U.S. ATLAS Tier 1 Networking

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LCG T0/1 Network Meeting

CERN

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BROOKHAVEN
NATIONAL LABORATORY

Disclaimer

- Presentation by a Non-network Expert
- Information Primarily From
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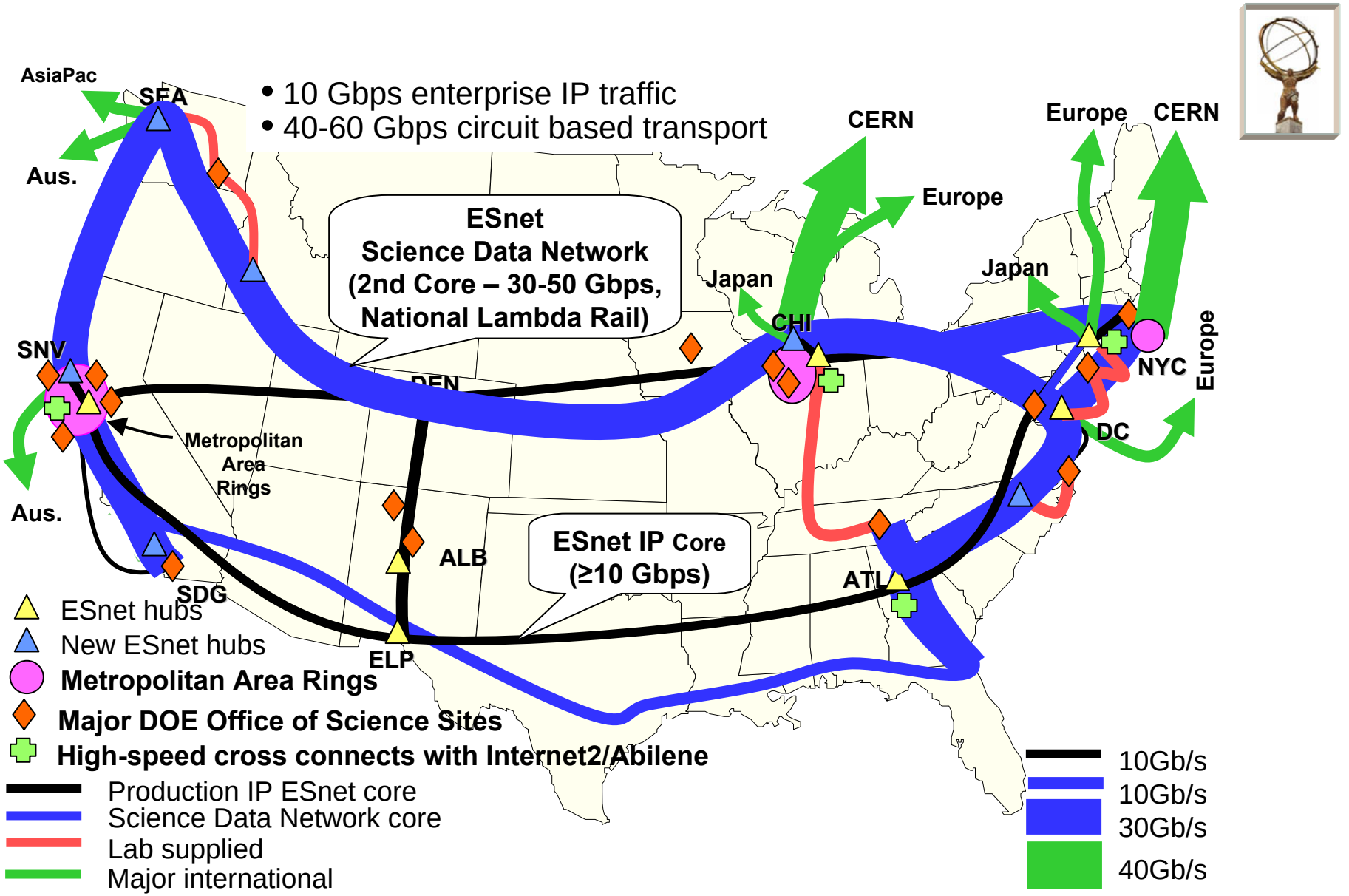
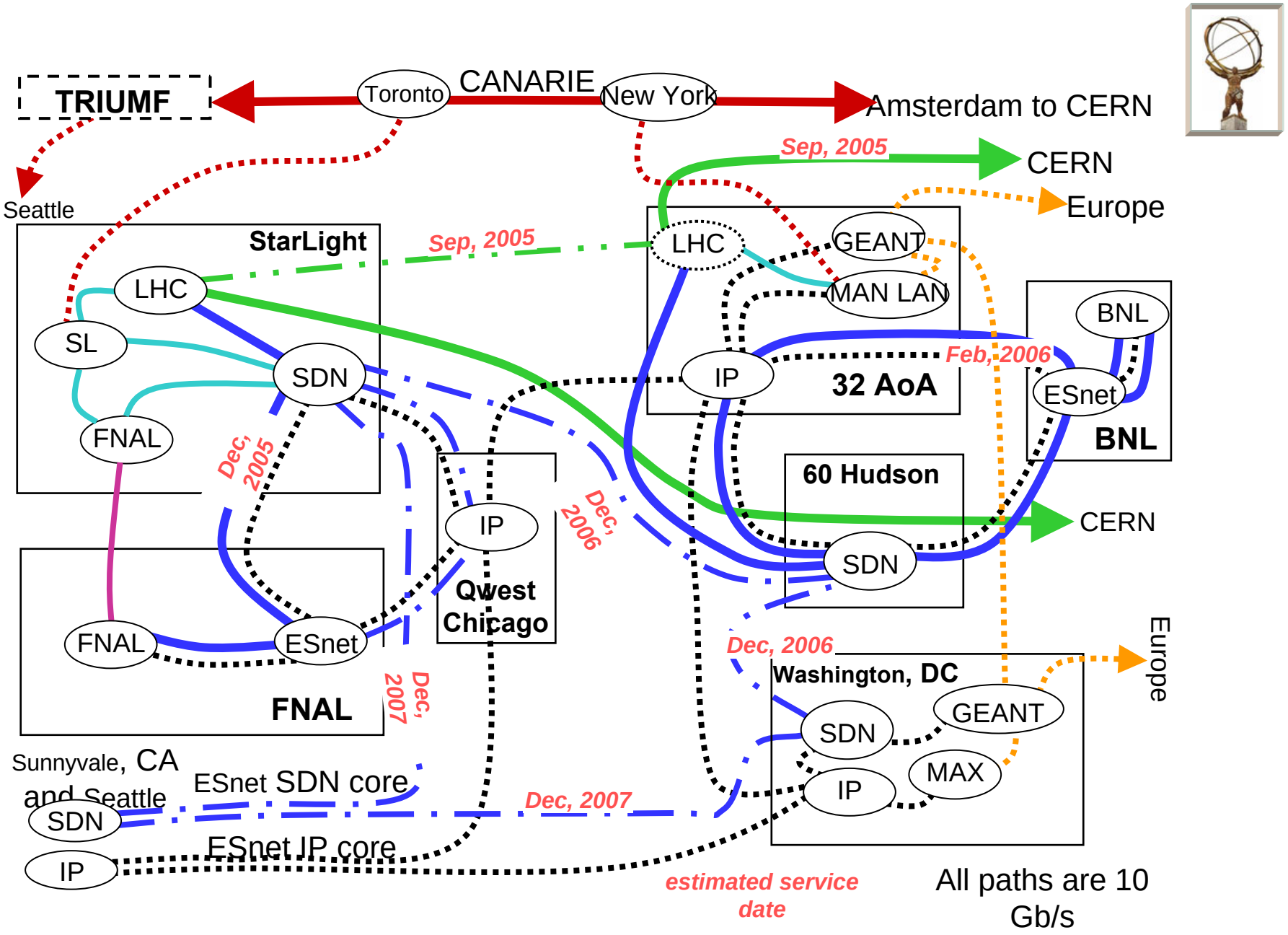
  - BNL Networking – W. Scott Bradley


AsiaPac
SEA
Aus.
• 10 Gbps enterprise IP traffic
• 40-60 Gbps circuit based transport
CERN
Europe
CERN
Europe
ESnet
Science Data Network
(2nd Core – 30-50 Gbps,
National Lambda Rail)
Japan
Japan
CHI
SNV
DEN
NYC
Europe
DC
Metropolitan
Area
Rings
Aus.
ALB
ESnet IP Core
(≥10 Gbps)
ATL
SDG
ELP
ESnet hubs
New ESnet hubs
Metropolitan Area Rings
Major DOE Office of Science Sites
High-speed cross connects with Internet2/Abilene
Production IP ESnet core
Science Data Network core
Lab supplied
Major international
10Gb/s
10Gb/s
30Gb/s
40Gb/s


TRIUMF
Toronto
CANARIE
New York
Amsterdam to CERN
Seattle
Sep, 2005
CERN
Europe
StarLight
LHC
SL
SDN
FNAL
Sep, 2005
Dec, 2005
LHC
GEANT
MAN LAN
IP
32 AoA
Feb, 2006
BNL
ESnet
BNL
60 Hudson
SDN
CERN
IP
Qwest Chicago
Dec, 2006
FNAL
ESnet
FNAL
Dec, 2007
Dec, 2006
Washington, DC
SDN
GEANT
MAX
IP
Europe
Sunnyvale, CA
and Seattle
ESnet SDN core
SDN
IP
ESnet IP core
Dec, 2007
estimated service date
All paths are 10 Gb/s

Foreseen T1 Connection to Lambda

- ***ESnet will provide a dedicated 10Gb wavelength from Brookhaven to the MANLAN PoP in NYC to provide T0-T1 connectivity, and a second 10Gb wavelength to provide for T1-T1, T1-T2/3***
- ***Which networking equipment will be used?***
  - Adva multiplexing platforms to provide 10GigE feeds to BNL's perimeter router.
- ***How is local network layout organized?***
  - 10Gb feed to BNL Atlas Computing Facility in production today, to be expanded to dual 10Gb feeds and beyond in anticipation of articulated bandwidth requirements.

Foreseen T1 Connection to Lambda (2)

- ***What AS number and IP Prefixes will they use and are the IP prefixes dedicated to the connectivity to the T0?***
  - BNL has registered number 43 as its BGP AS number. The IP prefixes for connection to the T0 facility have not been determined at this time.
- ***What backup connectivity is foreseen?***
  - The two wavelengths terminating BNL to the MANLAN PoP in NYC will traverse geographically disparate paths, with planned failover capability.
- ***What is the monitoring technology used locally?***
  - Spectrum, Cisco Works 2K.

Foreseen T1 Connection to Lambda (3)

- ***How is the operational support organized?***
  - The traditional operational relationship between ESnet and BNL will be maintained, with the BNL perimeter router serving as the line of demarcation for operational responsibility. The network support of the internal Atlas Computing Facility will be managed in the traditional manner now in place.
- ***What is the security model to be used with OPN?***
  - The security model for the OPN at Brookhaven is expected to be as currently in operation: the RHIC/ATLAS Computing Facility resides in its own firewalled enclave, with access rules and permissions applied appropriate to an international collaboration. ******It is a fallacy that firewall technology cannot support 10Gb line speeds; this point has been discussed separately as part of comments on the LHC High-Level Architecture document v 1.9******
- ***What is the policy for external monitoring of local network devices, e.g. the border router for the OPN.***
  - The traditional monitoring policy between ESnet and BNL will be maintained in that external entities will be allowed to monitor up to the external interfaces of BNL's perimeter router. Perceived problems within the BNL enterprise are reported to the BNL Network Operations staff for troubleshooting and resolution.