Export of Structured Data in IPFIX

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<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

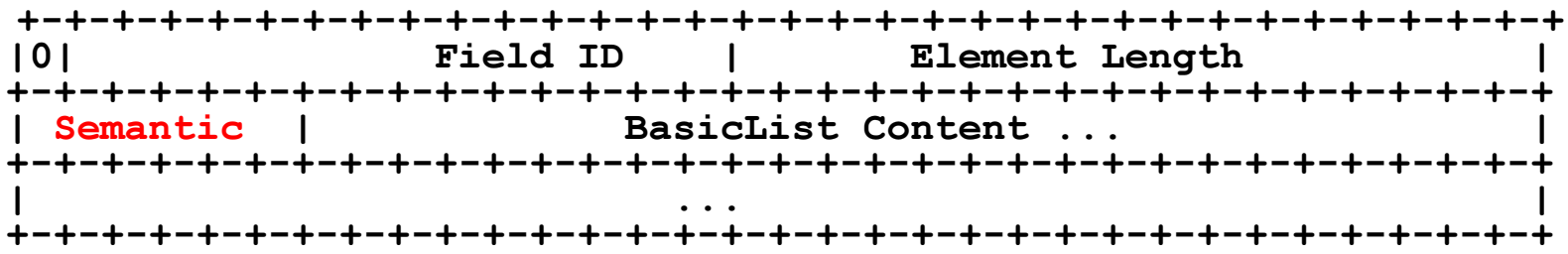
- **Example: basicList of egress interfaces in a Flow Record**

  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:



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 is 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.

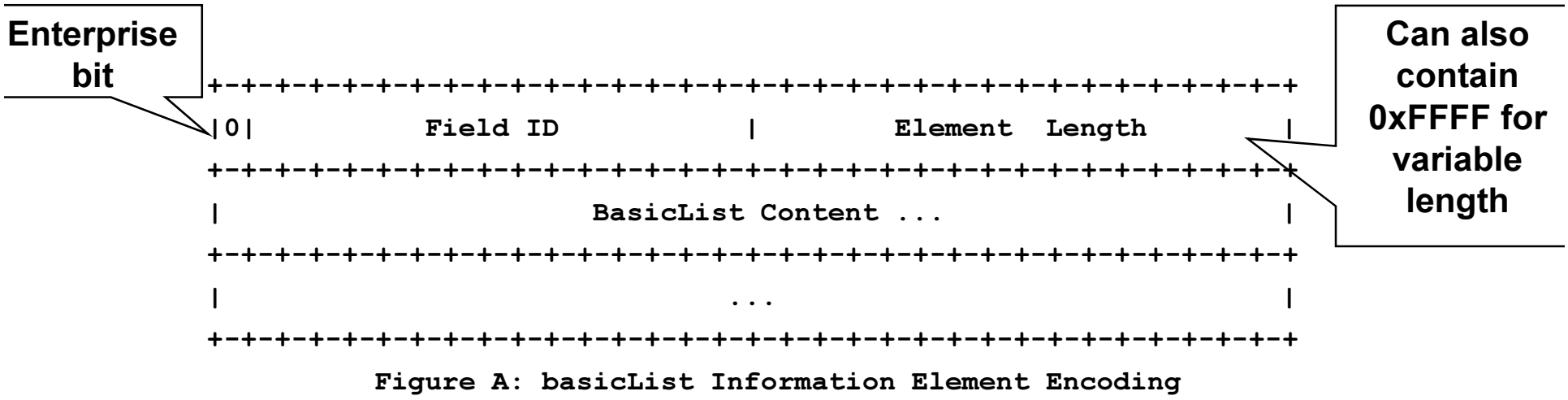

Figure A: basicList Information Element Encoding

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.

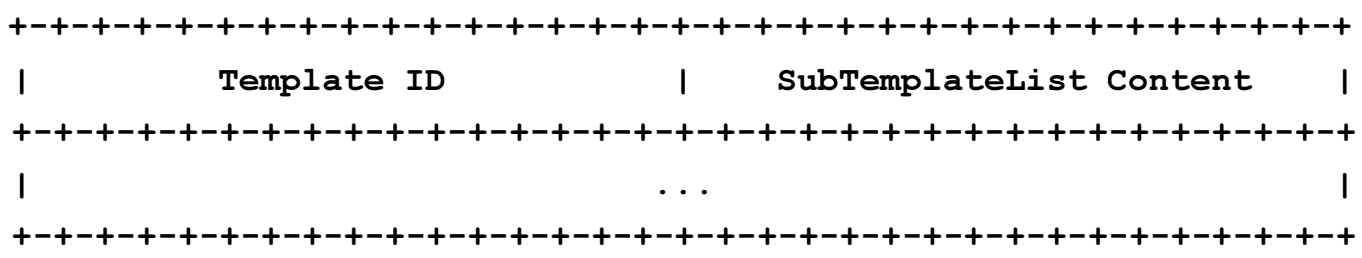

Figure E: subTemplateList Encoding

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.

Example: aggregated observation point in a mediation function