Export of Structured Data in IPFIX

IETF-77 March 23rd, 2010

<draft-ietf-ipfix-structured-data-01.txt>

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New in this Version

• How to encode a variable-length with the BasicList interface name example
• Some editorial changes
Only One Open Issue: Semantic

• Example: basicList of egress interfaces in a Flow Record

  - Has every counted packet been sent on every egress interface?
    - multicast case = AND semantic
  - Has every counted packet been sent on any one of the egress interfaces?
    - load balancing case = OR semantic
Discussions on the Mailing List

- Completely ignoring the semantic is not an option
- The solution is for the structured data only, so the semantic of the IEs within a structured data
- No change to RFC5101
- Add a semantic filed to the 3 list types: basicList, subTemplateList, and subTemplateMultiList
- For example, in the basicList Information Element Encoding becomes:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|0| Field ID | Element Length |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Semantic | BasicList Content ... |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| ... |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
Discussions on the Mailing List

- No "semanticless" versions of the IPFIX structured data types
- Semantic as a single list, as opposed to a bit vector
  In order to reduce the possibilities of wrong combinations
- Required semantics are:
  0x00: undefined (default)
  0x01: allOf
  0x02: oneOrMoreOf
  0x03: exactlyOneOf
  0x04: noneOf
  0x05: ordered
- An IANA registry is required, to have an extensible solution, like for the "MPLS label type" registry
Discussions on the Mailing List

• “exactlyOneOf” example: an aggregated observation point, composed of multiple template records
  template 1: exporterIPaddress
  template 2: exporterIPaddress, basicList of interfaces
  template 3: exporterIPaddress, LC
  Those three templates are linked with the semantic "exactlyOneOf"

• “ordered example: BGP AS path
  BGP AS-PATH 10 20 30 40 {50,60}
  (basicList, ORDERED, (basicList, ORDERED, AS10,AS20,AS30,AS40), (basicList, exactlyOneOf, AS50, AS60))
Discussions on the Mailing List

- Open issue: Do we need the RANGE semantic?
  Required by Gerhard, but is it in scope for this draft?
  Is it only valid for a list of single IE such as port range?
Export of Structured Data in IPFIX

IPFIX IETF-76 Nov 11th, 2009

<draft-ietf-ipfix-structured-data-00.txt>

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New Abstract Data Type and Information Element: basicList

basicList represents a list of zero or more instances of any single Information Element. Primarily used for single-valued data types.

Figure A: basicList Information Element Encoding

Example: list of output interfaces, list of BGP AS Path, list of port numbers
New Abstract Data Type and Information Element: subTemplateList

subTemplateList represents a list of zero or more instances of structured data, where the data type of each list element is the same and corresponds with a single Template Record.

```
+--------------------------+
|                        |
| Template ID             |
| SubTemplateList Content |
|                        |
+--------------------------+
```

Figure E: subTemplateList Encoding

Example: MPLS label stack, src/dst IP addresses pairs, performance metric for a fixed tuple
New Abstract Data Type and Information Element: subTemplateMultiList

subTemplateMultiList

represents a list of zero or more instances of structured data, where the data type of each list element can be different and correspond with different template definitions.

<table>
<thead>
<tr>
<th>Element 1 Template Id</th>
<th>Element 1 Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Element 1 Content ...</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Element 2 Template Id</td>
<td>Element 2 Length</td>
</tr>
<tr>
<td>Element 2 content ...</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Element N Template Id</td>
<td>Element N Length</td>
</tr>
<tr>
<td>Element N content ...</td>
<td></td>
</tr>
</tbody>
</table>

Example: aggregated observation point in a mediation function