
Bidirectional Flow Export using IPFIX

draft-trammell-ipfix-biflow-02

<http://www.ietf.org/internet-drafts/draft-trammell-ipfix-biflow-02.txt>

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Motivation

- Bidirectional flow information useful for a variety of use cases.
- Biflow matching often most convenient at Metering Process.
- Need an efficient way to export this data using IPFIX.

Possible Biflow Export Methods

- **Record Adjacency**
 - Informal arrangement to export forward and reverse directions of a biflow as uniflows.
- **Common Properties**
 - Export key data as common properties and associate values as in draft-boschi-ipfix-reducing-redundancy.
- **Multiple Information Elements**
 - Define first IE of a given type as “forward”, second IE as “reverse”.
- **Proposed solution: Single Record Biflows**
 - Define reverse information elements to represent reverse direction of biflow.

Record Adjacency

- Informal arrangement to export forward and reverse directions of a biflow as uniflows
- Pro: Extremely simple.
- Pro: Supported in IPFIX as-is.
- Con: No actual semantic association between forward and reverse flows exists in the data records.
- Con: All flow key data duplicated in message stream.

Common Properties

- Export key data as common properties and associate values.
- Pro: Reduces redundant export of flow key data.
- Pro: Associates forward and reverse flows directly via `commonPropertiesID`.
- Con: `commonPropertiesID` overhead makes export not as efficient as it could be.
- Con: Requires state management on both exporter and collector side for `commonPropertiesIDs`.

Multiple Information Elements

- Define first IE of a given type as “forward”, second IE as “reverse”.
- Pro: Allows single-record export of biflows.
- Pro: Requires no new information elements.
- Con: Conflicts with existing semantics for multiple information elements.
 - Multiple IEs are presently taken to be in process-treatment order (as in PSAMP selectors)
- Con: Requires definition of precedence rules for application of information element ordering.
 - *We really don't want to do this.*

Single Record Biflows

- Represent each bidirectional flow with a single record.
- Define “forward” direction as packets sent from the flow initiator.
- Define “reverse” direction as packets sent to the flow initiator.
- Flow initiator as determined by Metering Process’ best effort.
- Define new “reverse” information elements to represent values for reverse direction.

Single Record Biflows

- Single record biflows are efficient and unambiguous.
 - No scope management overhead or scope IEs required to link two records into one.
 - No bidirectional flow assembly requirement at the Collecting Process.
 - No conflict with existing IE semantics.
- Requires the allocation of new reverse IEs.

Policies for Reverse IE Definition

- **Direct Allocation**
 - add one reverse IE for each “reversible” IE presently in the data model.
- **Reverse PEN**
 - add a new “dimension” to the IE number space using an IANA-assigned private enterprise number (PEN).

Direct Allocation of Reverse IEs

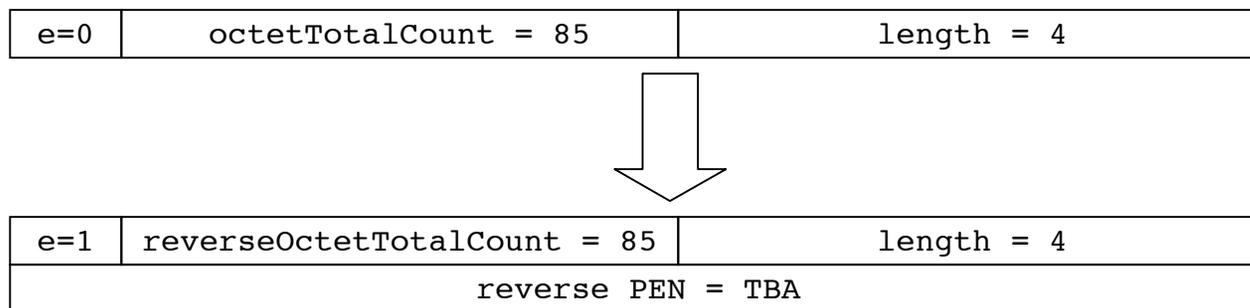
- Allocate a new “reverse” IE for each reversible IE
 - A reversible IE is one which *may* have a different value for each direction of a given biframe.
- Most IEs are reversible
 - All absolute and delta counters
 - All timestamps
 - All potentially non-key fields
 - All other IEs that aren’t solely used for scope
 - e.g., addresses, for matching ICMP error response to failed connection initiation.

Direct Allocation of Reverse IEs

- Straightforward – we can add these IEs as we would any other. But...
- Adds management overhead to future information element allocation.
 - Future IEs need to be evaluated for reversibility
 - Reversible IEs will need a reverse counterpart
 - Unclear who will perform this function
- Effectively reduces available IANA-managed IE number space by half.

Reverse PEN

- Allocate an IANA private enterprise number (PEN) to the draft.



- Information elements within this PEN IE number space correspond to the IETF number space, except that they apply to the reverse direction of a biflow.

Reverse PEN

- **Flexible**
 - Future IEs get reverse counterpart for free.
 - Does not reduce future available number space.
 - Compatible with proposals to add dimensioning explicitly to future revisions of IPFIX protocol.
- **IANA will assign an enterprise number to the draft after last call, if the working group selects this method.**

Since Dallas

- -01 (30 March)
 - clarified selection of a single proposed method for biflow export (single record biflows).
 - left question of how to allocate required reverse IEs open.
- Proposed Reverse PEN solution to list (11 May)
- Work item on draft WG charter (8 June)
- -02 (26 June)
 - Addressed remaining open issues.
 - Will select allocation policy after Montréal.

Next Steps

- **Select reverse IE allocation policy**
 - If Reverse PEN:
 - secure PEN from IANA.
 - If Direct Allocation:
 - define reversible IEs from IPFIX-INFO.
 - define procedure for future reversible IE allocation.
 - Release ietf-00 revision of draft reflecting this selection.
- **Continue incorporating WG input into draft for submission to IESG by March 2007.**

Questions and Discussion
