

Exporting MIB variables using the IPFIX Protocol

draft-johnson-ipfix-mib-variable-export-00.txt

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- Abstract

This document specifies a way to export Management Information Base (MIB) objects within the IPFIX protocol, avoiding the need to define new IPFIX Information Elements for existing Management Information Base objects that are already fully specified. This method requires an extension to the current IPFIX protocol. New Template Set and Options Template Sets are specified to allow the export of Simple Network Management Protocol (SNMP) MIB Objects.

- Focus on the big picture for OPS-AREA
- More IPFIX technical details in the IPFIX session

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Why?

- Foresee the need to export existing MIB fields
 - Requested by some collector partners,
and every proxy costs some money...
- No synchronized counters between Flow and MIB counters
 - Potential flow expiration timeout
 - Then Flow Record exported
 - Then SNMPGet
 - Then SNMPGet Response
 - => Flow and Counters not synchronized
 - Example: interface or QoS counters at the time the flow expired

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Why?

- Data model replication: two data models for a unique information model (*), i.e. MIB and IPFIX information elements, which are overlapping.
 - For example, ingressInterface I.E. “The index of the IP interface where packets of this Flow are being received. The value matches the value of managed object 'ifIndex' as defined in RFC 2863.”
 - For example, interfaceName I.E. “See [[RFC2863](#)] for the definition of the ifName object.”
 - More in the future...

(*) RFC 3444, "On the Difference between Information Models and Data Models"

Exporting MIB variables using the IPFIX Protocol Scope

- This mechanism applies to:
 - the addition of MIB variables to IPFIX Information Element in Flow Records
- This mechanism doesn't apply to:
 - Configuration, as IPFIX is a PUSH mechanism
 - Though some config MIB objects could be exported
- This mechanism could be applied to:
 - Replacement of SNMP notification, though this is not the initial goal. There is already the EVENT & EXPRESSION MIBs mechanism to create customized SNMP notifications

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MIB Object Access?

- The IPFIX Metering Process is configured to access some MIB objects, but can these objects be monitored?
 - The Metering Process (*) MUST check whether or not the MIB variables can be accessed, and hence exported with IPFIX.
 - Therefore a read or read-write community string in SNMPv1 and SNMPv2c, or a principal in SNMPv3, MUST be associated with the Metering Process.
 - If the management entity supports the View-based Access Control Model (VACM) for the SNMP [[RFC3415](#)], then the Metering Process MUST validate with the View-Based Access Control [[RFC3415](#)] that the MIB object can be accessed before exporting its content.
 - If there is a view in case of SNMPv1 and SNMPv2c, the Metering Process MUST validate that the MIB object can be accessed before exporting its content.

(*) or the configuration process, to be discussed

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Example 1: Non-index OID export

- Example: CPU utilization percentage sent every 1 minute

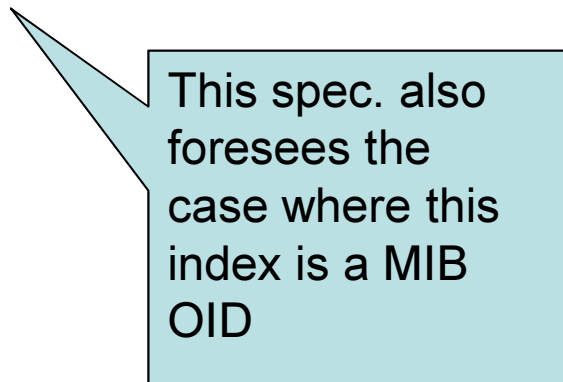
TIMESTAMP	CPU BUSY PERCENTAGE
=====	=====
StartTime + 0 seconds	10%
StartTime + 60 seconds	14%
StartTime + 120 seconds	19%
StartTime + 180 seconds	16%

- Template Record:
 - flowStartSeconds (IPFIX IE)
 - cpmCPUTotal1minRev (MIB OID)

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Example 2: Indexed OID Export

- Example: export the queue counters with the flow record
- Template Record:
 - sourceIPv4Address (IPFIX IE)
 - destinationIPv4Address (IPFIX IE)
 - totalLengthIPv4 (IPFIX IE)
 - egressInterface (IPFIX IE)
 - outboundQueueLength (MIB OID)
indexed by: egressInterface (IPFIX IE)



This spec. also foresees the case where this index is a MIB OID

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Example 2: Indexed OID Export

```

0           1           2           3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-----+-----+-----+-----+
|           Set ID = TBD1           |           Length           |
+-----+-----+-----+-----+
|           Template ID = 257       |           Field Count = 5   |
+-----+-----+-----+-----+
|0| IE = sourceIPv4Address          |           Field Length = 4   |
+-----+-----+-----+-----+
|0| IE = destinationIPv4Address    |           Field Length = 4   |
+-----+-----+-----+-----+
|0| IE = totalLengthIPv4           |           Field Length = 4   |
+-----+-----+-----+-----+
|0| IE = egressInterface            |           Field Length = 4   |
+-----+-----+-----+-----+
|0| MIBObjectIdentifierMark        |           Field Length 1     |
+-----+-----+-----+-----+
| Index Count=1 | MIB OID Len=20 | MIB Object Identifier ... |
+-----+-----+-----+-----+
|           = "1.3.6.1.2.1.2.2.1.21"           |
+-----+-----+-----+-----+
|           ... MIB Object Identifier continued ... |
+-----+-----+-----+-----+
|           ... MIB Object Identifier continued ... |
+-----+-----+-----+-----+
|           ... MIB Object Identifier continued ... |
+-----+-----+-----+-----+
| ... MIB OID continued           |0| IE = egressInterface |
+-----+-----+-----+-----+

```

New spec implies a new Set ID

One index

ifOutQLen

This is the new IPFIX spec.

This is the index. In this case, an IPFIX IE

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IPFIX Implications

- Requires an extension to the current IPFIX Protocol:
 - New (Options) Template Sets
- Targeting Standard Track
 - Patent-7788371
 - IPR: <https://datatracker.ietf.org/ipr/1436/>
 - Would like to get a broad technology review

TO DO

- Better explain the draft concept
- Add some more examples
- Juergen Schoenwalder's feedback
- Validate the security section