Protocol Transitions in Antiquity

IPv6 Forum AU

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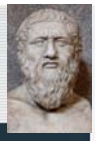
Protocol Transitions in Antiquity Agenda

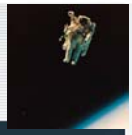


- Why should we care?
- Where have we been?
- How did we move forward?
- When does any of that apply to today?
- What did we learn?

Why should we care?

- Because a generational shift has occurred in the operations staff since the historic transitions, so ignoring the past will guarantee repeating those mistakes.
- Because evolution will happen, and feeding the strengths of the past into the emerging deployments will make them even better.
- Because remembering that we survived the churn of the past will help strengthen our resolve to conquer the current barriers.

Where have we been?



- NCP to IPv4
- DECnet to PhaseV/CLNS
- Appletalk to IPv4
- Novell IPX to IPv4
- X.25 to ISDN/FrameRelay/SMDS/ATM
- SNA to IPv4

These transitions occurred 15 – 30 years ago.

NCP to IPv4

Flash cut Jan. 1983

Positive	Negative
• Small number of participants, easy to organize. • No debate, indecision, or attempts to leverage alternative hacks for as long as possible.	• Synchronized effort where everyone and all apps had to move at once. • Network usage at each site stopped until everything was reconfigured and working again.

DECnet to PhaseV/CLNS

Despite rumors to the contrary, it did happen ...

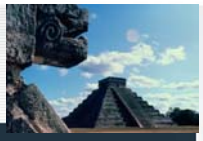
Positive	Negative
• Structured transition plan from the same group that designed both protocols. • Ships-in-the-night routing allowed incremental deployment. • Namespace management allowed control of when and where the new protocol would be used.	• One-size-fits-all transition plan didn't mesh well with how different networks were actually used and operated. • Policy collisions as 'hidden' nodes were now exposed. • Enabling new protocol access for some services on a system implied that all services on that system were ready. • Tools for managing the namespace were limited.

Appletalk / Ethertalk to IPv4

Did anyone notice or care?

Positive	Negative
• Magic transition node on the wire masked the actual discontinuity from the end users. • Since it was completely self-configuring and only exposed names, lower layer implementation was irrelevant.	• Took 15 years to finally terminate support.

Novell IPX to IPv4



Persists for legacy games and vpn bypass.

Positive	Negative
• Tunneling IPX over IP bootstrapped the transition. Netware 5 completed the evolution with NCP directly over TCP. • Transport proxy firewalls allowed lan use of IPX with wan use of IP.	• Split namespace created ample opportunity for confusion and misdirected connections. • Lack of urgency to upgrade the LAN protocol forced applications to choose between LAN & WAN modes.

X.25 to ISDN/FrameRelay/SMDS/ATM

Unclear if X.25 ever really gave up.

Positive	Negative
• Consistent circuit connection models where intermediate switching nodes could proxy the circuit in a different protocol. • Deployment models focused on core-out push meshed well with hierarchical management and funding.	• Centralized control of circuit establishment didn't align with rapidly changing requirements around the edge. • Independent name spaces required manual configuration of the mapping systems.

SNA to IPv4

IBM in denial to the very end.

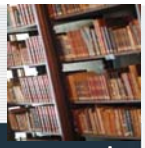
Positive	Negative
• Tunneling over TCP allowed serial circuit emulation without the need for dedicated physical circuits.	• Third parties drove the transition, slowing adoption due to support and loyalty concerns.

How did we move forward?

Fundamentally :

- Run both protocols until traffic stats show that the applications have stopped using the old one. Prefer the new one whenever it works to avoid stagnation on the old and put pressure on fixing the new.
- Parallel deployment with tunneling where necessary, including flipping the tunnel to make the most efficient use of the bandwidth resource as the traffic load shifts.
- Use name space management to control when and where enabled resources were exposed.

What did we learn?

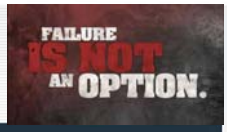


- Listening to the outcries and struggles of the current round of network operations staff ::: Nothing ???
  - Denial persisted past the end of the IANA IPv4 address pool, and is slow to dissipate even after the event.
  - Development of life extending hacks persist despite the expense of fragile operations that lie down that path.
  - Expectations persist that the core will control deployment without involving the application community.
  - The application community refuses to leverage tunneling technologies to drive use and allow time to build out the core.

When does any of the past apply to today?

- The fundamentals of parallel deployment and managed awareness are the key factors in the successes of the past.
- The key failures of the past are:
  - denial of the need for change;
  - continued hacks to perpetuate the old long past the point of fragility, leading to unstable operations;
  - direct translation between protocols at the network layer;
  - insisting on a core-out push deployment model, where the apps are not ready;
  - application developers not doing advanced preparation.

Summary



- History shows that protocol evolution is not hard, it just takes effort.
- Study and preparation are necessary to a point, but delay from excessive planning has the same impact as delay due to remaining in denial that action is required.

Just do it.

The IPv6 Forum
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