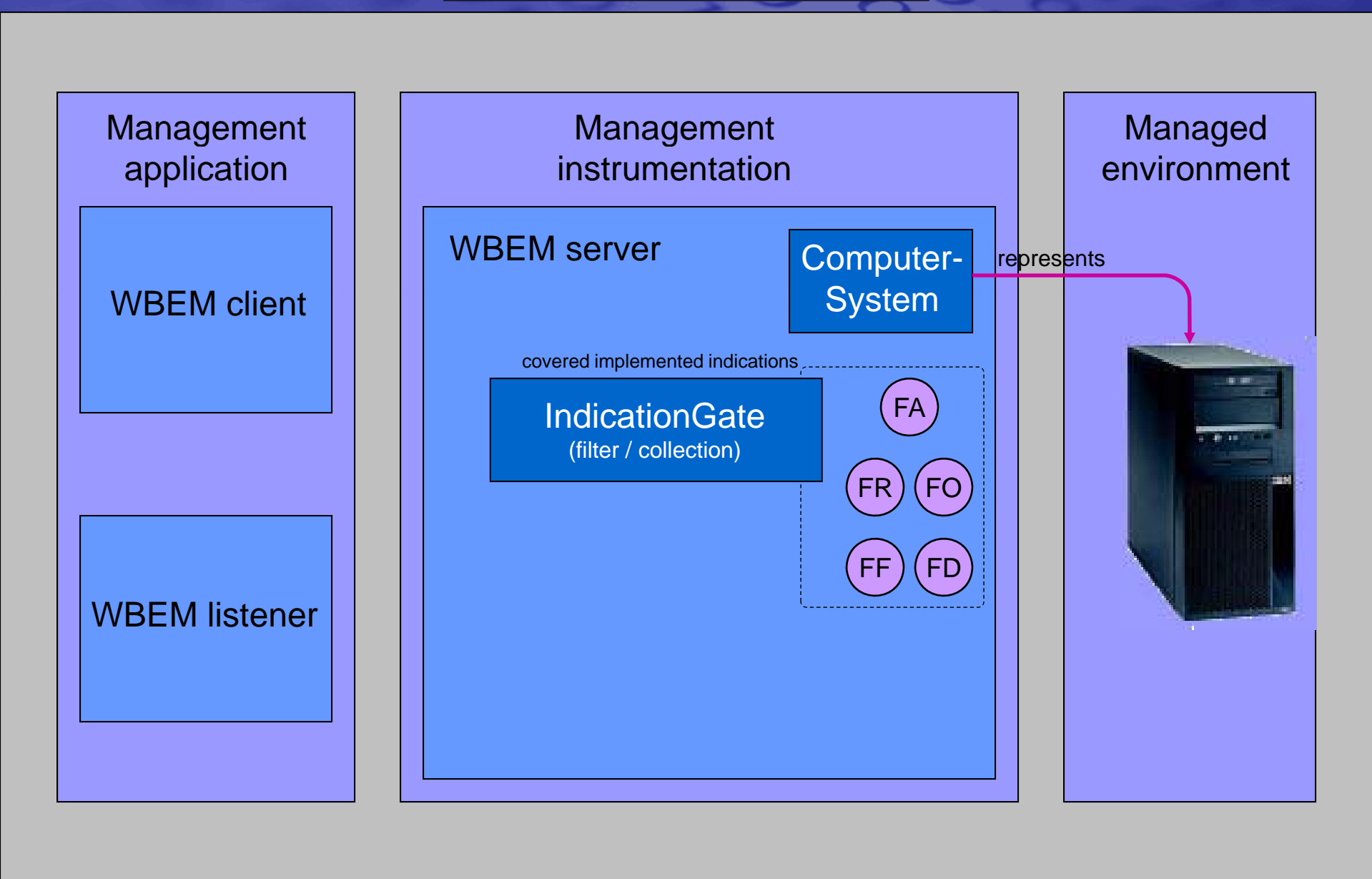
Listeners and listener destinations

- Listener
 - a receiver of indications
 - the implementation of WBEM listener related requirements defined in the Indications profile (as defined in DSP1054 1.2)
- Listener destination
 - an entity within an implementation that refers to a listener
 - Two variants:
 - Client creatable
 - recommended, individually per client
 - Implementation provided, and client modifiable
 - not recommended because of the potential of race conditions
 - Properties allow establishing
 - destination address
 - protocol
 - persistence (in case of errors)

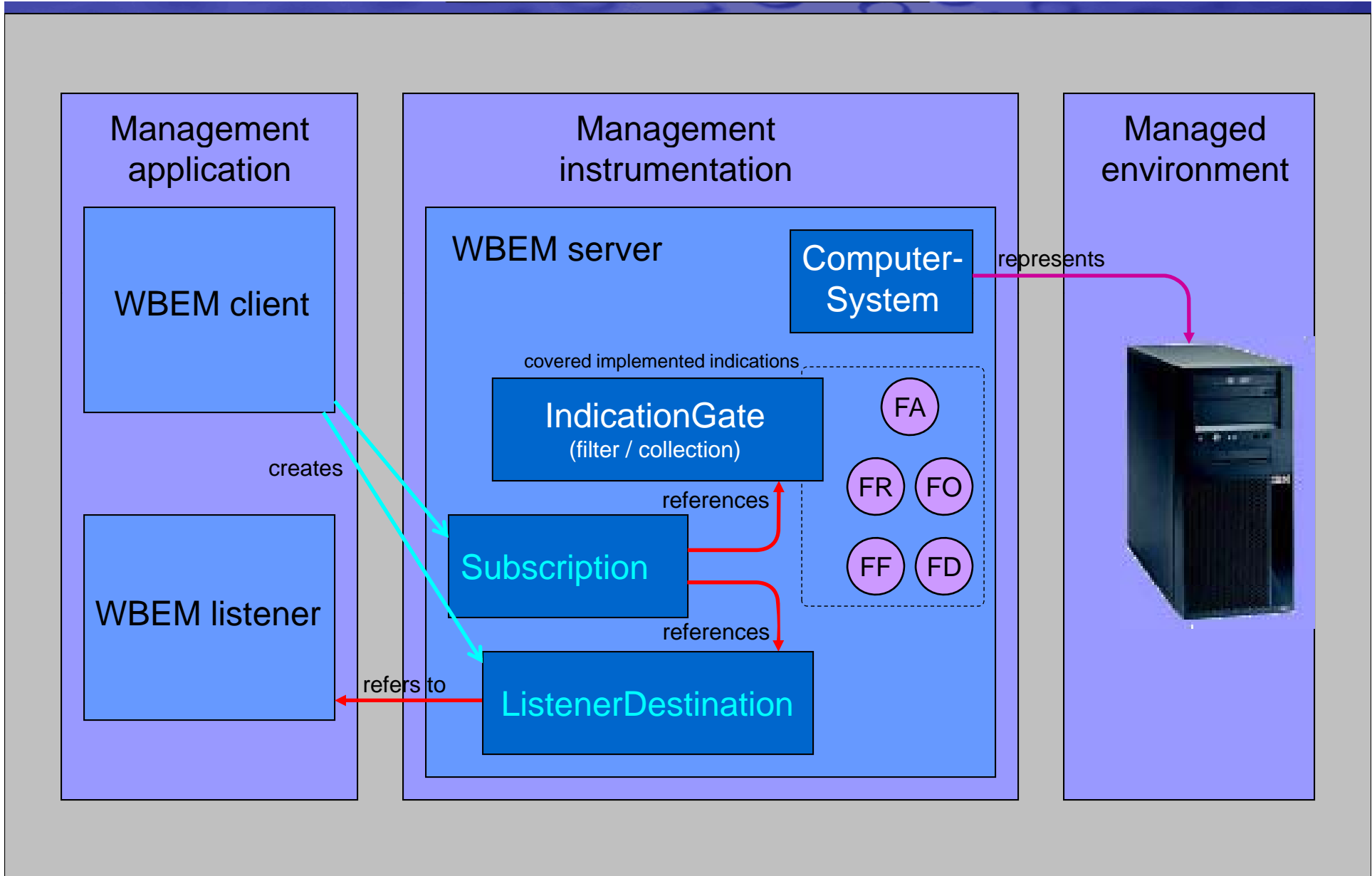
Subscriptions

- Subscription
 - an element within an implementation that
 - relates an indication gate with a listener destination
 - represents the referenced listener's interest in the set of indications covered by the referenced indication gate
 - typically client created
 - once created, a subscription results in indications being delivered to the listener that is referenced by the listener destination for each event reported through any of the indications covered by the indication gate referenced by the subscription
 - policies may be specified upon creation
 - OnFatalErrorPolicy: Ignore | Disable | Remove
 - RepeatNotificationPolicy: None | Suppress | Delay

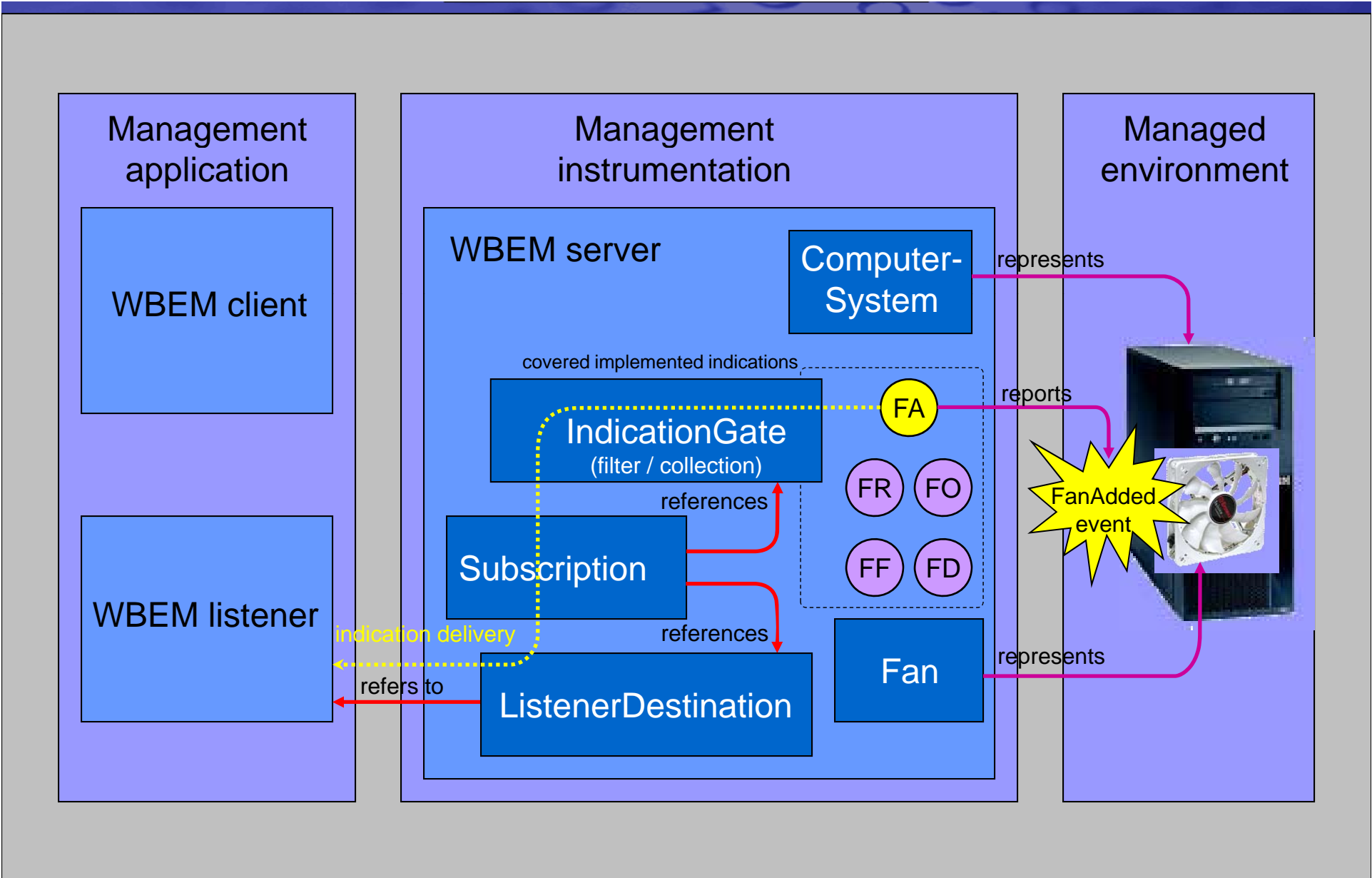
Typical scenario I



Typical scenario II



Typical scenario III



Suppression of repeated indication delivery

- Suppression of the repeated delivery of semantically identical indications
 - All properties values are identical, except those exposing the indication identifier, the indication generation time, and the sequence identifier
- IntervalControlledSuppressionOfRepeatedIndication-Delivery
 - if an indication was delivered once, semantically identical indications will not be delivered repeatedly, until a predefined time interval expired
- RateControlledSuppressionOfIndicationDelivery
 - if within a predefined time interval the *rate of indications* stays below a predefined rate, no semantically identical indications are delivered
 - the interval "floats" with each event
 - it is possible that no indications at all are delivered

Reliable indications

- Modeled by the ReliableIndications feature
 - requires the implementation of the ReliableIndication adaptation
 - additional adaptation independent requirements for WBEM servers and WBEM listeners
- ReliableIndication adaptation
 - constrains an indication to contain a sequence identifier
- Additional adaptation independent requirements for WBEM servers
 - prohibition of indication delivery for disabled or removed subscriptions
 - prohibition of repeated indication delivery after successful delivery
 - requirements for the retry of failed indication deliveries
 - requirements for undeliverable indications
 - requirements for the implicit removal of subscriptions and listener destinations
 - required behavior related to WBEM server restarts
- Additional adaptation independent requirements for WBEM listeners
 - determination of the expected sequence identifier of the next indication
 - discovery of lost indications
 - discovery of duplicate indications
 - discovery of out-of-order indications
- Additional protocol specific elements (out of scope of the Indications profile)
 - indication delivery
 - determination of delivery success or failure

Status

- 1st Work-in-Progress published 2010-07-14
- 2nd Work-in-Progress imminent
- DMTF Standard imminent