Multi-Instances ISIS Extension

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MI-ISIS

Introduction

• Allows separate ISIS instances to share nodes and links
• Allows routing and non-routing info to be conveyed and stored in separate/isolated LSDB flooding schemes
• Full Topology isolation
  – Ships in the night approach
• Mechanism used to mark packets with instance membership
  – IID TLV
  – Mark all packets: IIH, [C|P]SNP, LSP
MI-ISIS
Changes since V6

RFC 5120 NOT supported within a non-zero instance
Security Related Clarification
Now approved as a draft standard

85th IETF, Atlanta, November 2012
<table>
<thead>
<tr>
<th>Description</th>
<th>MT</th>
<th>MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instance</td>
<td>Standard Instance (#0) only</td>
<td>Non-zero Instances</td>
</tr>
<tr>
<td>Adjacencies</td>
<td>Shared by all topologies</td>
<td>Instance specific</td>
</tr>
<tr>
<td>Hellos</td>
<td>M-topologies TLV(229) advertises MTIDs supported on a link</td>
<td>IID-TLV advertises ITIDs supported on a link</td>
</tr>
<tr>
<td>Update Process</td>
<td>One LSPDB advertises all MTIDs</td>
<td>Each IID/ITID has a unique LSPDB</td>
</tr>
<tr>
<td>LSPs</td>
<td>Topology specific TLVs for: IS-Neighbors (TLV 222) IP Reachability (TLV 235) IPv6 Reachability (TLV 237) (in addition to standard TLVs (22, 135, 236))</td>
<td>MT TLVs forbidden Standard TLVs used</td>
</tr>
</tbody>
</table>

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RFC 5120 Support within MI

Not supported…

Was always discouraged – but now forbidden.
Would require advertising in hellos the MTIDs supported within a given IID/ITID which is not defined
LSP Purges

Section 7 (Security)

“Use of the extensions defined here with authentication as defined in [RFC5304] or [RFC5310] will result in the discarding of purges by legacy systems which are in strict conformance with either of those RFCs. To avoid this issue an MI-RTR MAY omit the IID-TLV in purges for the standard instance (IID #0) until such time as all ISs in the network have been upgraded to support [RFC6232].”

Text was from earlier version where IID #0 was allowed in PDUs associated with standard instance. As that is prohibited the above text was removed.
Security Discussion

Base Protocol Authentication scopes:
  Circuit (IIHs)
  Area (L1 SNPs, LSPs)
  Domain (L2 SNPs, LSPs)

MI adds:
  Area/IID/ITID (L1 SNPs, LSPs)
  Domain/IID/ITID (L2 SNPs, LSPs)

Authentication procedures unchanged
Next Steps

We’re DONE. 😊
Backup Slides

(from presentation at 83rd IETF in Paris)
Interoperability on LANs

- Use of dedicated per level multicast address for non-zero IID
  Prevent interoperability issues

- Hide MI-ISIS packets to non-MI capable routers

- MI routers MUST discard packets if:
  - The destination multicast address is AllL1IS or AllL2IS and the PDU contains an IID TLV with non-zero value
  - The destination multicast address is one of the two new addresses and the PDU contains an IID TLV with a zero value or has no IID TLV
Instance Identifier

- Assign to each ISIS packet an instance Identifier
  - IIHs, LSPs, SNPs
- Instance is identified through new TLV
  - IID TLV (TBA)
  - IID ==> ISIS Instance
  - IID TLV is 16-bits number
- Single IID TLV on each ISIS packet
Instance Identifier

• IID TLV allows a router to distinguish among ISIS packets when running multiple ISIS instances
  – Upon reception, packets are forwarded to the corresponding instance
  – Routers establish adjacencies if sharing same IID
• How to distinguish/discriminate among data packets once routing schemes/trees have been computed is out of the scope of this document.
MI-ISIS

• Slightly different approach than the one taken by Multi-topologies ISIS
  – No shared fate other than the link
  – Separate flooding, LSDBs, Adjacency table, …

• IID TLV _must_ be unique per ISIS packet
  – Requires packet analysis in order to enforce the rule
  – Probably more work to do prior to accept reject each packet
IID and ITID

• Before version 5:
  – If more than one IID is configured on a given link, multiple adjacencies will be established, one per instance
  – Means: more than one adjacency even on p2p links

• Version 5 introduces the capability of having multiple topologies within the same instance
  – Two levels: instance and topology
  – Separate LSDB per topology
  – Separate Update process per topology
  – ITID: Instance Topology Identifier

• Advantages: two levels of hierarchy:
  – Instance and Topology
  – Still independent flooding and LSDBs

83rd IETF, Paris, March 2012
MI-ISIS

• Version 6:
  – Re-defines ITID to 16 bits
    • Requirement: ability to map ITID to VLAN-ID