ESnet Planning for the LHC T0-T1 Networking

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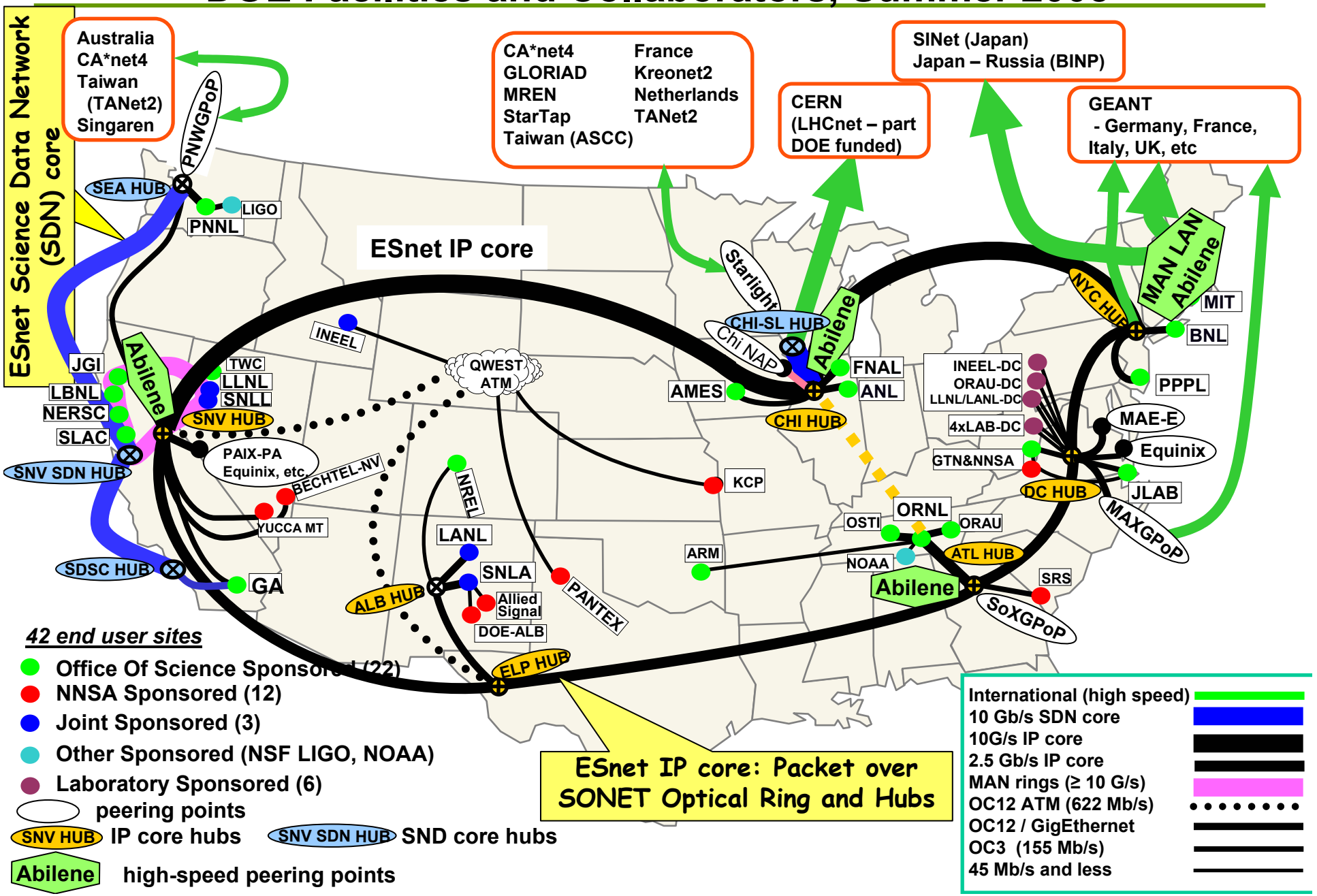
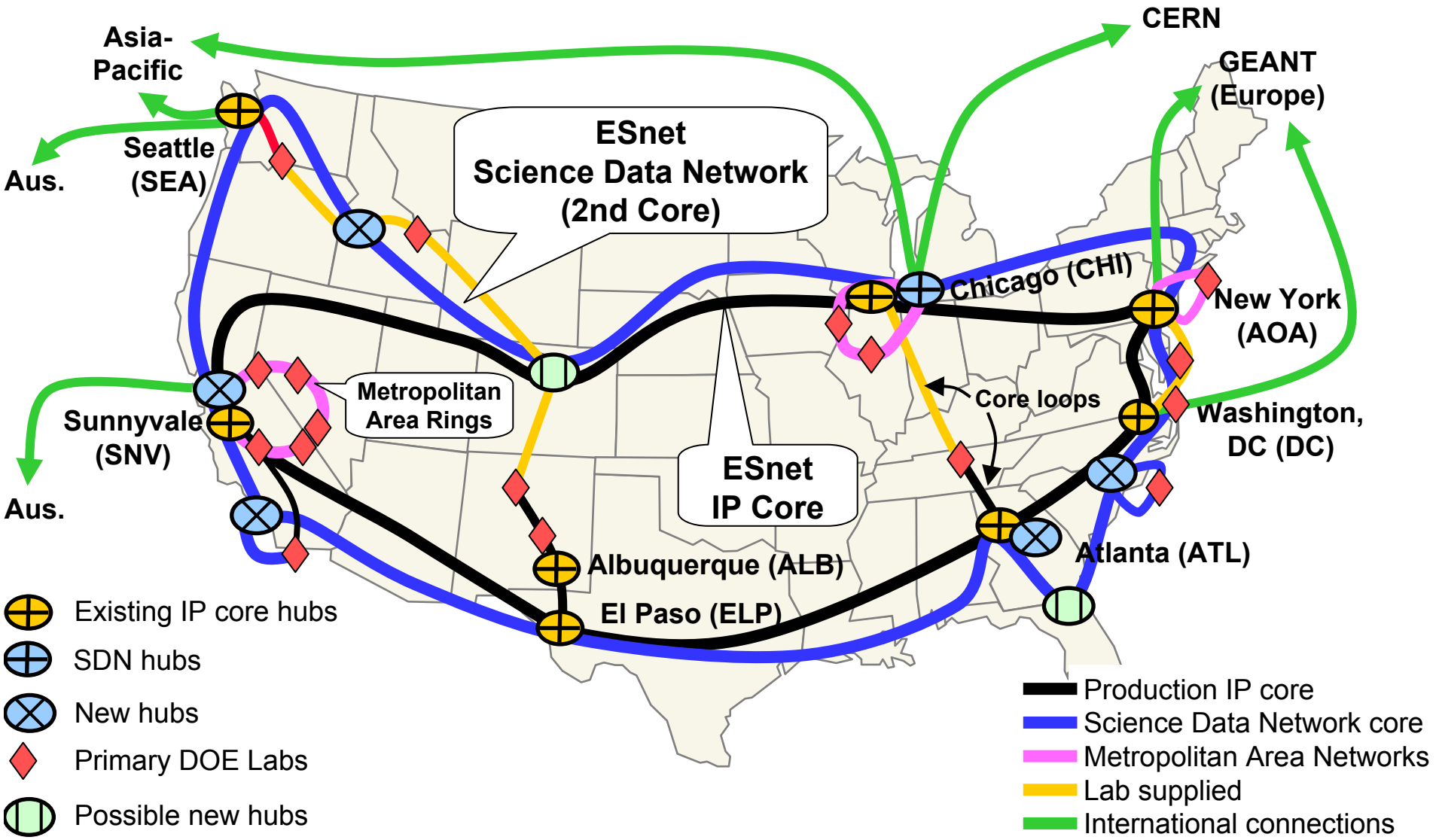
ESnet High-Speed Physical Connectivity to DOE Facilities and Collaborators, Summer 2005



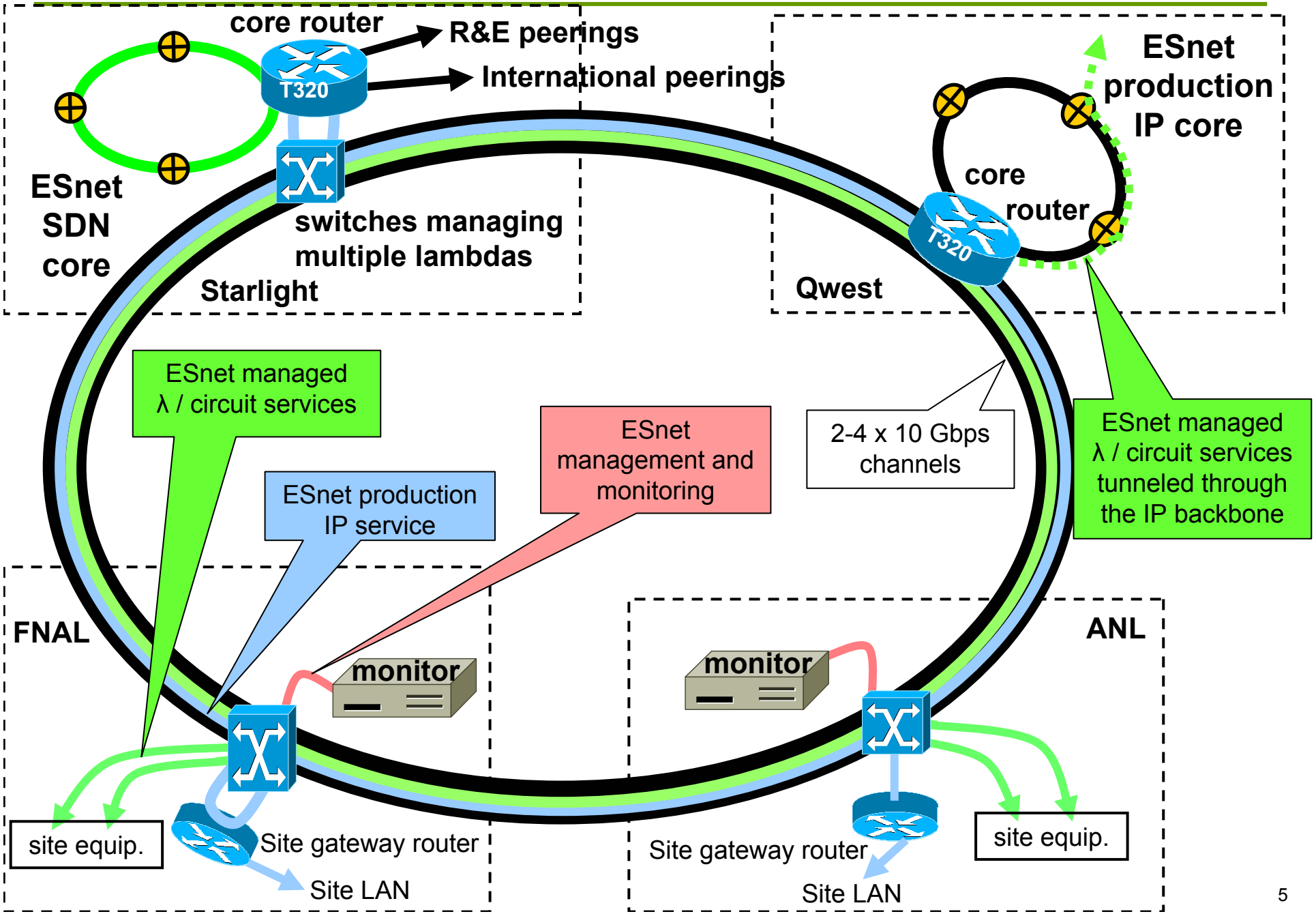
ESnet

- The IP core is primarily a layer 3 infrastructure
  - However, supports layer 2 via MPLS
  - Directly connects sites
  - Provides global peering for sites
- The SDN core is primarily a layer 2 infrastructure
  - Targeted at providing virtual circuit services

ESnet Target Architecture:
IP Core + Science Data Network + MANs

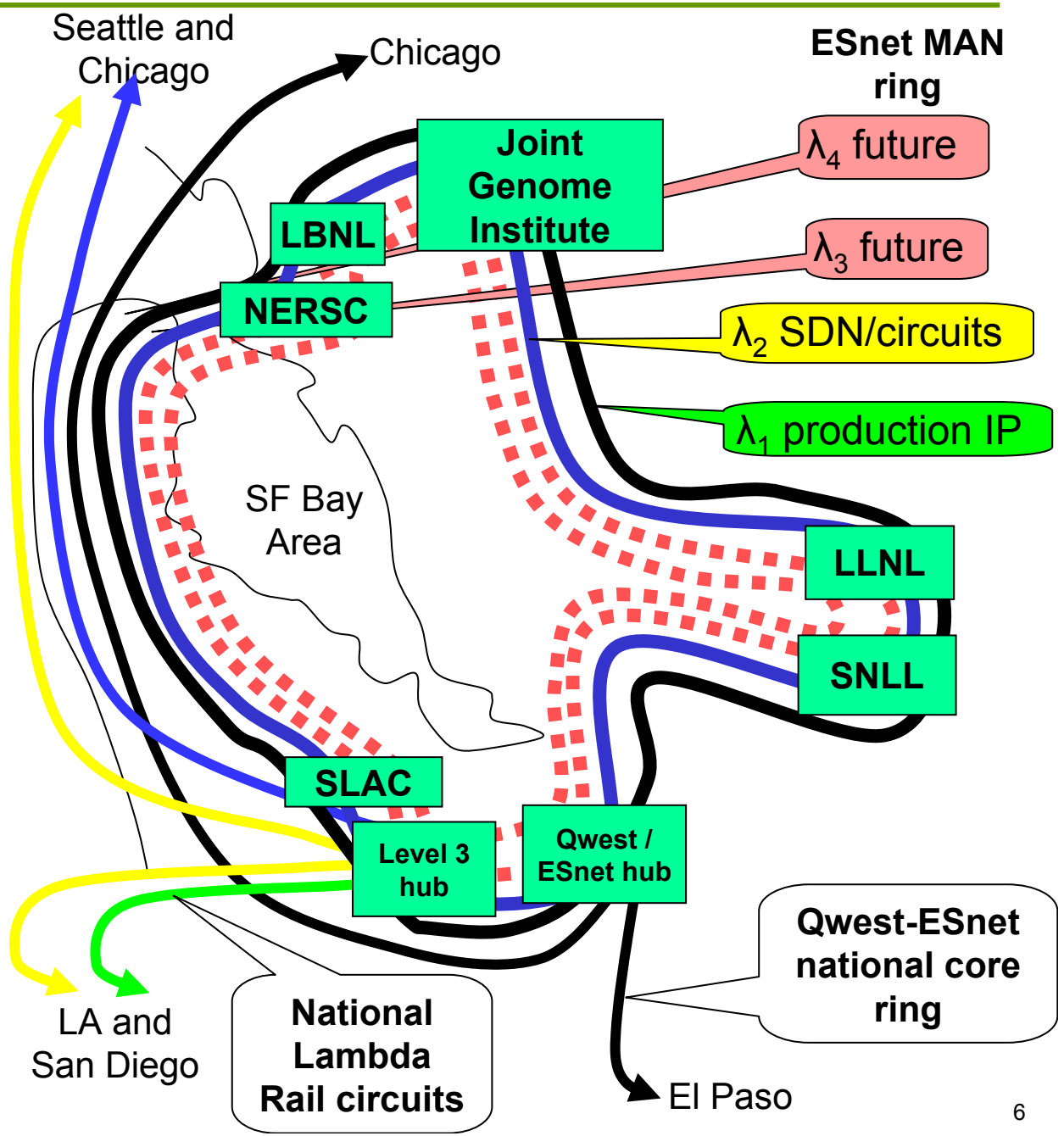


ESnet MAN Architecture (e.g. Chicago)

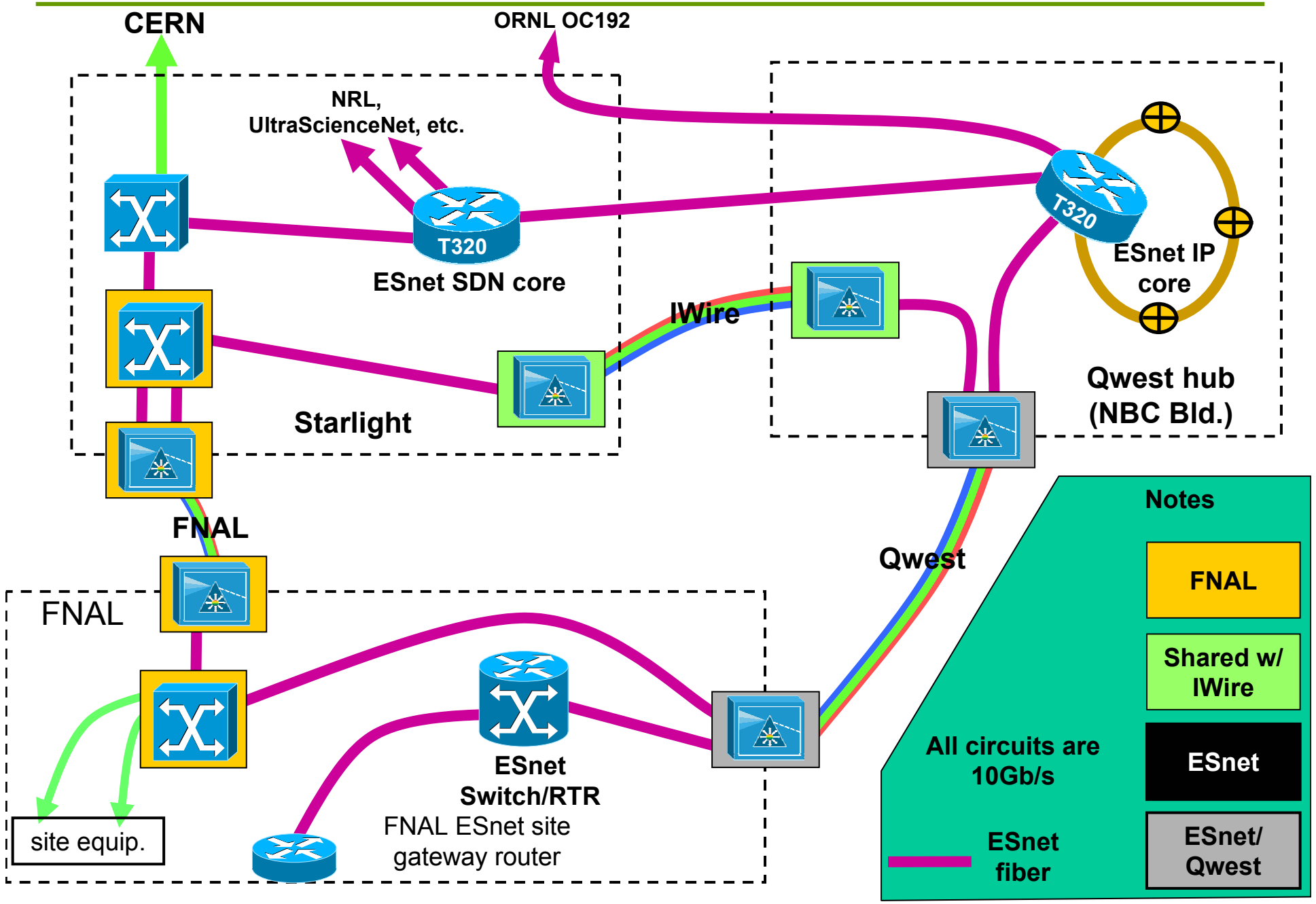


The First ESnet MAN: SF Bay Area

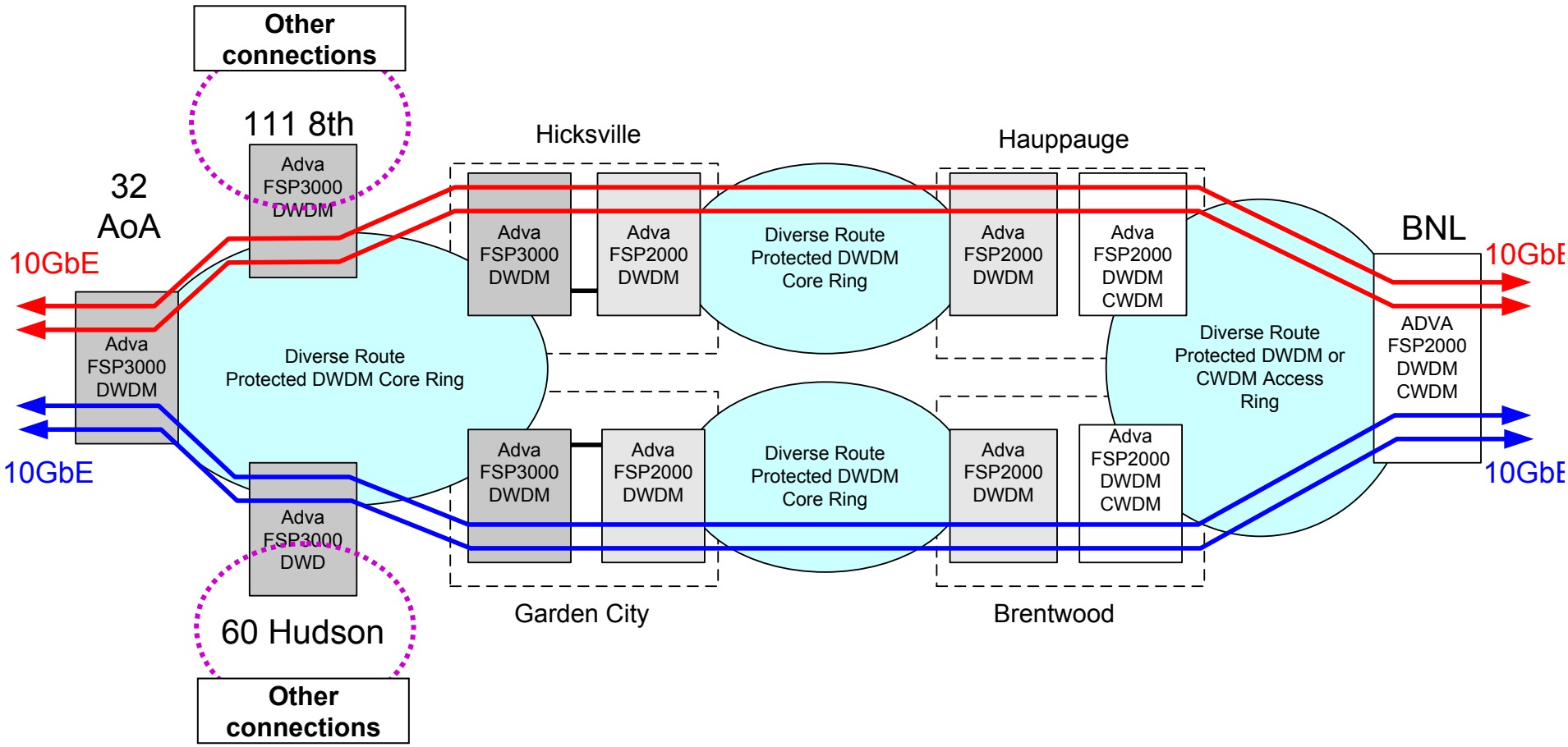
- 2 λs (2 X 10 Gb/s channels) in a ring configuration, and delivered as 10 GigEther circuits
- Dual site connection (independent "east" and "west" connections) to each site
- Will be used as a 10 Gb/s production IP ring and 2 X 10 Gb/s paths (for circuit services) to each site
- Qwest contract signed for two lambdas 2/2005 with options on two more
- Project completion date is



ESnet Near-Term Planning for FNAL

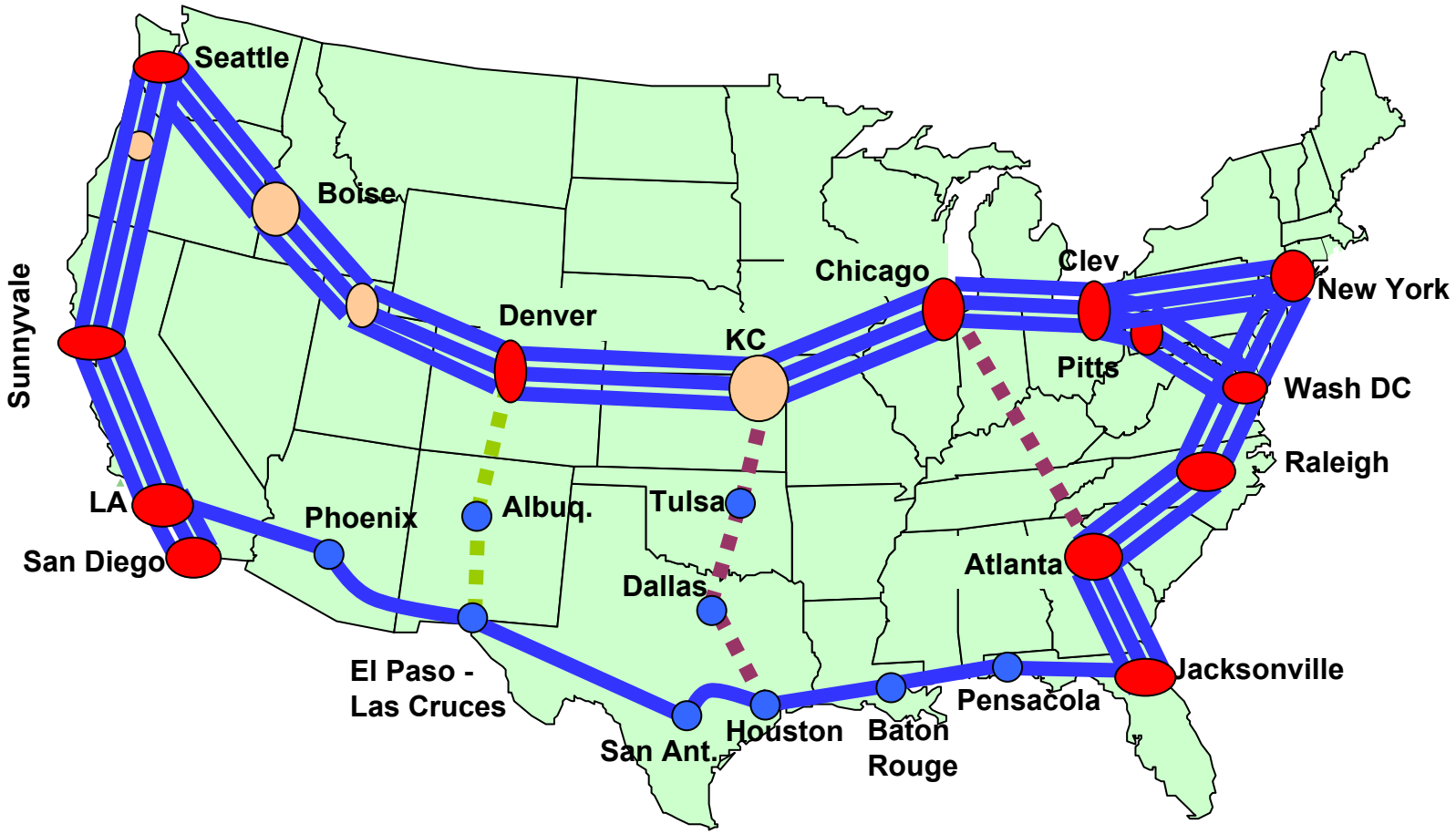


ESnet Planning for BNL (Long Island MAN Ring)



Engineering Study for LI MAN

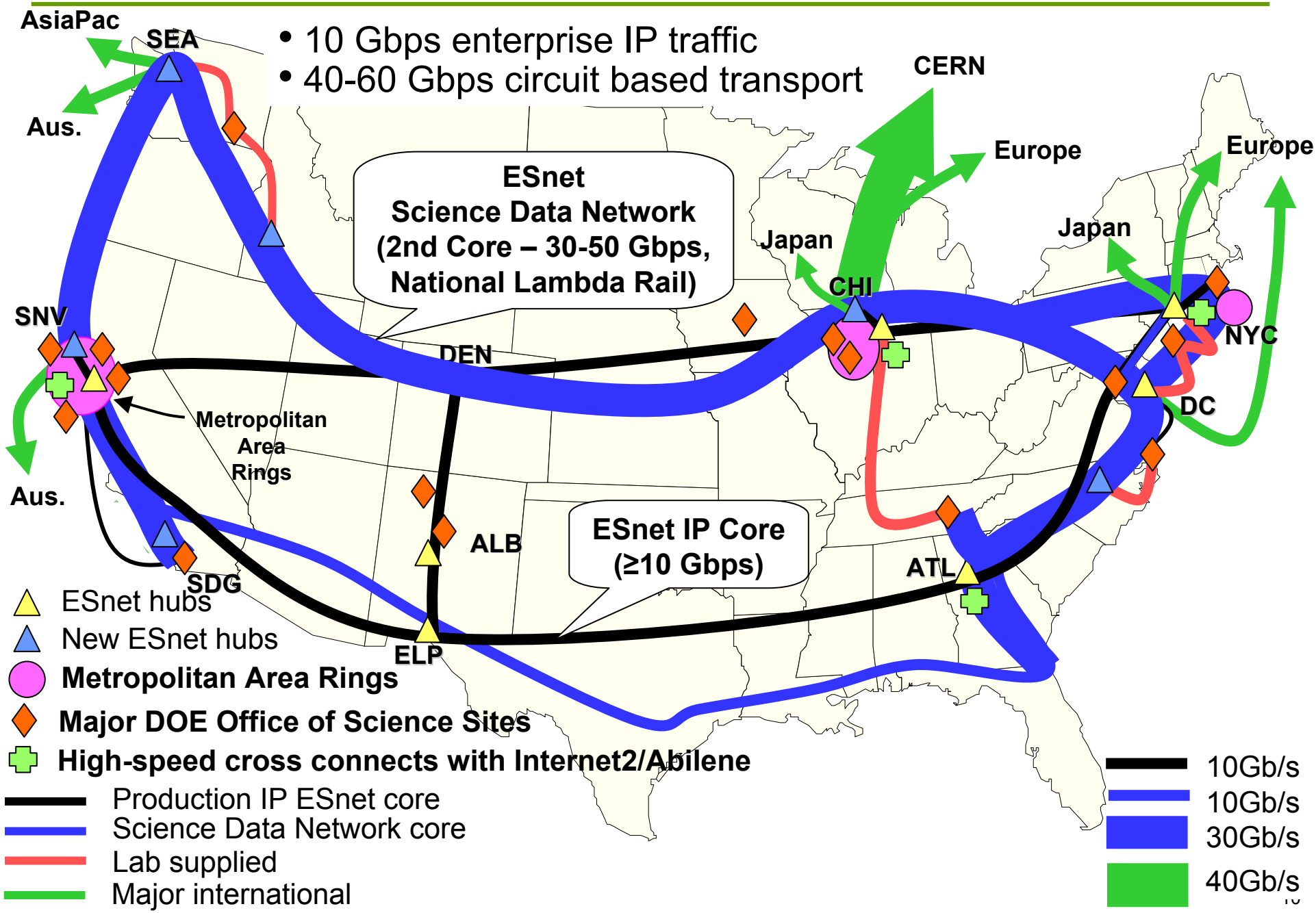
Proposed ESnet Lambda Infrastructure Based on National Lambda Rail – FY08



NLR regeneration / OADM sites

NLR wavegear sites

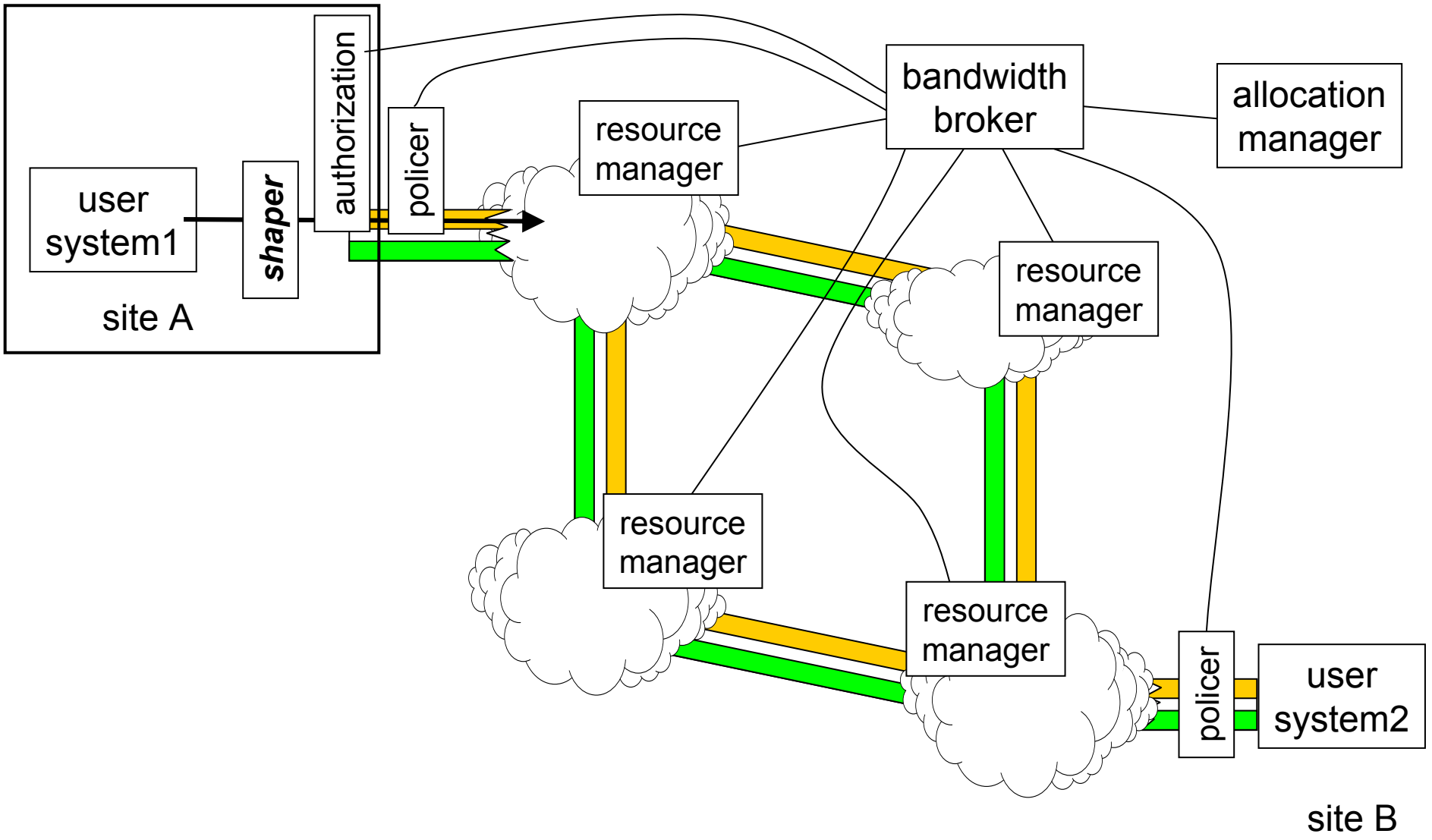
ESnet Goal – 2007/2008



OSCARS: Guaranteed Bandwidth Service

- A high-priority R&D topic in “DOE Science Networking Challenge: Roadmap to 2008”
- The MICS funded OSCARS project is implementing dynamically provisioned circuit switching in ESnet
  - On-demand Secure Circuits and Advance Reservation System (OSCARS)
  - End-to-end provisioning will be initially provided by a combination of Ethernet switch management of λ paths in the MAN and Ethernet VLANs and/or MPLS paths in the ESnet core
  - Provisioning will initially be provided by manual circuit configuration, on-demand in the future
  - A technology collaboration with Internet2/Abilene

OSCARS: Guaranteed Bandwidth Service

- Progress
  - Testing OSCARS Label Switched Paths (MPLS based virtual circuits)
    - A static LSP between BNL and FNAL has been configured for the sites to test their infrastructure
    - Multiple static LSPs have been configured between GA and NERSC to test local and wide-area QoS
  - Collaboration – code is being jointly developed with Internet2's Bandwidth Reservation for User Work (BRUW) project

OSCARS: Guaranteed Bandwidth Service