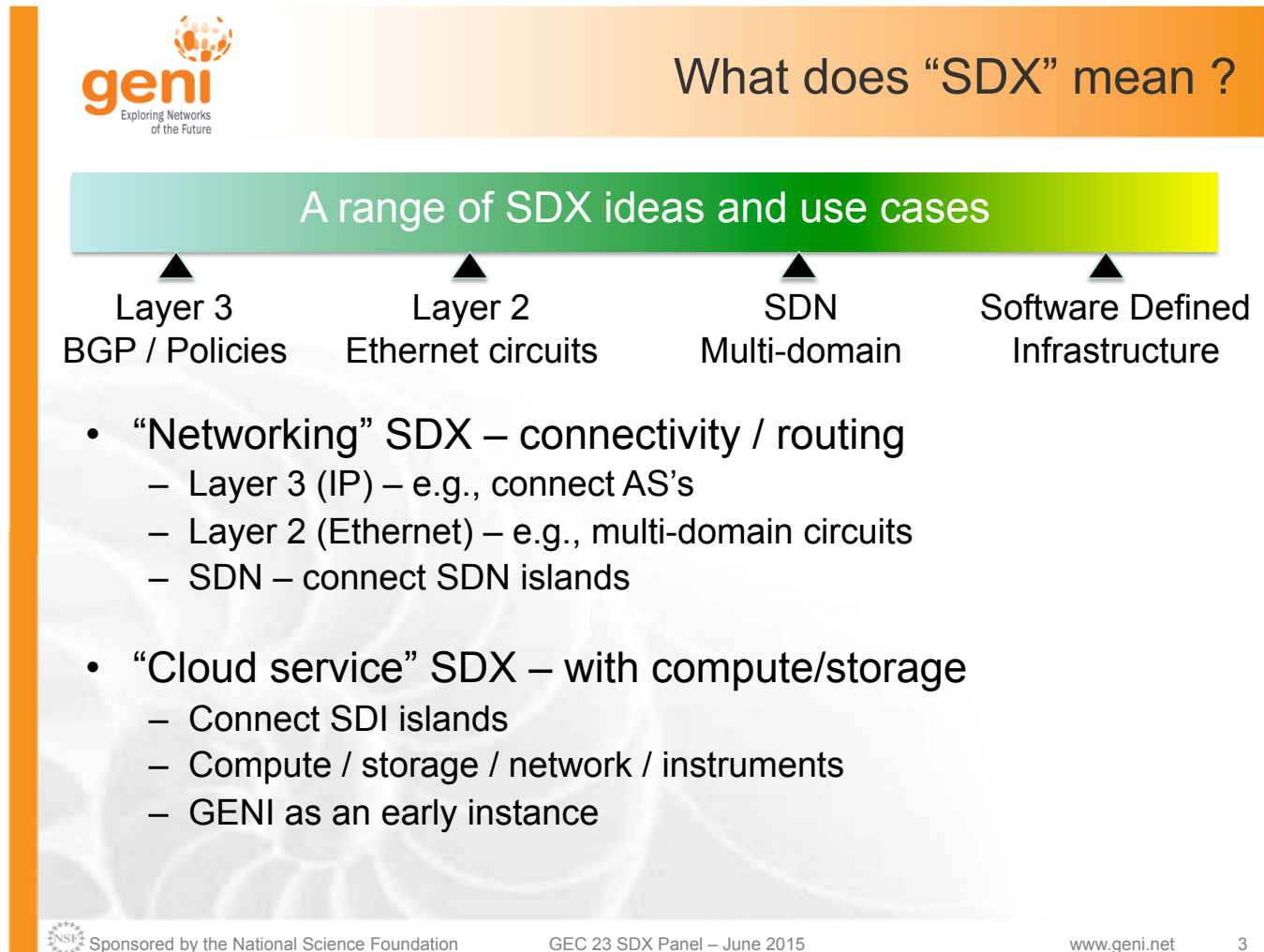# The Software Defined Exchange - GEC 23

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What is SDX to us?

- Yes, it's all of these!

What does "SDX" mean ?

A range of SDX ideas and use cases

Layer 3	Layer 2	SDN	Software Defined
BGP / Policies	Ethernet circuits	Multi-domain	Infrastructure

- "Networking" SDX – connectivity / routing
  - Layer 3 (IP) – e.g., connect AS's
  - Layer 2 (Ethernet) – e.g., multi-domain circuits
  - SDN – connect SDN islands

- "Cloud service" SDX – with compute/storage
  - Connect SDI islands
  - Compute / storage / network / instruments
  - GENI as an early instance

GT-RNOC
Georgia Tech Research Network Operations Center

What is SDX to us?

- Leverage SDN as a tool to overcome the limitations of traditional peering

  - limitations closely linked to limitations of BGP

  - lack of expressiveness in traffic policy

- Focus on the IXP (> 300 Internet Exchange Points)

- Incrementally deployed as a complementary technology

  - can't replace BGP all at once

- Joint research work with L. Vanbever, M. Shahbaz, S. Donovan, B. Schlinker, N. Feamster, J. Rexford, S. Shenker, R. Clark, E. Katz-Bassett

SDX is a platform that enables multiple stakeholders to define policies/apps over a shared infrastructure

Content providers

Eyeballs providers

Transit providers
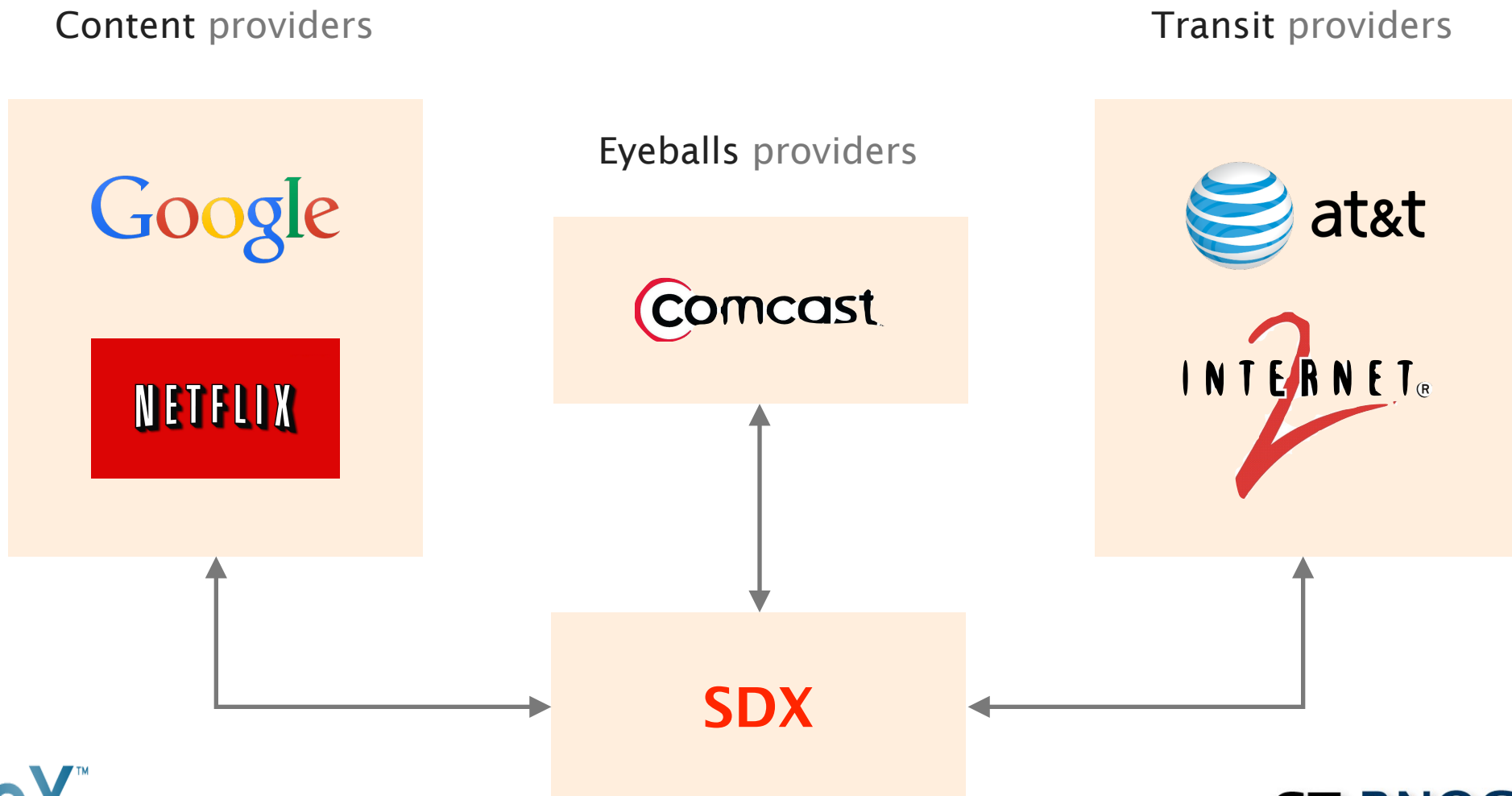
SDX enables a wide range of novel applications

security

Prevent/block policy violation

Prevent participants communication

Upstream blocking of DoS attacks

forwarding optimization

Middlebox traffic steering

Traffic offloading

Inbound Traffic Engineering

Fast convergence

peering

Application-specific peering

remote-control

Influence BGP path selection

Wide-area load balancing
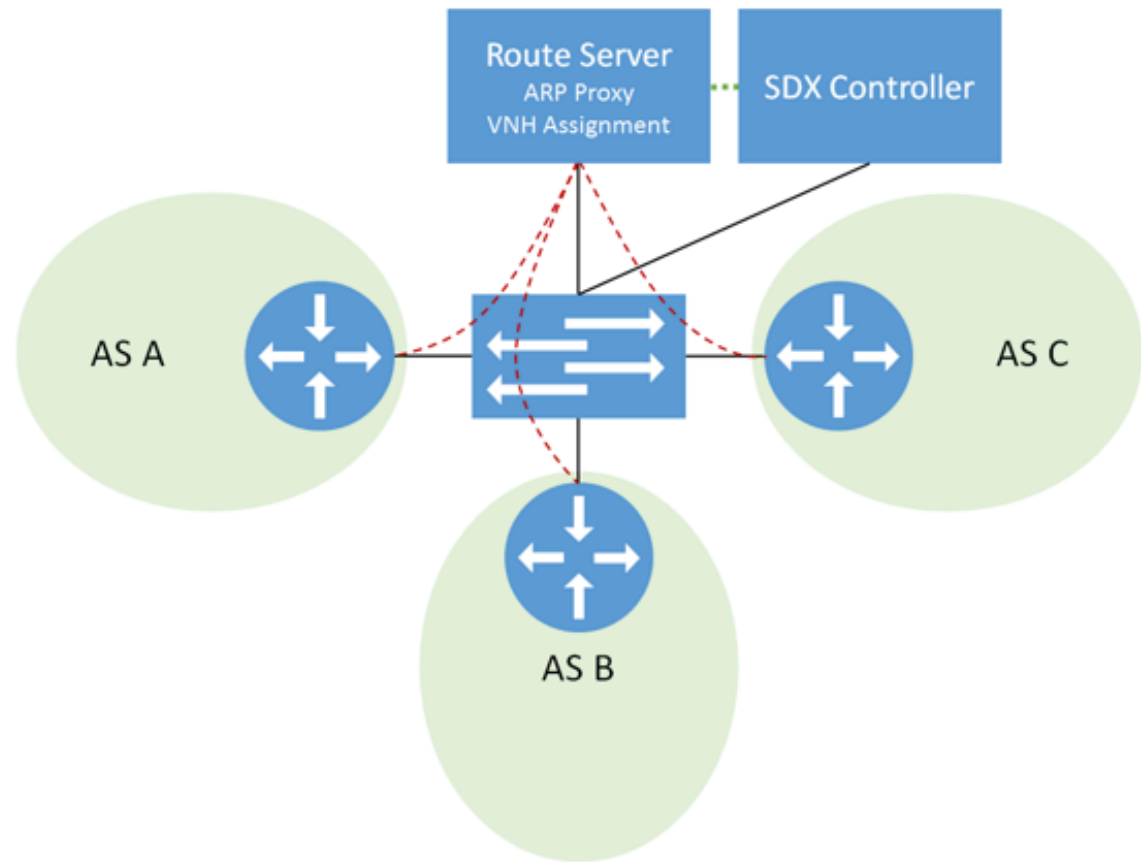
Virtual SDX Switch Abstraction
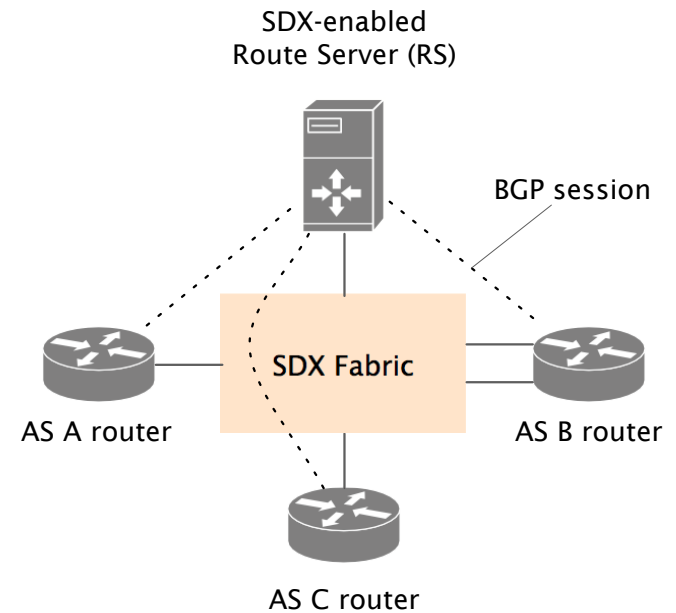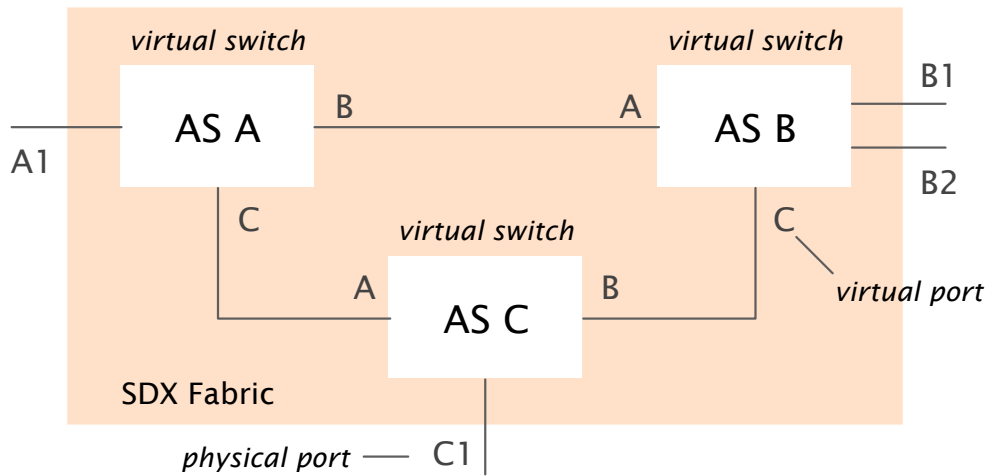
Illusion of its own virtual SDX switch for each participant

Balances desire for flexibility with necessary isolation

- Reduce state space and control overhead

- Updated controller (RYU)

- Leverage multiple tables/switches

- Move toward APIs for specifying policy

- Five year NSF Project

- Support large data flows from new telescopes in South America

- Includes stitching and SDI capabilities

- Must support dynamic allocation across multiple domains