The (Long) Road to SDN

Edward Crabbe
Network Architect
Google

'SDN' had been Around for Quite a While

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Ipsilon GSMP	1996
Cambridge's The Tempest	1998
IETF FORCES	2000
IETF PCE	2004
Princeton's Routing Control Platform	2004
4d Initiative	2005
Ethane	2007
Openflow	2008

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So What is SDN Anyway?

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So many things to so many people. :P

common threads:

- partitioning of resources & control within network elements

- minimization of network element local control plane
  - offline control of forwarding state
  - offline control of network element resource allocation

Why SDN?

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- Cost
- Innovation Velocity

Cost

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CAPEX

make efficient use of resources

- network element cpu and memories
- underlying network capacity

- move heaviest workloads off of expensive, relatively slow embedded systems to cheap, fast, commodity hardware

- provide visibility into and synchronized control of network state such that underlying capacity may be used more efficiently

Cost

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OPEX

Reduce network complexity and thus operational overhead and outage time

- simplify policy composition
- enforce correctness constraints and invariants
- reduce inter-dependencies
  - between protocols
  - between routers
- reduce complexity of distributed control system software
- implement potentially innovative new techniques (eg: Heller et al's Elastic Trees)

Innovation Velocity

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- Speed feature implementation and deployment
- partioning of resources and control allows for experimentation in relatively safe conditions
- implement on relatively simple, well known systems with well defined interfaces
- decoupling of control plane from network element allows for implementation of novel decision algorithms and hardware uses

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Questions?

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