Multi-part TLVs in IS-IS
draft-pkaneria-lsr-multi-tlv-03

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History

V0 - January 2022

V1 – July 2022
  Presented at IETF14
  Discussion on/off the list
  Debate about advertising a capability
  Not presented at IETF 115, IETF 116

V2 – November 2022
  Capability advertisement removed – not because of consensus but because of lack of consensus. Possibly to be discussed in the future and/or independently

V3 – May 2023
  Introduction of applicability/code point into IANA registries
Context

IS-IS TLV encoding uses an 8-bit length, limiting content to 255 octets. New technologies (SR, Flex-algo, Traffic Engineering extensions) increase demand for advertising more than 255 octets of information per object (links, prefixes).

Multi-part TLVs have been explicitly defined for some TLVs:

- GMPLS-SRLG [RFC5307]
- Router Capability TLV [RFC7981]
- IPv6 SRLG [RFC6119]
- ASLA SRLG [RFC8919]
- ASLA sub-TLV [RFC8919]

Extending the use of MP to other TLVs builds on the existing protocol framework.

Some implementations have implemented MP for neighbor/prefix TLVs. With partial deployment, behavior is unpredictable.
Current draft content

Defines correct way to send MP-TLVs:
  Include identical “key” in each part
  Defines “key” for Neighbor and Prefix TLVs

Defines receive behavior for MP-TLVs
  Use all information received
  Order of information does not matter
  Order of reception does not matter

Recommends implementations support a knob to enable/disable sending of MP-TLVs

Recommends implementations log occurrences:
  – MP is needed but not enabled
  – MP is received but not enabled
Current draft content(2)

Adds a column to relevant IANA registries to indicate if MP is applicable to each code point

Guarantees MP applicability will always be specified explicitly going forward

MP is applicable to any TLV/sub-TLV that is a container for sub-TLVs

In some cases the need for MP is unlikely to arise

Initial value for applicable code points is provided in the IANA section of the draft

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**MP-TLV for IS-IS Top-Level TLV Codepoints**

<table>
<thead>
<tr>
<th>Value</th>
<th>Name</th>
<th>MP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Reserved</td>
<td>MP</td>
</tr>
<tr>
<td>1</td>
<td>Area Addresses</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>IIS Neighbors</td>
<td>N</td>
</tr>
<tr>
<td>3</td>
<td>ES Neighbors</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>Part. DIS</td>
<td>N</td>
</tr>
<tr>
<td>5</td>
<td>Prefix Neighbors</td>
<td>N</td>
</tr>
<tr>
<td>6</td>
<td>IIS Neighbors</td>
<td>N</td>
</tr>
<tr>
<td>7</td>
<td>Instance Identifier</td>
<td>Y</td>
</tr>
<tr>
<td>8</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>
Deployment Considerations

The need to advertise > 255 octets for an object arises out of the requirements of real deployments when advertising existing information. It is not optional or negotiable.

If all nodes support sending/receiving > 255 octets for a given object, then it is safe to enable a configuration which requires it.

If all nodes do NOT support sending/receiving > 255 octets for a given object, then it is NOT safe to enable a configuration which requires it.

Backwards Compatibility

This is possible when introducing advertisement of new information which “legacy” nodes do not use.

Here no new advertisements are being introduced. Legacy nodes need to use all the information being advertised.

Backwards compatibility is not possible.
Alternative Proposal(1)

draft-chen-lsr-isis-big-tlv

A new container TLV is used to advertise the additional octets (> 255) associated with an existing TLV. The container TLV includes information identifying the TLV associated with the embedded information.

Authors claim this can be deployed “incrementally” – but this is not true.

Nodes which do not support the container TLV will not have access to the contained information – which is information they require in order to support existing features.

It would also result in MP being used for some TLVs (existing specifications) and the container TLV being used for other TLVs.

This does not help.
Alternative Proposal(2)

(from the mailing list)

Use a container TLV (like BIG-TLV), but include all information about the object – the original TLV would no longer be used at all.

If used with a “capability bit”, then it would be used only when all routers support it.

If network-wide capability bit status alters what can be sent, then we face unsolvable problems:

- Which of the > 255 octets do we send when network-wide capability does not exist?
- What do we do when a new node comes up and does not support the capability and we were sending the container TLV?
- How do you avoid flapping when transitioning from < 255 octets about an object (existing TLV is used) to > 255 octets (existing TLV withdrawn and container TLV introduced for the same object)?

A capability bit could also be used for MP, but faces the same issues.

Introduction of new TLV does not solve any problems.
Next Steps

WG adoption for draft-pkaneria-lsr-multi-tlv

The need to send > 255 bytes exists today

What should be done for feature support advertisements

Discussion on the list clearly shows differences of opinion as to whether this should be done or not
Potentially applies to many existing features and new features
Deserves a discussion independent of the MP use case

Separate draft should be written (if there is sufficient interest).
The draft should cover:

- Generalized/extensible format (does not belong in existing Router Capability TLV)
- Operational definition of how to decide what features should use this advertisement and which should not
- Why this information belongs in the control plane and not in the management plane