1.1   Overview

This section provides a brief architectural overview of the DMTF CIM-XML WBEM and the IETF SNMP alert mechanisms.

1.1.1   CIM Indication Overview

CIM Indication Architecture

In the OpenPegasus architecture, there are three key components associated with the generation and delivery of Indications: the Indication Provider, the CIMOM (CIM Object Manager) and the Indication Handler.

- ❑   The Indication Provider is responsible for the generation of the Indication.
- ❑   The CIMOM is responsible for any required post-generation processing and for routing the Indication to the appropriate Indication Handlers.
- ❑   An Indication Handler is responsible for the mapping, encoding and transport of the CIM Indication over the requested format and protocol.
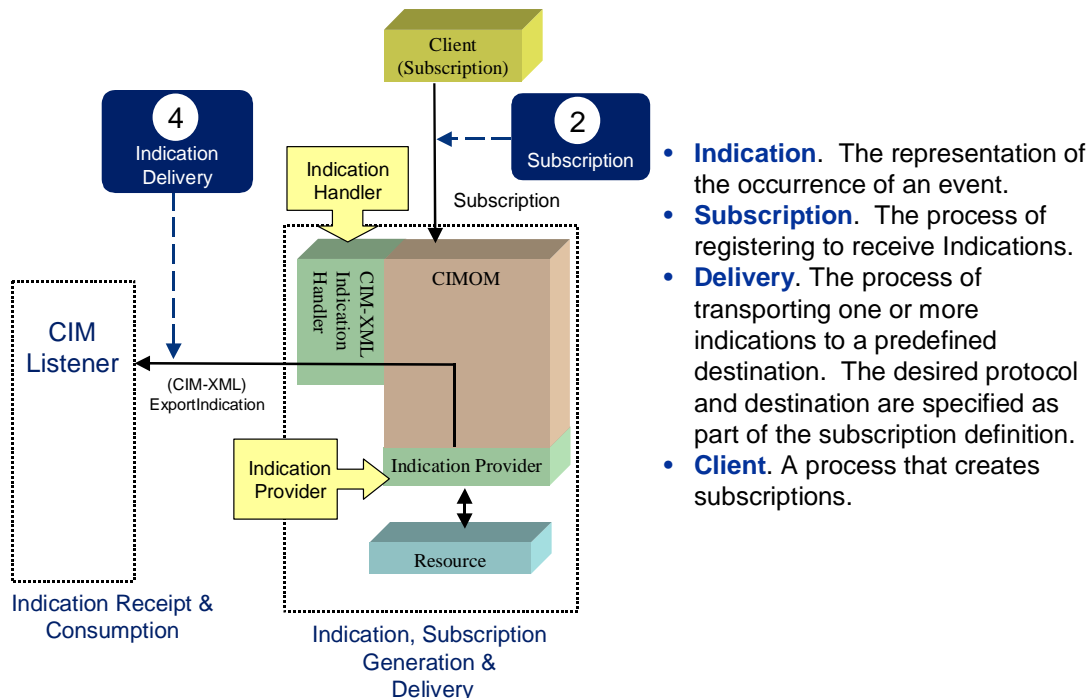
CIM Indication Architecture
Overview

- • **Indication**. The representation of the occurrence of an event.
- • **Subscription**. The process of registering to receive Indications.
- • **Delivery**. The process of transporting one or more indications to a predefined destination. The desired protocol and destination are specified as part of the subscription definition.
- • **Client**. A process that creates subscriptions.
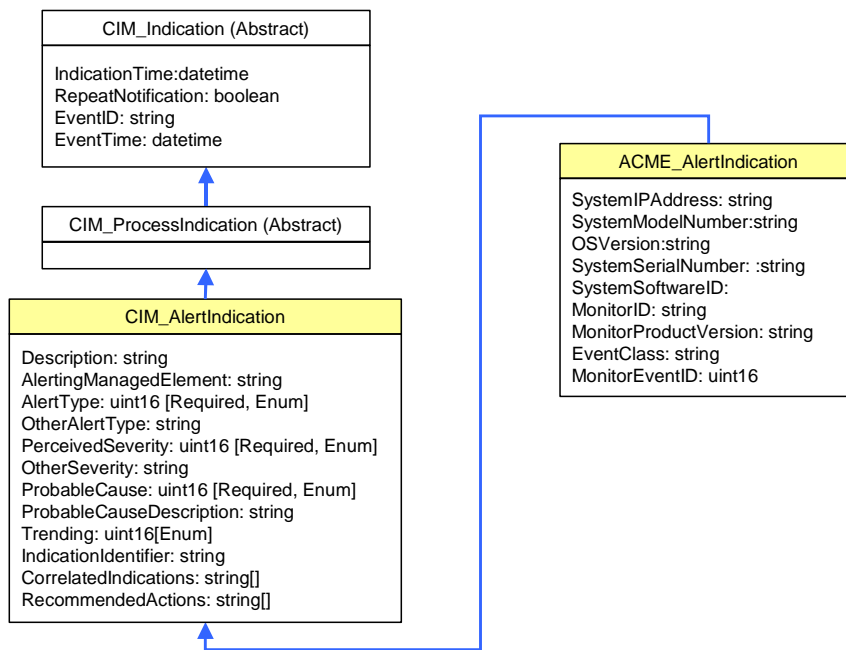
Figure 1 - CIM Indication Overview

CIM Indication Definition

Under CIM, Indications are instances of Indication classes. The DMTF has defined an initial set of Indication classes. Vendors can extend the model to include new types of Indications. Indication class definitions capture the semantics of the Indication data and, as a general rule, are designed to be independent of the format and protocol used to deliver the Indication. See, for example, the ACME-defined extension of CIM_AlertIndication in the following figure.

CIM Indication Architecture
Alert Indication Schema (v2.7)   What's Available

CIM_Indication (Abstract)

IndicationTime:datetime
RepeatNotification: boolean
EventID: string
EventTime: datetime

CIM_ProcessIndication (Abstract)

CIM_AlertIndication

Description: string
AlertingManagedElement: string
AlertType: uint16 [Required, Enum]
OtherAlertType: string
PerceivedSeverity: uint16 [Required, Enum]
OtherSeverity: string
ProbableCause: uint16 [Required, Enum]
ProbableCauseDescription: string
Trending: uint16[Enum]
IndicationIdentifier: string
CorrelatedIndications: string[]
RecommendedActions: string[]

ACME_AlertIndication

SystemIPAddress: string
SystemModelNumber:string
OSVersion:string
SystemSerialNumber: :string
SystemSoftwareID:
MonitorID: string
MonitorProductVersion: string
EventClass: string
MonitorEventID: uint16

Figure 2 - CIM Alert Indication Schema with Vendor Extensions

CIM Indication Subscriptions

Clients register to receive Indications by defining subscriptions (i.e., creating instances of the CIM_IndicationSubscription class). A CIM_IndicationSubscription is an association between an instance of the CIM_IndicationFilter class and an instance of the CIM_IndicationHandler class.
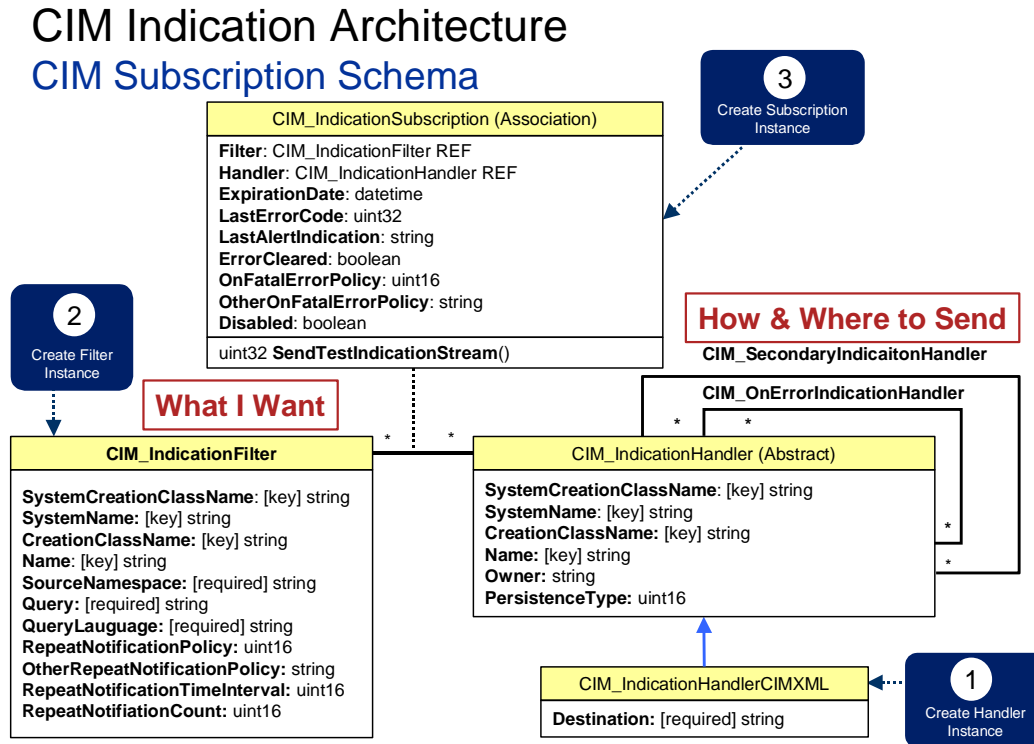
CIM Indication Architecture
CIM Subscription Schema

CIM_IndicationSubscription (Association)

Filter: CIM_IndicationFilter REF
Handler: CIM_IndicationHandler REF
ExpirationDate: datetime
LastErrorCode: uint32
LastAlertIndication: string
ErrorCleared: boolean
OnFatalErrorPolicy: uint16
OtherOnFatalErrorPolicy: string
Disabled: boolean

uint32 **SendTestIndicationStream**()

3 Create Subscription Instance

2 Create Filter Instance

What I Want

How & Where to Send

CIM_SecondaryIndicaitonHandler

CIM_OnErrorIndicationHandler

CIM_IndicationFilter

SystemCreationClassName: [key] string
SystemName: [key] string
CreationClassName: [key] string
Name: [key] string
SourceNamespace: [required] string
Query: [required] string
QueryLauguage: [required] string
RepeatNotificationPolicy: uint16
OtherRepeatNotificationPolicy: string
RepeatNotificationTimeInterval: uint16
RepeatNotifiationCount: uint16

CIM_IndicationHandler (Abstract)

SystemCreationClassName: [key] string
SystemName: [key] string
CreationClassName: [key] string
Name: [key] string
Owner: string
PersistenceType: uint16

CIM_IndicationHandlerCIMXML

Destination: [required] string

1 Create Handler Instance

Figure 3 CIM Subscription Schema

A CIM_IndicationFilter instance describes the type of Indications to be sent. E.g., the following filter condition defines the set of all "critical (6)" ACME alerts. The FROM clause contains the name of the Indication class.

```
SELECT *
FROM ACME_ALERTINDICATION
WHERE PerceivedSeverity = 6
```

A CIM_IndicationHandler instance describes the destination, format and protocol to be used to send the Indication. As part of the CIM 2.7 Event Schema, the DMTF has defined a single type of Indication Handler, CIM_IndicationHandlerCIMXML. This Indication Handler is used to send Indications using the DMTF CIM-XML WBEM Standard.

CIM Indication Operation Flow

The following figure shows the high-level flow of Indication operations, starting with the registration of the Indication Provider and ending with the delivery of an Indication.
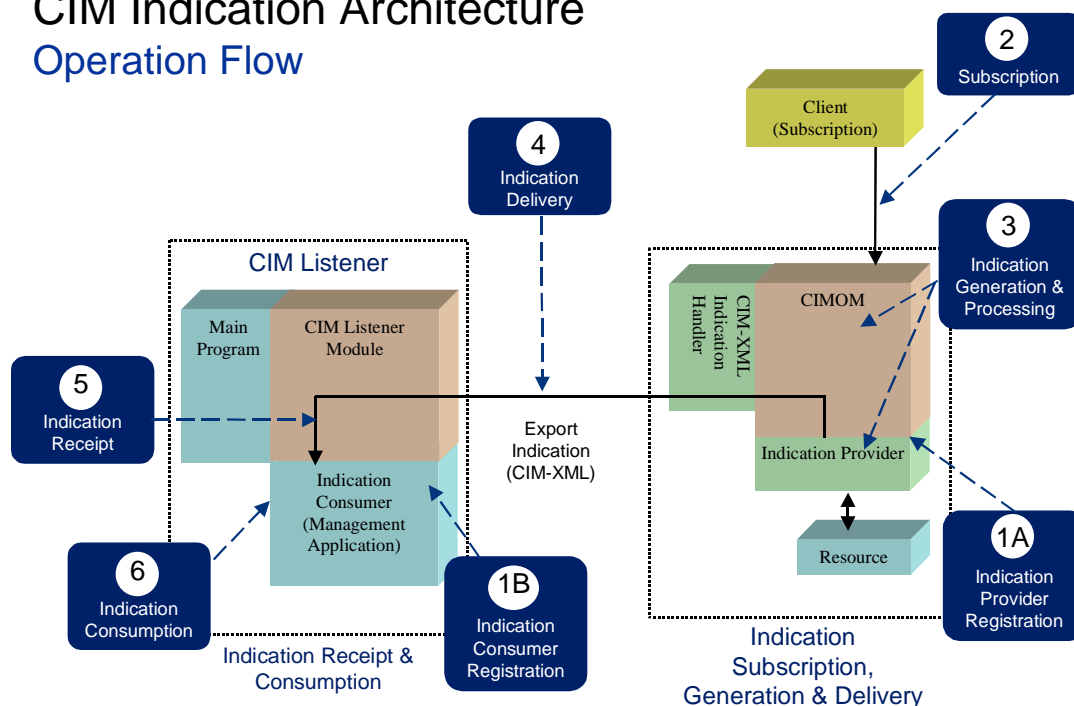

Figure 4 CIM Indication Operation Flow

1.1.2 SNMP Trap Overview

SNMP Trap Architecture

In SNMP, a trap is used to inform a management application of the occurrence of an event of interest.

SNMP Trap Architecture
Overview

Sample SNMP Hierarchy

- **Trap.** The representation of the occurrence of an event.
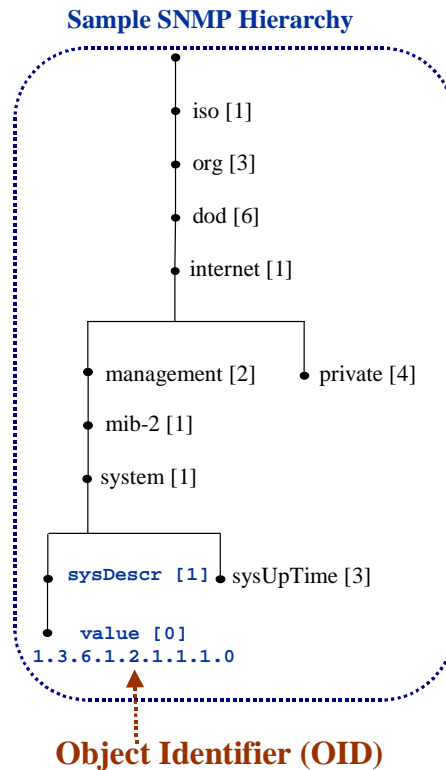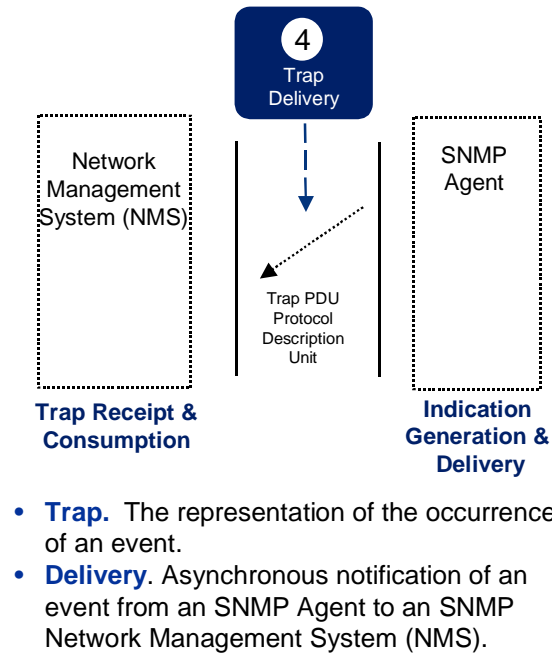- **Delivery**. Asynchronous notification of an event from an SNMP Agent to an SNMP Network Management System (NMS).

Figure 5 SNMP Trap Architecture