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	•••

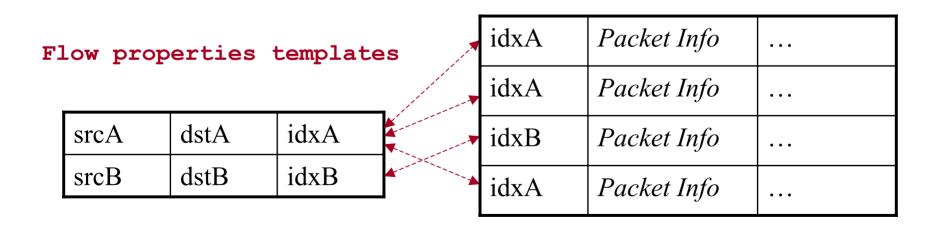


The flow information introduces a high degree of redundancy

...separating flow from packet information:

srcA	dstA	Packet info	• • •
srcA	dstA	Packet info	• • •
srcB	dstB	Packet info	• • •
srcA	dstA	Packet info	• • •

Packet properties templates



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/	Ipv4address/	Ipv4address/	Octet/ ID 5
vendor	ID 8	ID 12	

ProtocolIdentifier transportSourcePort Unsigned16/ ID 7 Unsigned16/ ID 11

Example packet property template

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

- 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	destinationAddressv4	ClassOfServicev4	ProtocolIdentifier
4	4	1	1

	transportSourcePort	transportDestinationPort	Timestamp	PacketID	PacketLength
• • •	2	2	8	4	2

Evaluation (...back to the OWD example)

With one-packet flow records: 28 bytes/packet

4	4	Т	Τ	
SourceAddressva	des cilia ciolindaless v 4	1	1	

transportSourcePort transportDestinationPort Timestamp PacketID PacketLength 2

With packet and flow properties templates: 16 bytes/packet

flowID	sourceAddressv4	destinationAddressv4	ClassOfServicev4
2	4	4	1

ı	ProtocolIdentifier	transportSourcePort	transportDestinationPort
• • •	1	2	2

packetTimestamp	packetID	packetLength	flowID
8	4	2	2

...+16 bytes/flow

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?