Issue: How many spanning trees?

Radia Perlman

Radia.Perlman@sun.com

What will we use spanning trees for?

- Unknown destinations
- Layer 2 multicasts
- IP-derived multicasts (for which IGMP will announce where the listeners are)

Possibilities

- One per campus
- One per VLAN
- One per (ingress) RBridge

Calculating a spanning tree

- We can do any of those possibilities without protocol messages beyond the link state protocol
 - For one: calculate a spanning tree rooted at the lowest ID router, with deterministic tie-breaker
 - For per-VLAN: calculate a spanning tree rooted at the lowest ID router attached to that VLAN
 - For per-RBridge: calculate a spanning tree rooted at that RBridge

Need a broadcast domain per VLAN

- That's the definition of a VLAN
- A packet for VLAN A must only be delivered to links in VLAN A
 - Could be filtered at egress RBridges
 - Makes forwarding info for intermediate RBridges trivial, but packet delivery more expensive
 - Or could be filtered if no downstream receivers for VLAN A

Delivery path for VLAN A if one spanning tree, and pinks are VLAN A



Delivery path for VLAN A if per VLAN spanning tree, and pinks are VLAN A



Likewise for IP-derived multicasts

• If receivers are on just a few links, then it would be worth calculating per-RBridge spanning tree

Filtering info

- With spanning tree, have a set of ports
- For each port, mark what VLANs, and IP multicasts are downstream on that branch
- Select the spanning tree (based on ingress RBridge from shim header, or VLAN tag), then apply filtering rules

Encapsulation Header

S=Xmitting Rbridge D=Rcving Rbridge	hop count	original pkt (including L2 hdr)
pt="transit"	KBridge	

RBridge=egress on unicastRBridge=ingress on multicast

Recommendation

- Based on opinions on people from IS-IS
- Do per-ingress RBridge spanning tree