Evolution of the Internet2 Network

John Hicks, jhicks@internet2.edu
SAACC

INTERNET 2

Topics:

- Current transition of the network – Short term
- SDN Support
- Long term evolution of the network
- Research facilitation
- Continued participation in GNA activities

INTERNET 2

CURRENT TRANSITION OF THE NETWORK – SHORT TERM

2016-2017 Target areas

Core Network:

- Move to single vendor platform based on MPLS (2016 – 2017)

Capacity:

- Improve analytics; perform first wave of upgrades
- Leverage DCI at key interconnect locations

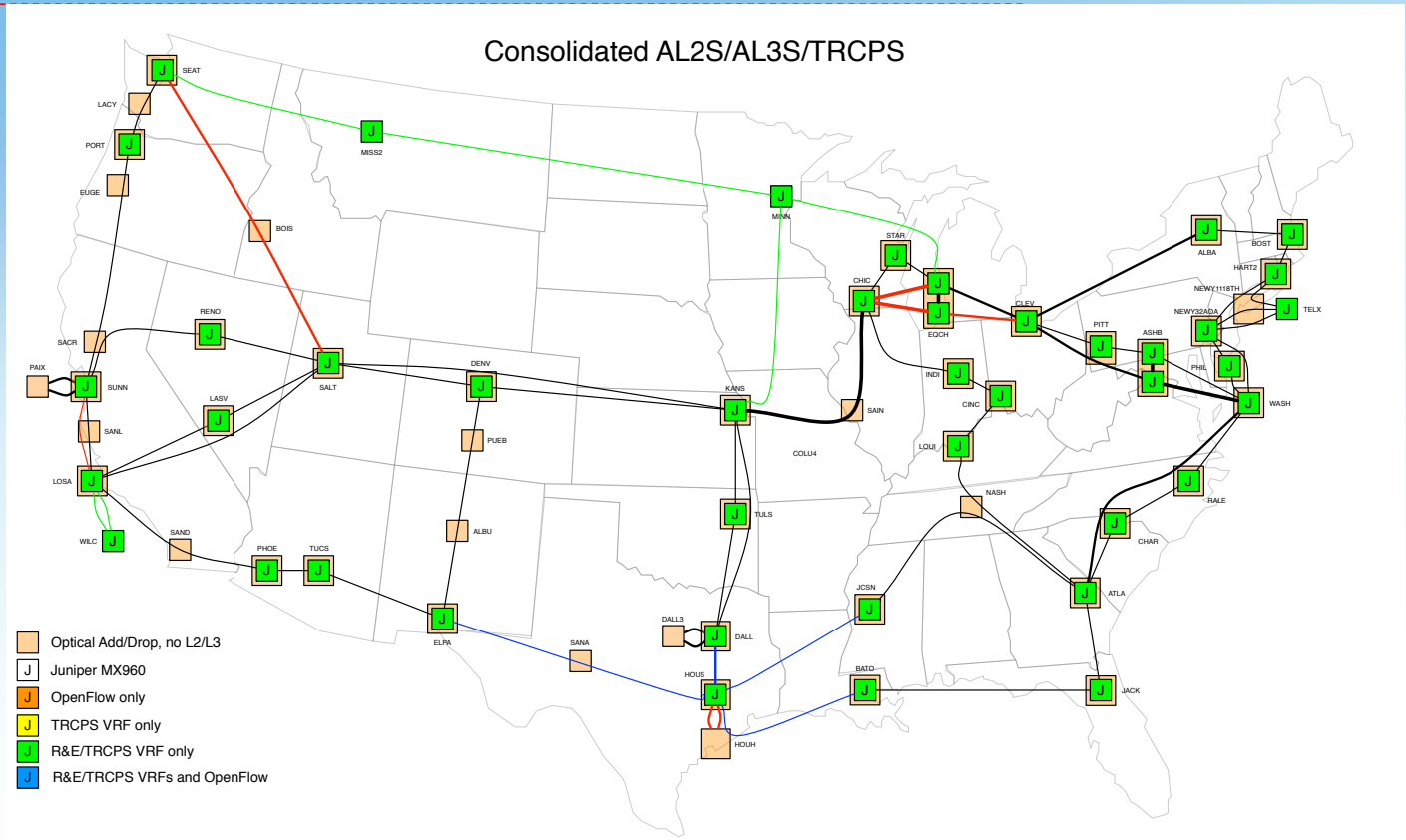
Optical:

- Auditing and Compliance

2016-2017 CORE Network Program: Requirements

- All Services at all nodes
  - AL3S (R&E, TRCPS, LHCONE, other L3VPNs)
  - AL2S (L2VPN, VPLS, Advanced L2-CCC)
- Allow for Explicit Path Selection
- Restore to Primary by Default
- Edge interface support all services on a single port
- Multipoint (VPLS, default MAC-Address Table Limits)
- Path Exposure (Traceroute, MPLS Ping)
- IPv6
- Multicast (ASM & SSM)

2016-2017 CORE Network Program



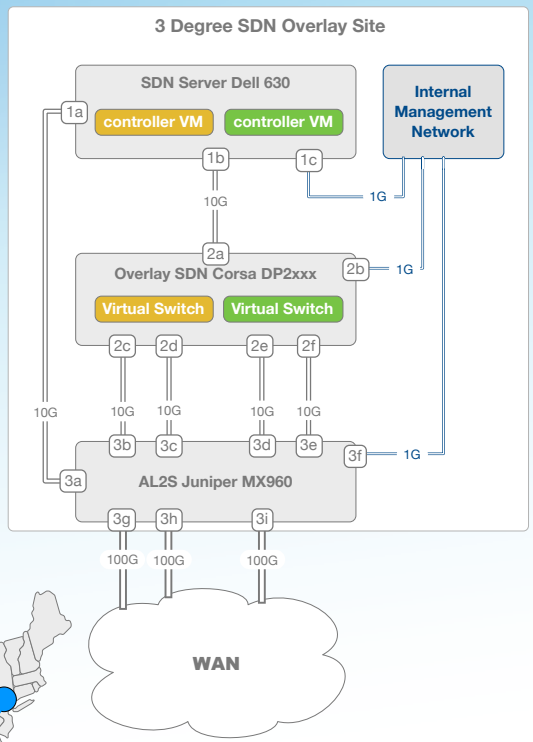
Current Status

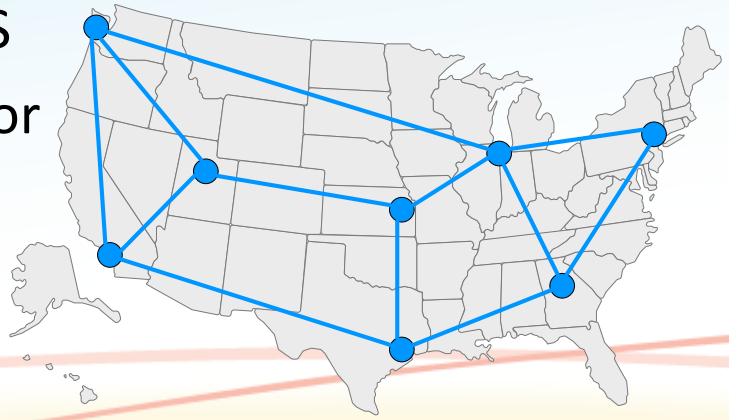
- Transition of all vlans to MPLS is completed as of 8-15-17.
  - Total of vlans transitioned in stages was 890.
  - Took about 40 hours total
- The process occurred over 7 nights. No single vlan took more then a minute or so.
- No substantive issues came up during this process.

SDN SUPPORT

What it looks like

- 8 sites, national footprint
- Each site contains:
  - Dell Server
  - Corsa Switch
  - Multiple 10GE interconnects provided via AL2S
  - 10GE AL2S port for onramp/offramp

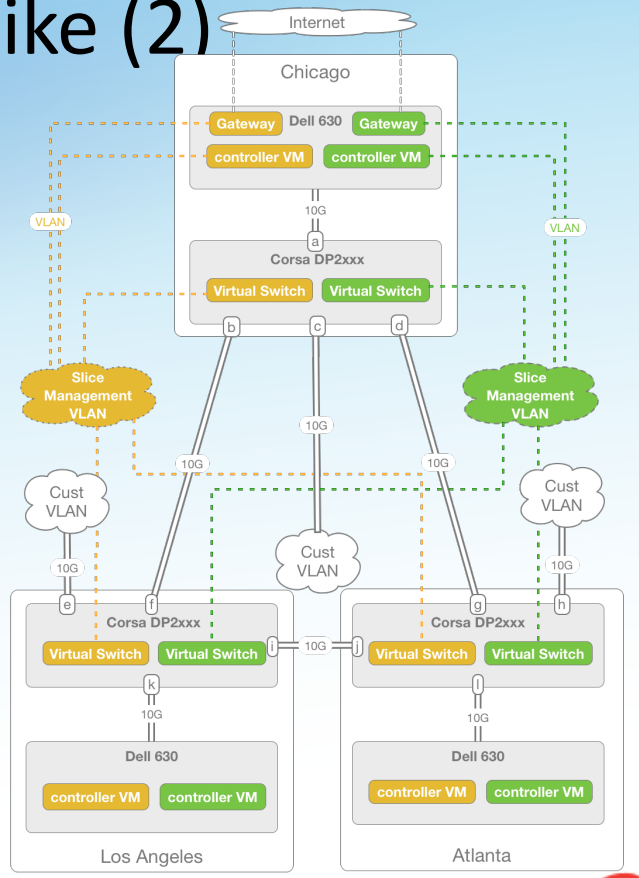




INTERNET2

What it looks like (2)

- AL2S circuits interconnect sites, circuits follow physical infrastructure
- Each slice gets its own set of logical circuits
- To the control plane, these look just like direct 10GE adjacencies
- Each slice has its own dedicated management network.



LONG TERM EVOLUTION OF THE NETWORK

Framing

- Community investment - not just backbone - and not normal refresh
  - Not “what Internet2 should do” but “how can we work differently together”
- Target for capital investment is 2+ years out
  - Practically - looking at technology that is not yet ready for prime time today
  - We should take the time to more efficiently make shared investments where practical
- Re-emphasize our commitment to our research support missions
  - Tailor services and infrastructure to do so in a more integrated fashion
- Workforce impact - skills, processes, etc.
  - This is an overarching issue
- This is not a firm plan - we need input and collaboration
  - Not everyone will be ready to engage day one
  - Maintain community mindset - all can join and benefit when ready

INTERNET2

Key principles

- Developed from requirements gathering process
  - Ecosystem - planning, service development and investment should proceed in an integrated fashion amongst ecosystem members (campuses, regionals, NRENs, etc.)
  - Experimentation - development of the integrated infrastructure (ecosystem) should take place as a community-wide continuous development process
  - End User Experience - Follow leading use cases and examples that enhance the user's end to end experience
- Points to the need for coordinated, community experimentation efforts

INTERNET 2

GNA

GNA

- Currently in the process of developing GNA 2.0 standards.
- GNA tech is co-chaired by Dale Finkelson and Erik-Jan Bos
- Many people from the community are engaged in the current activities, these include:
  - Enhanced measurement/monitoring
  - Work on End-to-End capabilities
  - Agreements on baseline services and functionalities
  - Potential use of NFV tools
  - Non-networking capabilities
  - Security and Authentication
- More information on the GNA activities will be forthcoming from Erik-Jan and Dale Finkelson.

INTERNET 2