Link Discovery and Liveness

What do we really need?

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Application

Presentation

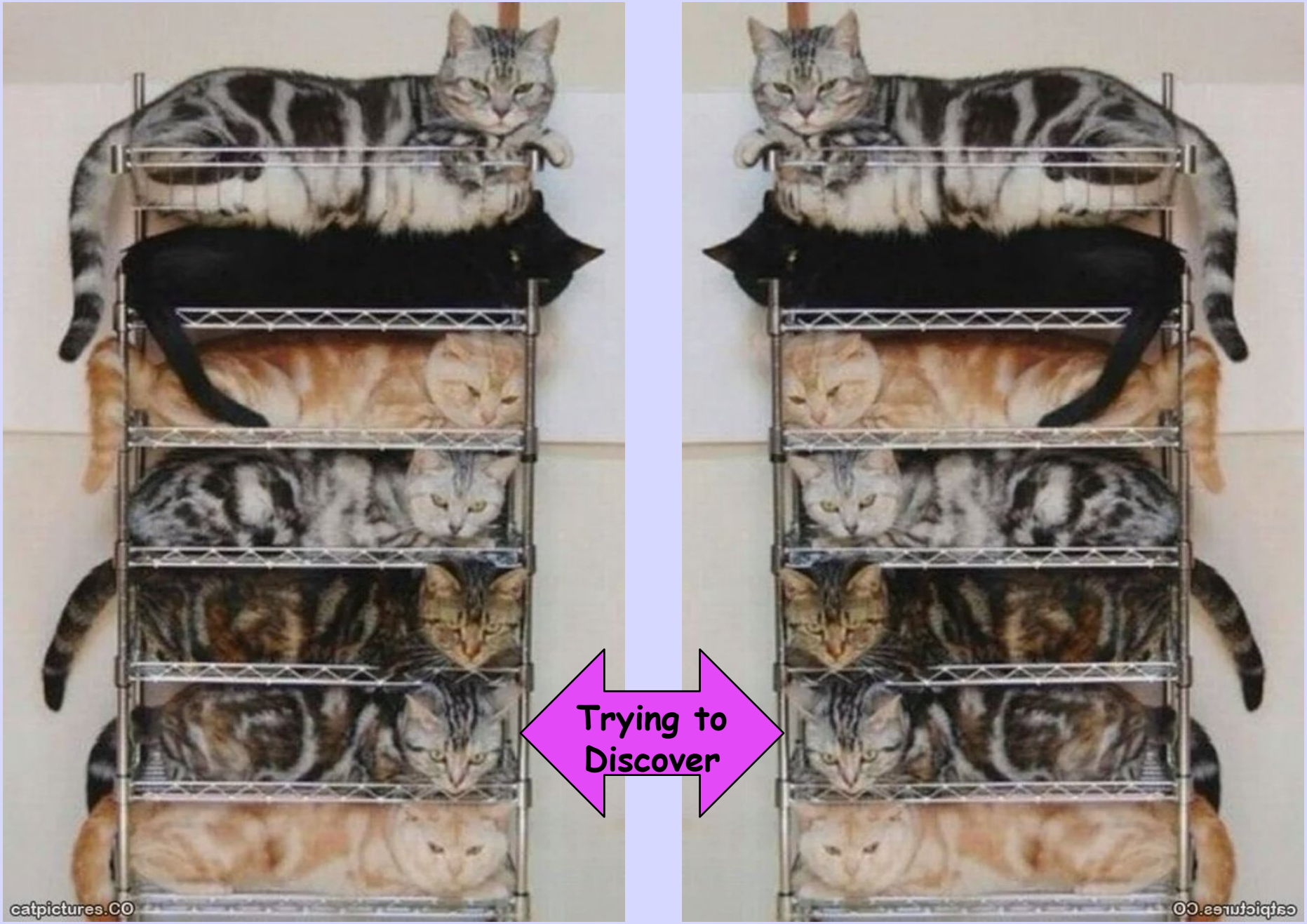
Session

Transport

Network

Data Link We Are Here

Physical



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

	LLDP	IS-IS	ECP	BNA	LSOE
Who Owns	IEEE	IETF	IEEE	IETF	IETF
Maturity	Mature	Mature	Recent	New	New
Complexity	Somewhat	Very	Rather	Somewhat	Almost too Simple
Discovery	Yes	Yes	Yes	Configure	Yes
Liveness	Beacons	Yes	No	No	Yes
IPR	IPR	No	?	?	No

Discussion