

# **SDX** Investigations

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## History Recap on Exchanges



Telephone exchange



## **History Recap on Exchanges**



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http://www.linuxjournal.com/node/8073/print

Internet exchange

## **History Recap on Exchanges**





Global Lambda Open Exchange

### New kind of exchange?



#### Software-Defined Exchange

	ESnet FLA (AS 3434)
	VANDERVECKEN eth1 192.168.1.2/24
	fla-otb-rt1 (Pica8)
1	eth0 92.168.1.106/24
	Port 2 (VLAN ??) (VLAN 3801) [192.188.37.2/30] [192.188.37.6/30] (Peers w/ ESnet) (Peers w/ REANNZ FLA)
	2x 10GE
	plane)

**TREEHOUSE** (since March 2013)



#### Other folks



 Network nodes now at VUW & CSIRO (Australia), being worked on in Houston and South Africa actively



The most important single central fact about a free market is

that no exchange takes place unless both parties benefit.

**Milton Friedman** 

## What does SDX exchange?



Application data? IP Packets? Virtual topologies? ...

- While SDX's can be defined broadly (everything under the sun!)
  - It merits to define SDX within this group
- At the base level, SDX is a more intelligent IP exchange
- At the sophisticated level, SDX is a virtualized, application-specific exchange
- Building the right framework for an exchange will be critical to support all definitions
  - Policy-free?

## Current vision on SDX





Lawrence Berkeley National Laboratory

U.S. Department of Energy | Office of Science

## Why the glacial growth?



- Software is ready multi-table compliant (OF 1.3)
- Hardware missing so far at the ends of the spectrum
  - Top of Rack switch (Pica8)
  - Top of the line Router (Juniper/Brocade)

Cannot build capable programmable networks without capable, programmable hardware



## What Problems Are We Solving and How?

Brainstorm today