IS-IS Point to Multipoint operation

draft-lamparter-isis-p2mp-00

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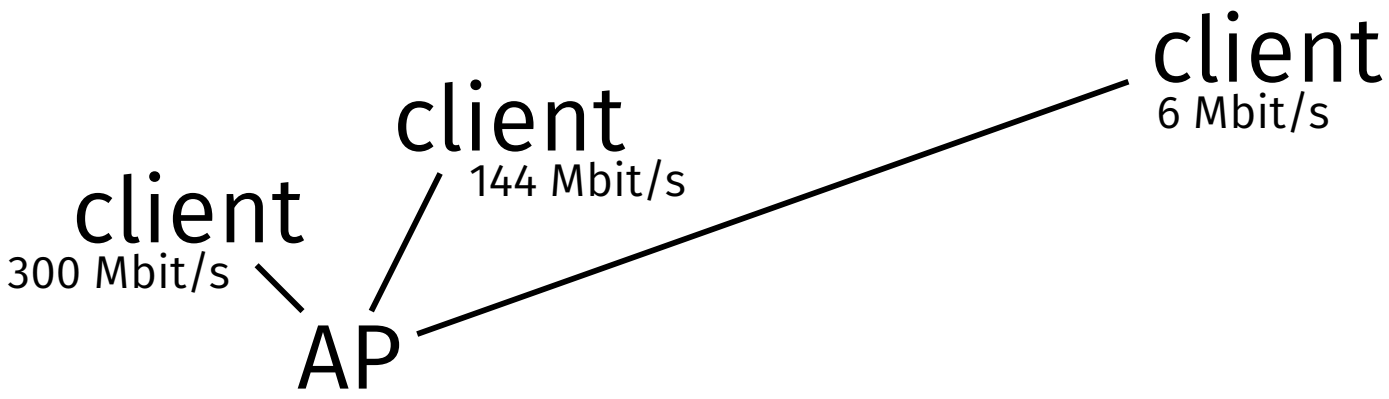
Starting problem



- 802.11 metrics vary wildly inside a broadcast domain
- all station to station packets relayed by AP
- slow and unreliable multicast

Applicability check

Some problems can be worked around:

- 802.11v and 11aa add reliable multicast
- software can improve multicast TX rate

Some cannot:

- cost is a function of (sender,receiver) pair

IS-IS approach

Use PtP on broadcast ala RFC 5309 (P2P over LAN), but support more than one adjacency.

- need to demultiplex received packets, adjacencies will interfere with each other
- need mechanism to create adjacency / want some discovery protocol

P2MP Adjacencies

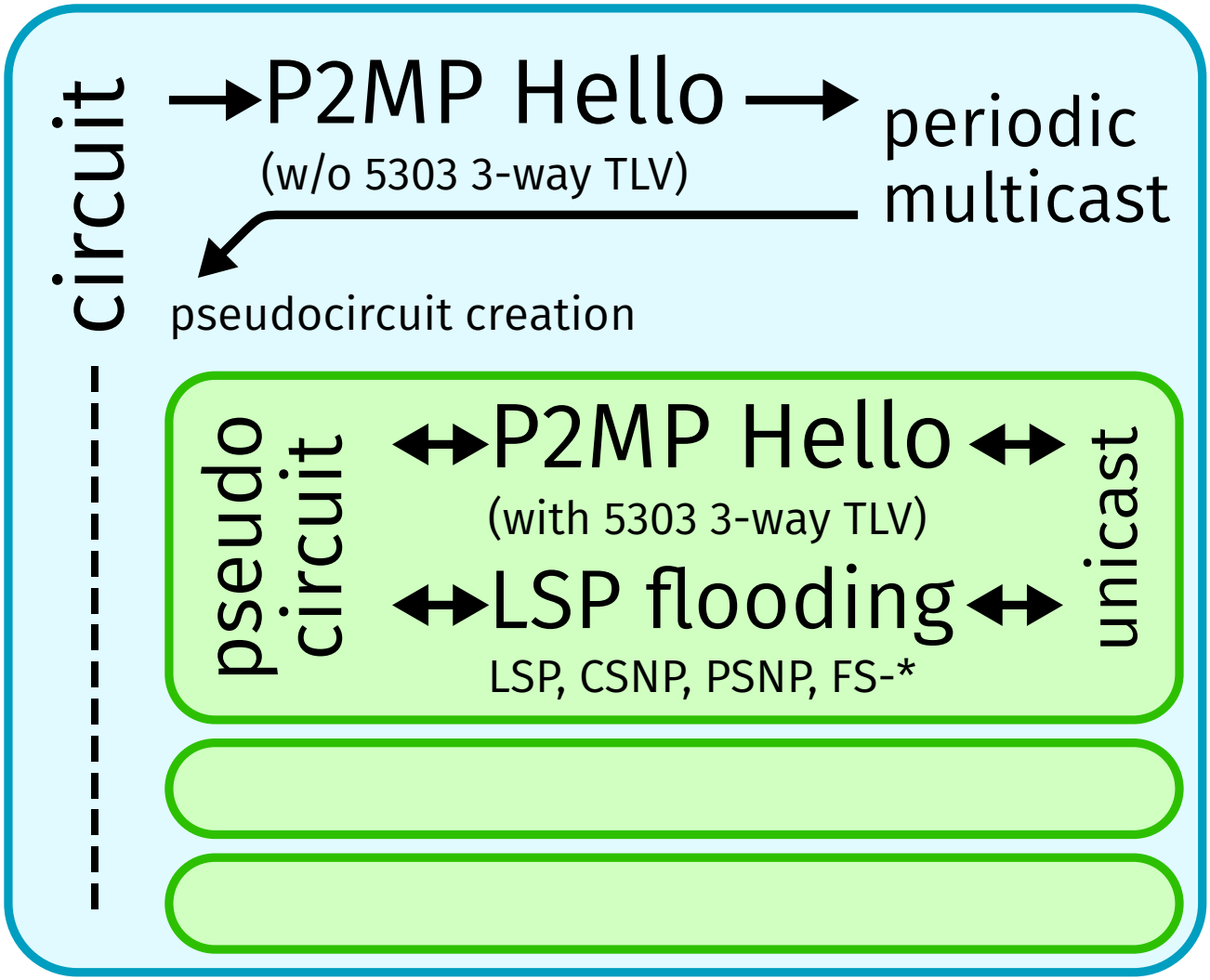
Introducing "pseudocircuit" as name for an individual (PtP) adjacency on a P2MP link.

Uses a separate new P2MP Hello PDU type:

- P2MP Hello w/o RFC5303 3-way Adj TLV for discovery
- P2MP Hello with RFC5303 3-way Adj TLV for adjacency maintenance

Note autodiscovery is not functionally required, draft specifies adding known neighbor addresses from other sources.

Single router view



PDUs and TLVs

No new TLVs added by this draft.

New P2MP IIH PDU added by this draft:

- separate P2MP Hello to avoid confused non-P2MP PtP speakers
- same fields as LAN / PtP Hellos, without LAN ID or Local Circuit ID

IIHs

L1/L2 LAN

Intradomain Routing Protocol Discriminator	
Length Indicator	
Version/Protocol ID Ext.	
ID Length	
R	PDU Type
Version	
Max. Area Addresses	
R	Circuit Type
Source ID	
Holdtime	
PDU Length	
LAN ID	
TLVs	

PtP

Intradomain Routing Protocol Discriminator	
Length Indicator	
Version/Protocol ID Ext.	
ID Length	
R	PDU Type
Version	
Max. Area Addresses	
R	Circuit Type
Source ID	
Holdtime	
PDU Length	
Local Circuit ID	
TLVs	

P2MP

Intradomain Routing Protocol Discriminator	
Length Indicator	
Version/Protocol ID Ext.	
ID Length	
R	PDU Type
Version	
Max. Area Addresses	
R	Circuit Type
Source ID	
Holdtime	
PDU Length	
TLVs	

Alternate approach

Instead of adding a P2MP PDU type, LAN IIHs (or ISHs) could be used for discovery and PtP IIHs for pseudocircuit hellos.

$\Rightarrow$ LAN IIHs would contain a new P2MP capability TLV to indicate support, and would not list IS neighbors.

$\Rightarrow$ On the pseudocircuit level, regular PtP IIHs would be used without change, though with unicast destination addresses.

If a legacy PtP neighbor's address is added some way (e.g. manual config), a P2MP$\leftrightarrow$PtP adjacency would work correctly.

(Thanks to Chris Hopps for feedback this slide is based on.)

LSP / Flooding behavior

- no change to PtP flooding mechanics
- packets demultiplexed by packet source address
- packets sent to neighbor's unicast destination address

Generated TLVs

- P2MP is invisible to rest of IS-IS domain
- topology contains a bunch of PtP links
- can be deployed incrementally, enabled on per-link basis

Caveats

- no requirement for full mesh, system can choose not to form some adjacencies
  - application: 802.11 clients can choose to only become adjacent with AP, since all frames are relayed by the AP anyway
- no requirement for transitive reachability
  - theoretical mesh support - experience from OSPF-MDR shows this is not a good idea

Next steps

- WG feedback
  - especially on creating new P2MP IIH
    vs. using LAN + PtP IIHs
- fixing TODOs in draft
- spend cycles on multicast LSP/CSNP/PSNP on P2MP