# Control Plane Architecture for Inserting OPS (and other emerging technologies) in GENI Optical Substrate

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# Emerging Optical Substrate

- Photonics has been undergoing revolutionary advances over past few years: *integration* & *functionality*
- These emerging technologies will enable:
  - Fine granularity manipulation of optical data across broad spectrum, multi-casting
  - Ultra-high bitrates >100G toward Tb
  - Chip scale, programmable optical switching
- GENI research agenda:
  - Dynamic slicing
  - Multiple data formats, diverse traffic (latency sensitive, real time streaming, distribution…)
  - physical layer aware routing, secure communications, resilience via path diversity, etc.
- To address full spectrum of GENI research will require new ways for how network interacts with optical substrate, and must allow for seamless insertion of emerging heterogeneous technologies

# Control plane interface to substrate

- Infrastructure that enables simple, well defined insertion of emerging optical technologies
  - Standardized GENI hw/sw interface
  - Programmable
  - Extendible to new technologies, functionalities
  - Enable experimental deep access to optical substrate in isolated slice, deployed in parallel with upper layer robust experiments
- Development of network adaptation:
  - Control, data, management planes
  - In support of future optical substrate
- OPS clearly emerging over GENI roll out period

# Enabling OPS in GENI infrastructure

Cross-layer information exchange

**programmable photonic packet switch fabric**