Use of IPFIX for Export of Per-Packet Information

<draft-pohl-pktid-01>

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Outline

- **Problem statement**
- *Solutions*
- **Example**: One-Way Delay measurement
- **PSAMP**
- **Evaluation**
- **Conclusions**

Problem statement

- **For a number of passive measurement there is a need to export per-packet data**
  - **E.g. one-way delay, jitter…**

- **Per-packet information export can be done:**
  - **Using one record (one-packet flow)**
  - **Using two different records (flow and packet properties)**

Export records
containing packet information

srcA	dstA	*Packet info*	...
srcA	dstA	*Packet info*	...
srcB	dstB	*Packet info*	...
srcA	dstA	*Packet info*	...

The flow information introduces a high degree of redundancy

…**separating flow from packet information:**

srcA	dstA	*Packet info*	...
srcA	dstA	*Packet info*	...
srcB	dstB	*Packet info*	...
srcA	dstA	*Packet info*	...

Packet properties templates

Flow properties templates

srcA	dstA	idxA
srcB	dstB	idxB

idxA	*Packet Info*	...
idxA	*Packet Info*	...
idxB	*Packet Info*	...
idxA	*Packet Info*	...

Example: one-way delay measurements

- Two measurement points(MP)with syncronized clocks must be set up at each end of the path

- Both MPs capture packets, assign them timestamps, and generate and id (to identify packets passing both points)

- Each MP will export its trace to a collector process where the traces are correlated based on packet ids and timestamps and

- the delay is calculated as a difference of two timestamps of a packet pair

OWD Example templates

- **Example flow property template**

flowID	sourceAddressv4	destinationAddressv4	ClassOfServicev4
unsigned32/ vendor	Ipv4address/ ID 8	Ipv4address/ ID 12	Octet/ ID 5

	ProtocolIdentifier	transportSourcePort	transportDestinationPort
...	Octet/ ID 4	Unsigned16/ ID 7	Unsigned16/ ID 11

- **Example packet property template**

packetTimestamp	packetID	packetLength	flowID
unsigned64/vendor	unsigned32/ vendor	unsigned32/vendor	unsigned32/ vendor

PSAMP

- **IPFIX is well suited to export packet information from a PSAMP exporting process to a PSAMP collecting process**
  - Good match between the architectures
  - IPFIX satisfies PSAMP requirements

- **Currently PSAMP information „is exported" using flow records**

- **Flow + Packet property templates reduce redundancy**
  - Better solution for PSAMP
  - See evaluation...

Evaluation
(export and evaluation considerations)

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- Reduced amount of data to be exported

- 16 vs/ 28 bytes per packet

- Less storage capacity needed (collector)

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- Extra processing power (exporter)to:
  - Manage flow info
  - Assign packets to flow

- The collector has to process records of two templates

- Correlation of flow and packet information (additional post processing)

Evaluation
(…back to the OWD example)

With one-packet flow records: 28 bytes/packet

sourceAddressv4 4	destinationAddressv4 4	ClassOfServicev4 1	ProtocolIdentifier 1

...

transportSourcePort 2	transportDestinationPort 2	Timestamp 8	PacketID 4	PacketLength 2

Evaluation
(…back to the OWD example)

With one-packet flow records: 28 bytes/packet

sourceAddressv4 4	destinationAddressv4 4	ClassOfServicev4 1	ProtocolIdentifier 1

...

transportSourcePort 2	transportDestinationPort 2	Timestamp 8	PacketID 4	PacketLength 2

With packet and flow properties templates: 16 bytes/packet

flowID 2	sourceAddressv4 4	destinationAddressv4 4	ClassOfServicev4 1

...

ProtocolIdentifier 1	transportSourcePort 2	transportDestinationPort 2

packetTimestamp 8	packetID 4	packetLength 2	flowID 2

...+16 bytes/flow

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Conclusions

- **The proposed solution reduces the overhead while exporting packet information**

- **What to do next:**
  - **Separate draft?**
  - **Integrate in IPFIX proto?**
  - **Integrate in PSAMP proto?**