IPFIX IPv6/TCP/UDP I-Ds Set: Updates & Next Steps

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IETF#116 "What’s Next?" Plan

• Request WGLC for draft-ietf-opsawg-rfc7125-update

• Request WG adoption for the following I-D set:
  – draft-boucla-opsawg-ipfix-fixes
  – draft-boucadair-opsawg-ipfix-tcpo-v6eh
  – draft-boucadair-opsawg-tsvwg-udp-ipfix

• The last two documents may be merged, but we prefer to keep them separate because of the dependency on the UDP Options spec (tsvwg)
Update Since IETF#116

- **draft-ietf-opsawg-rfc7125-update**
  - Status: Passed the WGLC and IETF LC

- Adoption of the following I-Ds set:
  - *draft-ietf-opsawg-ipfix-fixes-03*
  - *draft-ietf-opsawg-ipfix-tcpo-v6eh-05*
  - *draft-ietf-opsawg-tsvwg-udp-ipfix-03*

- Seeked for cross-WGs reviews:
  - Sent messages to the following WGs
    - *6man*: draft-ietf-opsawg-ipfix-tcpo-v6eh
    - *tsvwg*: draft-ietf-opsawg-tsvwg-udp-ipfix
  - ...but no follow-up unfortunately

- However, we received good reviews from IPFIX IE Doctors and Éric Vyncke
Focus on IPv6 EH IEs (1)

- 4 IEs

- Specify how to report
  - Multiple EH chains in a Flow
  - Length of EH chains
  - Occurrences and order of Ehs
  - Non-consecutive EHs; not aggregates
  - Whether reported EHs are constrained by a HW/SW limit
  - Optimize the encoding

- Specify the dependency between the various IEs

- Add Examples
Focus on IPv6 EH IEs (2)

Reduced-encoding (rfc7011#section-6.2) is unlikely because these EHs are the ones that are likely to be observed.

"Bit 0 corresponds to the least-significant bit in the ipv6ExtensionHeadersFull IE while bit 255 corresponds to the most-significant bit of the IE. In doing so, few octets will be needed to encode common IPv6 extension headers when observed in a Flow."
Focus on IPv6 EH IEs (3)

These are not EHs per se, but:
- UNK was already assigned in the existing ipv6ExtensionHeaders
- Added NoNxt as per a comment from Éric Vyncke (better observability)

The value was selected to minimize the implications on the use of reduced-encoding (rfc7011#section-6.2)

<table>
<thead>
<tr>
<th>Bit</th>
<th>Label</th>
<th>Protocol Description Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>DST</td>
<td>60</td>
<td>Destination Options for IPv6</td>
</tr>
<tr>
<td>1</td>
<td>HOP</td>
<td>0</td>
<td>IPv6 Hop-by-Hop Options</td>
</tr>
<tr>
<td>2</td>
<td>NoNxt</td>
<td>59</td>
<td>No Next Header for IPv6</td>
</tr>
<tr>
<td>3</td>
<td>UNK</td>
<td></td>
<td>Unknown Layer 4 header</td>
</tr>
<tr>
<td>4</td>
<td>FRA0</td>
<td>44</td>
<td>Fragment header - first fragment</td>
</tr>
<tr>
<td>5</td>
<td>RH</td>
<td>43</td>
<td>Routing header</td>
</tr>
<tr>
<td>6</td>
<td>FRA1</td>
<td>44</td>
<td>Fragmentation header - not first</td>
</tr>
<tr>
<td>7 to 11</td>
<td></td>
<td></td>
<td>Unassigned</td>
</tr>
<tr>
<td>12</td>
<td>MOB</td>
<td>135</td>
<td>Mobility Header</td>
</tr>
<tr>
<td>13</td>
<td>ESP</td>
<td>50</td>
<td>Encapsulating Security Payload</td>
</tr>
<tr>
<td>14</td>
<td>AH</td>
<td>51</td>
<td>Authentication Header</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td>Unassigned</td>
</tr>
<tr>
<td>16</td>
<td>HIP</td>
<td>139</td>
<td>Host Identity Protocol</td>
</tr>
<tr>
<td>17</td>
<td>SHIM6</td>
<td>140</td>
<td>Shim6 Protocol</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td>Use for experimentation and testing</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td>Use for experimentation and testing</td>
</tr>
<tr>
<td>20 to 255</td>
<td></td>
<td></td>
<td>Unassigned</td>
</tr>
</tbody>
</table>

Registry created by draft-ietf-opsawg-ipfix-fixes
Focus on IPv6 EH IEs (4)

• Exporting Destination Options and Hop-by-Hop Options and Routing Types
  – Left out of scope
  – If there is a need to export specific options/type, we suggest to follow an approach similar to
    • draft-ietf-opsawg-ipfix-srv6-srh-14 (RFC-to-be 9487)

• Are you OK with this approach?
Focus on TCP (1)

Options are mapped to bits according to their option numbers. Option number X is mapped to bit X. TCP option numbers are maintained by IANA.

```
<table>
<thead>
<tr>
<th>MSB</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
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<td>18</td>
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<td>...</td>
</tr>
<tr>
<td>LSB</td>
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<td>57</td>
<td>58</td>
<td>59</td>
<td>60</td>
<td>61</td>
<td>62</td>
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<td>66</td>
<td>67</td>
<td>68</td>
<td>69</td>
<td>70</td>
</tr>
</tbody>
</table>
```

- "weird" mapping
- Inconsistency between the description vs. drawing
- Suboptimal encoding

"TCP option kind 0 corresponds to the least-significant bit in the tcpOptionsFull IE while kind 255 corresponds to the most-significant bit of the IE. This approach allows an observer to export any observed TCP option even if it does support that option and without requiring updating a mapping table."
Focus on TCP (2)

- TCP uses Experiments IDs (ExIDs) to disambiguate between shared TCP options
  - Two ExID flavors can be allocated: 2-byte or 4-byte ExIDs
  - A mix of ExIDs may be observed in a Flow

- Two IEs are defined to easily identify ExIDs
  - tcpSharedOptionExID16: List of 2-byte ExIDs
  - tcpSharedOptionExID32: List of 4-byte ExIDs

- We considered relaxing tcpSharedOptionExID32 to include both 2-byte and 4-byte ExIDs but this induces extra overhead
  - We decided to not include such a mention in the text
Éric Vyncke raised a comment during the call for adoption and also recently in the list – Split draft-ietf-opsawg-ipfix-tcpo-v6eh into two I-Ds: One of TCP and another one for IPv6 EHs

The authors prefer to proceed with the current approach

Thoughts?
Next Steps

• Request the WGLC for the set of I-Ds
  – with tcpm, tsvwg, 6man, and ipfix cced

• Consider early directorate reviews before or in // of the WGLC
  – simple-fixes: genart, opsdir
  – tcpo-v6eh: intdir, tsvart, opsdir
  – udp: tsvart, opsdir
Appendix: Example of Shared TCP Option

tcp\texttt{SharedOptionExID16} IE:

\begin{verbatim}
MSB
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

| 0x0348 | 0x454E |

LSB
\end{verbatim}

tcp\texttt{SharedOptionExID32} IE:

\begin{verbatim}
MSB
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

| 0xE2D4C3D9 |

LSB
\end{verbatim}