

Guidelines for the order of Information Elements draft-irino-ipfix-ie-order-03

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last draft & last meeting

■ Purpose of the last draft

- Optimize performance of collectors.

■ My idea for increasing performance

- Based on processing multiple fields (IEs) placed in a suggested order at a time.

■ Feedback I was gave

- The rule is complex. →
- It need to specific conditions (restrictions) to improve performance →
- Can everybody implement this idea? →

■ In new draft

- The rule is now easier.
- Idea extended to apply to not only Collectors but also Exporters.
- **Unsolved**
(Could anyone implement this idea?)

Current 03 draft

- My basic idea is unchanged; however...
- I changed these points.
 - Purpose
 - Before: optimize performance of Collectors.
 - Current proposal: optimize performance of Collecting Processes and Exporting Processes.
 - Order rule
 - Delete size classification to make the rule easier
 - Before: 3 steps
 1. IEs are classified into 3 kind of sizes and placed in the order.
 2. IE groups are placed in the order in each size.
 3. IEs are placed in the order in each groups.
 - Current proposal: 2 steps
 1. IE groups are placed in order.
 2. IEs are placed in the order in each group.

Ideas of new order and increasing performance

- Idea about performance:

- If processes can process multiple fields at a time, their performance can be higher.

- Idea about order:

- MPs, EPs and CPs place fields (IEs) in the same order, so it is highly likely multiple fields can be processed at one time.

	MPs	EPs	CPs
Input	Observed packets	Their caches	IPFIX Data Record
Output	(Storing) their caches	IPFIX Data Record	(Storing) files, their DB (Real-time analyzing)

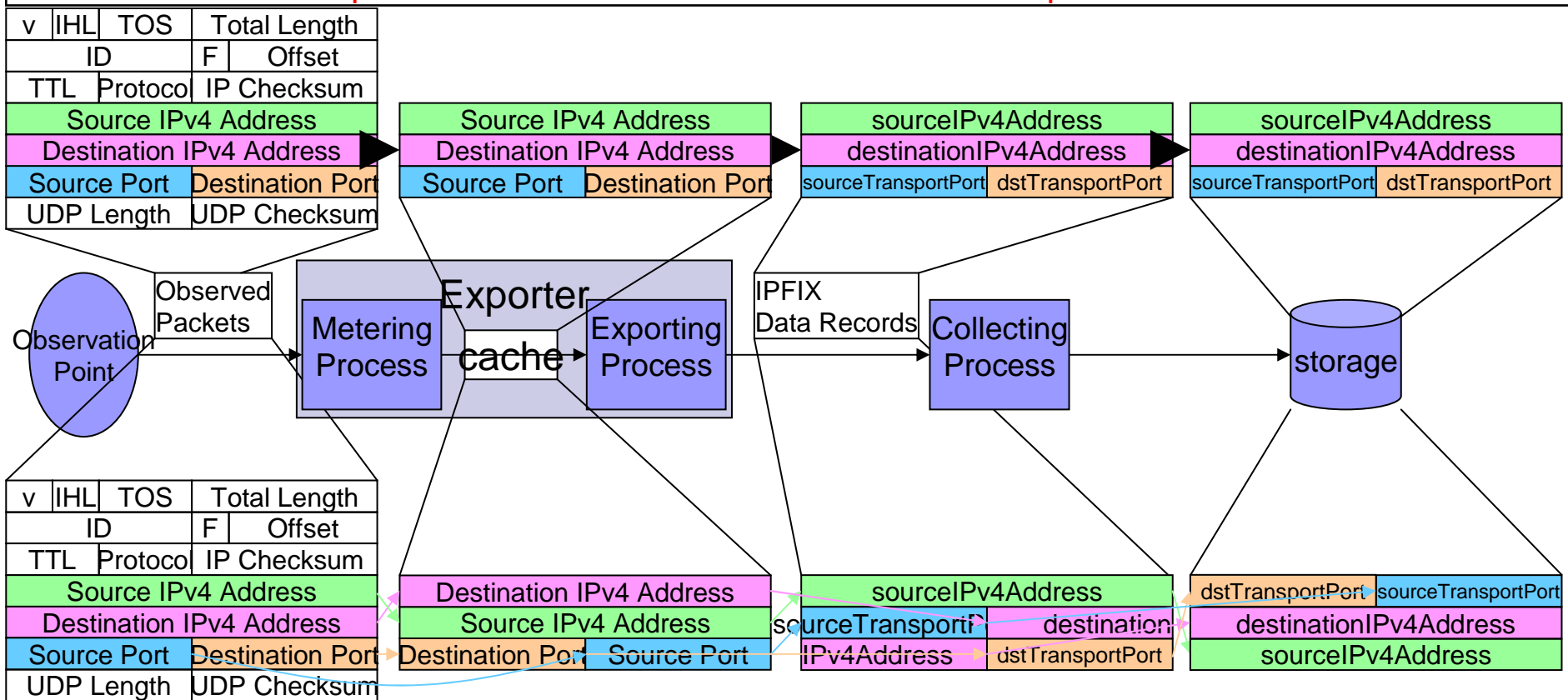
- Fields in observed packets are placed in orders of protocol header.

 **Therefore, the suggested order of IEs, which refers order of packet header fields, is recommended in this draft**

Example of using same order in MP, EP, CP

Flow Keys: sourceIPv4Address, destinationIPv4Address, sourceTransportPort, destinationTransportPort

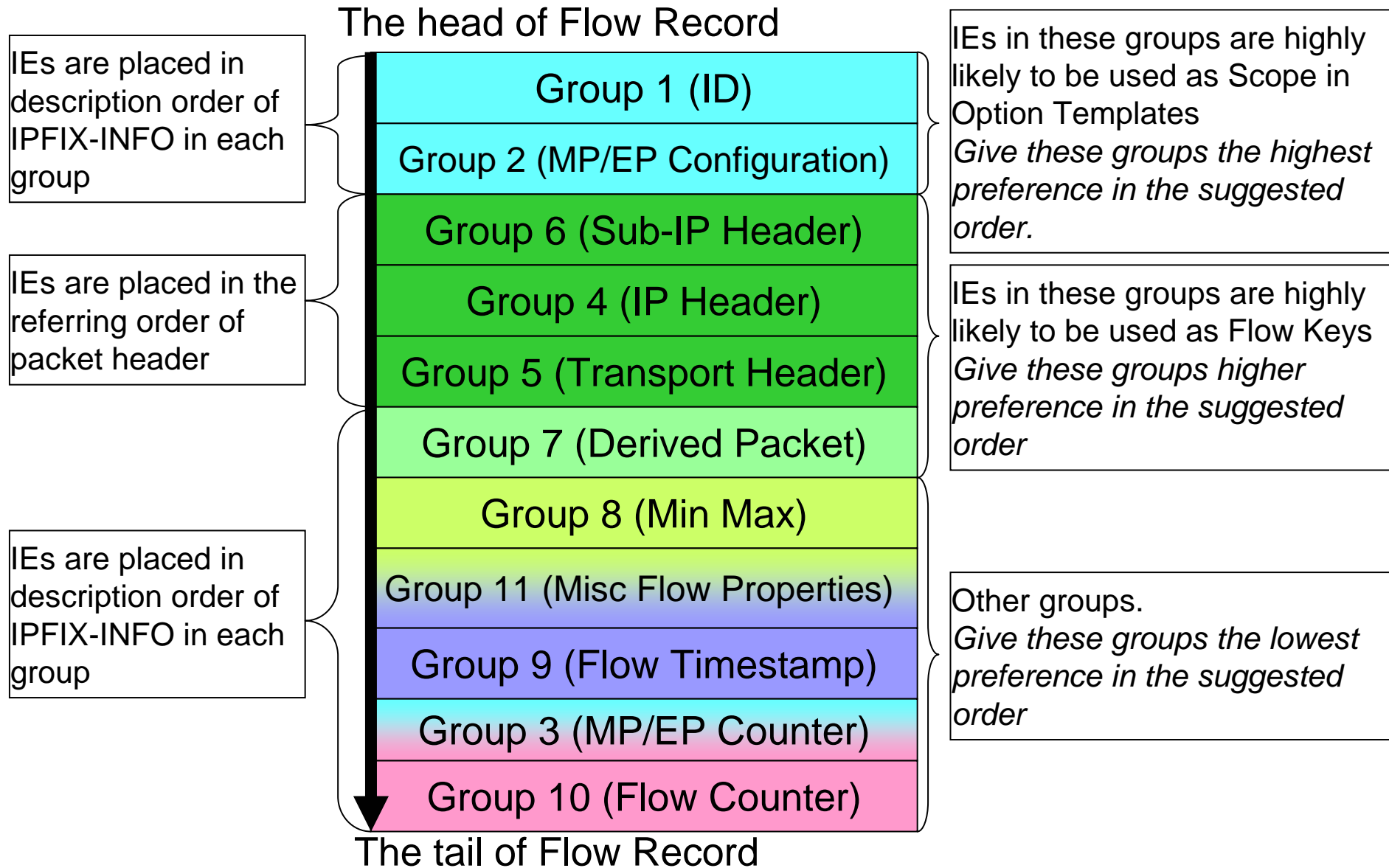
Good (ideal) case: Same suggested order, which refers order of packet header fields used in the cache in Exporter and IPFIX data records



Bad case: Different order used in the cache in Exporter and IPFIX data records

- If the referential order, which refers to the order of packet fields, is defined, it could, in some cases, lead to increased performance.
- If a referential order is undefined, there is no possibility of increased performance.

Suggested Order in current draft



Appendix: supplementary material

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Numbers of IEs in each group in each size classification

- Almost all fixed-length IEs belongs group 4-6, which corresponds to packet headers
 - It is highly likely that fixed-length IEs will be concentrated when IEs are placed in the suggested order, which refers to the order of packet header fields.

	Multiple of 4	Even	Odd	Reduced Size Encoding applicable	Variable Length
1(ID)	0	1	0	8	0
2(M/E Conf)	4	2	0	2	0
3(M/E Count)	0	0	0	9	0
4(IP)	8	2	16	4	0
5(Transport)	2	11	6	0	0
6(Sub-IP)	0	6	3	12 (MPLS)	1
7(routing)	6	0	2	5	0
8(Min/Max)	1	0	3	4	0
9(timetsamp)	9	0	0	4	0
10(Count)	0	0	0	24	0
11(Misc)	0	0	2	4	0

Example

Constant-fixed-length IE
 Reduced-size-encoding applicable to IE

1. NetFlow v5 Format

sourceIPv4Address(8)	
destinationIPv4Address(12)	
ipNextHopIPv4Address(15)	
ingressInterface(10)	egressInterface(14)
packetDeltaCount(2)	
octetDeltaCount(1)	
flowStartSysUpTime(22)	
flowEndSysUpTime(21)	
srcTransportPort(7)	dstTransportPort(11)
pad(210)	tcpCtrl(6)
protocol(4)	ipClass(5)
bgpSrcAsNum(16)	bgpDstAsNum(17)
srcv4PrefLen	dstv4PrefLen
padding(210)	

2. Order of O2 draft

sourceIPv4Address(8)	
destinationIPv4Address(12)	
ipNextHopIPv4Address(15)	
srcTransportPort(7)	dstTransportPort(11)
srcv4PrefLen	dstv4PrefLen
protocol(4)	ipClass(5)
tcpCtrl(6)	padding(210)
ingressInterface(10)	egressInterface(14)
bgpSrcAsNum(16)	bgpDstAsNum(17)
flowStartSysUpTime(22)	
flowEndSysUpTime(21)	
octetDeltaCount(1)	
packetDeltaCount(2)	

3. Order of O3 draft

ingressInterface(10)	egressInterface(14)
ipClass(5)	protocol(4)
sourceIPv4Address(8)	
destinationIPv4Address(12)	
srcv4PrefLen	dstv4PrefLen
srcTransportPort(7)	dstTransportPort(11)
ipNextHopIPv4Address(15)	
bgpSrcAsNum(16)	bgpDstAsNum(17)
tcpCtrl(6)	padding(210)
flowStartSysUpTime(22)	
flowEndSysUpTime(21)	
octetDeltaCount(1)	
packetDeltaCount(2)	

Constant Fixed Length IEs are concentrated.