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**IODEF Enumeration Reference Format**  
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Abstract

The Incident Object Description Exchange Format [[IODEF](#)] provides a Reference class used to reference external entities (such as enumeration identifiers). However, the method of external entity identification has been left unstructured. This document describes a method to provide structure for referencing external entities for the [[IODEF](#)] Reference class.

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## 1 Introduction

There is an identified need to specify a format to include relevant enumeration values in an IODEF document. It is anticipated that this requirement will exist in other standardization efforts within several IETF Working Groups, but the scope of this document pertains solely to [\[IODEF\]](#).

### 1.1 Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [[RFC2119](#)].

## 2. Referencing External Enumerations

The need is to place enumeration identifiers and their references in [\[IODEF\]](#)'s Reference class. There are several ways to accomplish this goal, but one that seems the most appropriate at this point is to require a specific format for the ReferenceName string of the [\[IODEF\]](#) Reference class, such that an IANA table can be used to catalog a variety of reference types.

```
+-----+
| Reference      |
+-----+
|               |<-----[ ReferenceName ]
|               |<--{0..*}--[ URL           ]
|               |<--{0..*}--[ Description  ]
+-----+
```

FIGURE 1: [\[IODEF\]](#) Reference Class

Per [\[IODEF\]](#) the ReferenceName is of type ML\_STRING. This becomes problematic when specific references, especially enumerations such as CEE, CVE, CCE, and so on, are referenced - how is an implementer to know which type of reference this is, and thus how to parse it? One solution, presented here, is to require that ReferenceName follow a particular format.

### 2.1 Reference Name Format

The format of the ReferenceName MUST follow the form of

```
id_type:version:id
```

Where id\_type is an IANA-registered type having the form



<Abbreviation>

And where version is an IANA-registered type having the form

<Version>

And where id is the actual enumeration identifier string.

The IANA Considerations section of this document provides details for <Abbreviation> and <Version>. This format allows the <Version> to be associated with the id rather than the id\_type. By requiring that a specific type and version be associated with the identifier, an implementer can look up the type in an IANA table to understand exactly what the identifier in ReferenceName is and how s/he may expect that identifier to be structured.

## 2.2 Reference Example

The operation of this method can be described using a fictitious example. Assume a Reference class as described in the [Section 2](#) introduction and an enumeration of formatted strings used to identify Concept X. Then, the string format of Concept X Identifiers would be registered with IANA (see [Section 4](#)), such that implementations of the Reference class understand how to handle the formatted string.

```
<Reference>
  <ReferenceName>CXI:1.0:CXI-1234-XYZ</ReferenceName>
  <URL>http://cxi.example.com</URL>
  <Description>Foo</Description>
</Reference>
```

Information in the IANA table (see [Section 4](#)) would include:

```
Full Name: Concept X Identifier
Abbreviation: CXI
Version: 1.0
Specification URI: http://cxi.example.com/spec_url
```

## 2.3 Reference Method Applicability

While the scope of this document pertains to [[IODEF](#)], it should be readily apparent that any standard needing to reference an enumeration identified by a specially formatted string can use this method of providing structure after the standard has been published. In effect, this method provides a standardized interface for enumerations, thus allowing a loose coupling between



a given standard and the enumeration identifiers it needs to reference now and in the future.

### **3 Security Considerations**

None.

### **4 IANA Considerations**

This document specifies an identifier format for the [[IODEF](#)] ReferenceName string of the Reference class.

Registration request for the IODEF Enumeration Reference Format:

Name of the Registry: "Enumeration Reference Type Identifiers"

The registry is intended to enable enumeration value additions to attributes of a given reference class of an IETF standard, for example, the Reference class of the IODEF schema. Note that certain name requests should not be permitted as either Full Name or Abbreviation entries for the requested IANA table. For example, the following list should not be permitted: foo, bar, example.com. It is anticipated that the Expert Review process will flag any additional undesired Full Name or Abbreviation issues.

Fields to record in the registry:

Full Name: The full name of the enumeration as a string

Abbreviation: The abbreviation of the enumeration as a string, e.g. a short initialization is encouraged

Version: The version of the enumeration as a string, e.g. dot-separated numbers are a good idea

Specification URI: A list of one or more URIs [[RFC3986](#)] from which the registered specification can be obtained. The registered specification **MUST** be readily and publicly available from that URI.

Initial registry contents: None.

Allocation Policy: Expert Review [[RFC5226](#)] and Specification Required [[RFC5226](#)]

The Designated Expert is expected to consult with the MILE (Managed Incident Lightweight Exchange) working group or its successor if any such WG exists (e.g., via email to the working group's mailing list). The Designated Expert is expected to review the request and validate



the appropriateness of the enumeration for the attribute. If a specification is associated with the request, it MUST be reviewed by the Designated Expert.

## **5 References**

### **5.1 Normative References**

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [IODEF] Danyliw, R., Meijer, J., and Y. Demchenko, "The Incident Object Description Exchange Format", [RFC 5070](#), December 2007.
- [3986] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [BCP 26](#), [RFC 5226](#), May 2008.

### **5.2 Informative References**

None.

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