Link Discovery and Liveness

What do we really need?

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Application
Presentation
Session
Transport
Network
Data Link
Physical
We Are Here
Trying to Discover
Two Kinds of Standards

Union - the accumulation of all the features anybody wanted

Intersection - only those things everybody absolutely had to have

Either Tony Hoare or Klaus Wirth - I can not find the quote <blush>
IETF asks the ITU

Q: So you add features until the “NO”s stop

A: We don’t like to think of it that way
Must Haves

• Discover Nodes and Links
• Discover Link Encapsulations:
  • IPv4, IPv6, MPLS4/6
• Maintain Liveness
• Northbound API to BGP-SPF
Security?

- Datacenter Ops seem not to think of security at this layer (or any!)
- Do we want to add Authentication and maybe Integrity?
- One of the things which are likely to drive the size over 1,500
Non-Features

• Routing Data, BGP-SPF does that

• Access to IGP Databases, This is discovery and liveness, not routing

• Just want the Link

• Transport, not our job
Desiderata

• Discovery & Liveness for BGP-SPF
• Simple but usable in Massively Scalable networks of >10,000 nodes
• May be useful for other applications
• Simple
• Extensible (e.g. authentication, cost)
• Simple
• No IPR
Why Simple?

We are here to produce easily understood, implementable, and securable standards, not build résumés.
Why Simple?

A high goal of software engineering is to remove the need for features. It's a vital part of designing for simplicity, even invisibility. -- Rob Pike
Candidates?

- LLDP and its children
- IS-IS link discovery
- Edge Control Protocol (Alvaro)
- BGP Neighbor Autodiscovery
- Link State Over Ether
LLDP

- IEEE Protocol
- IPR over 1,500 bytes
- A bit complex
- Won’t go through a switch (feature or bug?)
- Beacons, not KeepAlives
- Viable but
IS-IS Discovery

- IETF now has control
- Complex enough that BGP-LS was invented so normals could get the link state database
- IS-IS not commonly implemented on MSDC devices, so would need to profile and develop
Edge Control Protocol

- It is a transport controlled by IEEE
- A Reliable layer two transport, on top of LLC
- Has flow control, reliable, non-reorder, ... transport
- used for EVP and PD/CSP
- Reinventing TCP over 802.1
BGP Neighbor Autodiscovery

- IETF protocol
- Very new
- Needs the peering address to get the peering address
- AS Based, can not use other idents
- Not really discovery at all, configuration
- No liveness
Link State Over Ether

- Custom made for the job
- Very bare bones, brutally simple
- Only does discovery and liveness
- New, therefore risky
- But so is BGP-SPF
- No measurement or monitoring tools
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<th>IS-IS</th>
<th>ECP</th>
<th>BNA</th>
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Discussion