Multicast support on the AMS-IX platform

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Research Project 2

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AMS-IX

- One of the largest internet exchanges in the world
- Peak traffic at 675Gbit/s
- Broadcast Domain
- Separate vlan for multicast
AMS-IXv4

- Current platform, maximum of scalability
- No 100Gbit/s available
- Implementation of MPLS/VPLS
AMS-IXv4

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How can multicast support be provided on a VPLS platform, such as is implemented on the AMS-IX, in an efficient way in respect to scalability, performance, and stability?
# Multicast

<table>
<thead>
<tr>
<th>Multicast Protocol</th>
<th>Usage</th>
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<tbody>
<tr>
<td>IGMP/MLDv2</td>
<td>Local</td>
</tr>
<tr>
<td>PIM-DM</td>
<td>Intra-domain</td>
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<tr>
<td>PIM-SM</td>
<td>Intra/Inter-domain</td>
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<tr>
<td>PIM-SSM</td>
<td>Intra/Inter-domain</td>
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<tr>
<td>PIM-BIDIR</td>
<td>Intra/Inter-domain</td>
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<tr>
<td>MSDP</td>
<td>Inter-domain</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Routing Protocol</th>
<th>Usage</th>
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<tbody>
<tr>
<td>MOSPF</td>
<td>Intra-domain</td>
</tr>
<tr>
<td>DVMRP</td>
<td>Intra-domain</td>
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<tr>
<td>MBGP</td>
<td>Inter-domain</td>
</tr>
</tbody>
</table>
Out of band (S,G)
Multicast tree
Multicast tree
Multicast tree
Multicast tree
PIM Snooping

- Control of multicast traffic
- Opt-in for multicast
- No congestion by unwanted multicast traffic

PIM Proxy

- Addition to PIM Snooping
- Blocking and aggregation of PIM messages
Scalability

Where in a VPLS environment are multicast packets being replicated? Which effect does this have on scalability?

Does PIM-snooping use the VPLS path information to direct the multicast streams only to the source PE?
Resource usage

Which problems can be expected when enabling PIM-snooping on the AMS-IX in terms of routing, load, performance and availability?

• Effect on routing protocols
• Memory usage
• CPU usage
Implementation

Which metric does PIM-snooping on the PE’s use for switching the multicast stream? Does this cause problems?

IPv4: $\text{MAC} \leftarrow 01005E000000_{16} \lor (\text{group} \land 7FFFFFFF_{16})$

IPv6: $\text{MAC} \leftarrow 333300000000_{16} \lor (\text{group} \land FFFFFFFFFF_{16})$

What is the difference between ASM and SSM in respect to the AMS-IX?
Abuse

What will happen when a PE receives an excessive amount of join messages?

How do the switches react on unexpected PIM messages?
Demo

Crashing an internet exchange with a single packet
Conclusion

• Scalability
• Resource usage
• Stability

Recommendations

• Do not yet enable PIM-snooping
• Do not use a PIM-proxy
Questions?